مجلة

كلية المصطفى الجامعة

مجلة علمية محكمة نصف سنوية

تعنى بالدراسات والبحوث العلمية والإنسانية

العدد الخاص بالمؤتمر العلمي الدولي الخامس المدمج

(دور المؤسسات الحكومية وغير الحكومية في صناعة المستقبل

- رؤية واقعية في التغيير والإصلاح)

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Website: almustafauniversity.edu.iq

E-mail: info@almustafauniversity.edu.iq

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وزارة التعليم العالي والبحث العلمي

كلية المصطفى الجامعة

وقائع المؤتمر العلمي الدولي الخامس المدمج

قال تعالى :

وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ)

برعاية معالي وزير التعليم العالي والبحث العلمي

(أ.د. نبيل كاظم عبد الصاحب) المحترم

وتحت شعار (دور المؤسسات الحكومية وغير الحكومية في صناعة المستقبل- رؤية واقعية في التغيير والإصلاح)

تقيم كلية المصطفى الجامعة مؤتمرها العلمي الدولي الخامس المدمج

وذلك على قاعة فندق المنصور ميليا في تمام الساعة التاسعة من صباح يومي السبت والاحد الموافقين ٢١-٢٢/آيار/٢٠٢٢

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قواعد النشر في المجلة

١- تتخصص المجلة بنشر البحوث ذات التخصصات العلمية والإنسانية .

٢- تعرض البحوث المقدمة للمجلة على هيئة التحرير؛ لبيان ملاءمتها ويحق لهيئة التحرير أن تعتذر عن قبول البحث .

٣- يتم عرض البحث مسبقاً على لجنة السلامة اللغوية ولجنة السلامة الفكرية بالنسبة للتخصصات الإنسانية قبل إرسال البحث إلى التحكيم العلمي .

٤- تلتزم هيئة التحرير بإرسال البحوث إلى خبراء علميين من الاختصاص نفسه عدد (٢) وفي حالة الرفض من أحدهم يرسل إلى خبير ثالث لغرض الترجيح .

٥- تلتزم هيئة التحرير بعدم الكشف عن أسماء المحكّمين ، لضمان سرية التحكيم ولرفع، الرصانة العلمية وكذلك تكون المعلومات الخاصة بهوية الباحث في الصفحة الأولى من البحث فقط . وأن يلتزم الباحث بعدم الإشارة إلى هويته أو مكان عمله في ثنايا البحث .

٦- تكون حقوق الطبع للبحث ملكاً للمجلة عند قبوله للنشر، ولا يحق النقل والاقتباس عنه إلا بعد الإشارة إلى المجلة .

٧- لا يجوز نشر أكثر من بحث للباحث في العدد الواحد .

٨- تحتفظ هيئة التحرير بحق أولوية النشر للبحوث مع مراعاة التنويع في النشر بحسب المحاور المعتمدة .

٩- ما ينشر في المجلة من بحوث ودراسات تعبّر عن رأي أصحابها ولا تعبر بالضرورة عن وجهة نظر هيئة تحرير المجلة أو وجهة نظر الكلية .

شروط النشر :

١- أن لا يكون البحث مشاركاً في مؤتمر أو ندوة علمية سابقاً أو مقدما للنشر في مجلة علمية أخرى .

٢- يقدّم البحث على قرص مدمج مع نسخة ورقية أو يرسل على البريد الإلكتروني: info@almustafauniversity.edu.iq

٣- أن لا يزيد عدد صفحات البحث عن٣٠ صفحة .

٤- أن لا يزيد عدد المشتركين على ثلاثة باحثين في البحث الواحد .

٥-يطبع البحث على ورق (A4) ونوع الخط (Simplified Arabic) بالنسبة للبحوث باللغة العربية و(Times New Roman) بالنسبة للبحوث باللغة الانكليزية ويكون

حجم الخط (١٤) للمتن والهامش (١٢) .

اهداف المؤتمر :

١-تفعيل دور المؤسسات الحكومية وغير الحكومية في تقويم وتصحيح الواقع العراقي المتمثل بالجوانب السياسية والقانونية والاقتصادية .

٢-ايجاد الوسائل والسبل الكفيلة بتحقيق التكامل المنشود بين المؤسسات الحكومية وبين المؤسسات غير الحكومية في المجالات كافة .

٣-تشجيع المؤسسات كافة للانخراط في خدمة المجتمع وتقديم الخدمات والمتطلبات الكفيلة بتحقيق رفاهية افضل لافراد المجتمع .

٤-تفعيل وتشجيع القطاع الخاص لاخذ دوره في عمليه الاصلاح والتغيير والدفع بعجلة التقدم الاقتصادي .

٥-بيان دور المؤسسات الحكومية في الدفع بعملية الاصلاح والتغيير في المجالات كافة .

٦-اقتراح التشريعات والقوانين اللازمة ورفعها للجهات ذات العلاقة لاعتمادها واقرارها لغرض تحقيق متطلبات التغيير والاصلاح بشكل ينسجم مع طموحات افراد المجتمع العراقي .

محاور المؤتمر:

- **محور الدراسات الطبية**
- **محور الدراسات الهندسية**
- **محور الدراسات الاقتصادية والإدارية**
- **محور الدراسات الإنسانية والتربوية**
- **محور دراسات العلوم الصرفة**
- **محور الدراسات الزراعية**

كلمة المؤتمر:

بسم الله الرحمن الرحيم

والصلاة والسلام على اشرف خلق الله نبينا محمد وعلى آلة المنتجبين واصحابه الغر الميامين

السيد ممثل وزير التعليم العالي الدكتور ..... المحترم

السادة رؤساء الجامعات وعمداء الكليات المحترمون

السادة الحضور من الباحثين والضيوف الكرام المحترمون مع حفظ المقامات والالقاب

السلام عليكم ورحمه الله وبركاته

ان التجديد العلمي يشكل عنصراً اساسياً في تطوير وبناء المجتمعات وتعد العملية التعليمية ركناً اساسياً في هذا البناء ، اذا تساهم وبشكل فعال في تحقيق التنمية بكافة اشكالها ، سواء كانت اقتصادية او بشرية او اجتماعية ، وعلى هذا الاساس فان الحرص على رصانة العملية التعليمية يصب بالاساس على تطوير المجتمع وتاهيله لمواجهة متطلبات الحياة .

ومن هذا المنطق فقد سعت كلية المصطفى الجامعة وكلية النسور الجامعة ان يكون من اهم خطواتها هو تطوير الدور العلمي والمعرفي واكساب الطلبة المهارات النظرية والعملية الحديثة ، وذلك باستخدام اساليب تعليمية متقدمة وضمن منهاج علمي رصين مع المحافظة على التقاليد الجامعية والقيم التي تحفظ اصول العلم وتاريخه اذا بذلت جهوداً حثيثة من اجل الارتقاء العلمي والريادة لرفع كفائه الاساتذة والطلبة اسهاماً من الكلية في رفد سوق العمل باحتياجاته من الاختصاصات كافة . وقد تم استحداث عدد من الاقسام العلمية ضمن المعايير المحلية والدولية التي يتطلبها سوق العمل كما سعت الكليتين المصطفى الجامعة و النسور الجامعة للحصول على مراتب علمية عالية وفق تصانيف الجودة المحلية والعالمية.

ولأجل المساهمة في معالجة المشكلات التي تواجه بلدنا العزيز عقد في الكليتين مؤتمرات علمية عديدة محلية ودولية سلطت فيها الضوء على تحديد اهم المعوقات وتحديد طرق واساليب معالجتها باسلوب علمي اعتمدت فيها البحوث العلمية التي قدمت في هذه المؤتمرات واستكمالاً لهذه المسيرة العلمية جاء مؤتمرنا العلمي الدولي الخامس الموسوم (دور المؤسسات الحكومية وغير الحكومية في صناعة المستقبل ، رؤية واقعية في التغيير

والاصلاح) وقد عقدنا مؤتمرنا هذا ليكون مناراً في التاكيد على اهمية المسؤولية المشتركة التي تقع على عاتق القطاع العام والقطاع الخاص في صناعة مستقبل مشرق للاجيال القادمة في بناء عراقنا العزيز.

وقد كان عدد البحوث المقبولة في المؤتمر اكثر من تسعون بحثاً علمياً في مختلف الاختصاصات والتي نأمل ان تسهم في بناء عراق الرفاهية والتقدم .

وفي الختام نتقدم بالشكر والعرفان لجميع الحضور الكريم والباحثين والعاملين الذين اسهموا في انجاح هذا المؤتمر والسلام عليكم ورحمة الله وبركاته .

أ.د. هادي حسن جاسم

عميد كلية المصطفى الجامعة

ورئيس المؤتمر

منهاج المؤتمر العلمي الدولي الخامس

(دور المؤسسات الحكومية وغير الحكومية في صناعة المستقبل - رؤية واقعية في التغيير والإصلاح)

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Design of an unusual matching unit for a specific frequency band application	Al-Nisour University College, Baghdad, Iraq Computer Engineering techniques Department	Taha Raad Al-Shaikhli Jamal kamil Alrudaini, Ahmed Raed Al-Tameemi
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Transmission Efficacy of Offset Pulse Position Modulation by Using Reed Solomon and LDPC	Middle Technical University, Electrical Engineering Technical College, Baghdad, Iraq	Ahmed Hasan Salman Mohamed Ibrahim Shuja'a Basman M. Al-Nedawe
Semigroup Based Ordinary Differential Equation Solution	Computer Engineering Techniques Al-Nisour University College	Ali Abdul Kadhum Ruhaima Dunya Mohee Hayder Jamal Kamil Kh. Abbas

Essentially Semismall Quasi-Dedekind modules and nonsingular modules	Computer Engineering, Al-mansur University College College of Education for pure science, Diyala University College of Computer science and Mathematics, Kufa University	Zahraa jawad kadhim Mukdad Qaess Hussain Heyam Khazaal Alkhayyat
New approach for image steganography	University of Al-Mustansiriyah, Iraq-Baghdad-Palestine Street	**Ahmed A. Mohammed**[1] **Iman A. Saad**[2] **Hussein A. HIlal**[3]
تفضيل الاختبار الالكتروني على التقليدي في مادة الحاسوب متوسطة دجلة للبنين انموذجاً	وزارة التربية، مديرية تربية بغداد الكرخ الثالثة/ ثانوية الشهيد أبو مهدي المهندس	**م. م. اسراء حسين عبد الله**

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Effectiveness improvement of offset pulse position modulation system using reed–Solomon codes	Middle Technical University, Electrical Engineering Technical College, Baghdad, Iraq Middle Technical University, Technical Institute of Baquba, Diyala, Iraq	Ahmed H. Albatoosh Mohamed Ibrahim Shuja'a Basman M. Al-Nedawe
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Different Parameters Influence on Electrocoagulation Process	*Chemical Engineering Department ,College of Engineering, University of Babylon*	Abbas Salim[a] , Tahseen Ali Al-Hattab[b] , Huda Saeed Al-Barakat[c]

ديكور التصميم الداخلي و تحقيق المتعة الحسية للمتلقي	قسم التصميم الداخلي / العمارة و التصميم/ جامعة الشرق الاوسط عمان- الاردن	د. زينب عبد الباقي عبد العلي
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Enhancing the electrical conductivity and mechanical properties of the PVA electrospun polymeric film by adding a Silver nanoparticles	Al-mustafa University collage_ Dept. of Building and Cons. Engineering Technique	Shafaq Y. Abd [1.a]
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PREDICTION ON THE CONDUCTION TO HEAT TRANSFER FOR PLANE-CHANNEL OF COMPLEX GEOMETRY	University of Thi-qar- College of engineering- Department of Petroleum and Gas engineering;	***R.SHAKIER***

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اليوم الثاني ٢٠٢٢/٥/٢٢

الجلسة الاولى محور العلوم الانسانية		
رئيس الجلسة		مقرر الجلسة
اسم الباحث	مكان الانتساب	عنوان البحث
م.م. رسل ربيع زرع الله ا.م.د. أسماء عبدالحسين محمد	كلية المصطفى الجامعه كلية التربية للبنات\جامعه بغداد	التفاؤل غير الواقعي لدى الطلبة
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فاطمة محمد محمد طاهر شبيري		دور الاعلام التربوي في تحقيق الأمن النفسي الأسري
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أ.م.د. اياد عبد علي سلمان الشمري م.م.ناطق هاشم طوفان الشمري د. حسين كاظم عبد الحسين	قسم الجغرافية/كلية التربية الأساسية/جامعةواسط مديرية تربية واسط/وزارة التربية الشركة العامة لموانئ العراق/وزارة النقل	رؤية جغرافية في التخطيط التنموي المستدام للأحواض المائية الموسمية -أحواض شرق محافظتي واسط وميسان (انموذجاً
م. م. فاطمة حسين كاظ		التربية والتعليم في الإسلام
الاستاذ الدكتور منال جبار سرور	جامعة بغداد /كلية الادارة والاقتصاد الجمهورية العراقية	الابعاد النظرية للمحاسبة الادارية البيئية ودورها في تخفيض التكاليف وتحقيق استدامة المنتج
زهير محمد عبدالعاطي مسعود	جامعة درنة / فرع القبة قسم الجغرافيا – كلية الآداب	حرفة الرعي في بلدية القبة- ليبيا خلال الفترة 25/12/2019)الي ٢٠٢٠/١٢/٣١(
م. د. جنان حسين علي **م.د. مريم مجيد عبد الله**	وزارة التربية، مديرية تربية بغداد الكرخ	دور المعلم في تعزيز الأمن الفكري

م. محمد ثائر علي البياتي **م. حيدر جابر جاسم الغيلاني** **م.م. مصطفى خضير حسين**	الجامعة المستنصرية / كلية العلوم جامعة كربلاء – كلية العلوم السياحية كلية الامام الاعظم الجامعة	تأثير جودة الخدمة في تحسين عناصر التنمية السياحية دراسة تحليلية من وجهة نظر مديري الفنادق والاماكن السياحية في كربلاء

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رئيس الجلسة		**مقرر الجلسة**
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دكتورة فاطمة محمد محمد طاهرشبيري		دور المشاركة المجتمعية في صناعة المستقبل الجمعيات الأهلية النسائية العراقية انموذجًا
الأستاذ الدكتور ماهر محمد عواد العامري	كلية التربية البدنية وعلوم الرياضة / الجامعة المستنصرية	تأثير الامتحان و التصحيح الالكتروني على التفكيرما وراء المعرفي لطلبة الدراسات العليا
خالد زيدان عبدالهادي	**معاون مدير** **البنك المركزي العراقي / بغداد**	**واقع تطبيق مبادئ الحوكمة المصرفية في مصرف التنمية الدولي**
نور چتين شوكت	كليه القانون والعلوم السياسية / قسم العلوم السياسية	دور المرأة في السلطة التشريعية في العراق
م.م علي داود علي	قسم القانون / كلية النسور الجامعة	**الضرر المباشر والعوامل المؤثرة في التعويض**
ا.م.د. بشار عبد اللطيف العبودي	**جامعة القاسم الخضراء/كلية التربية البدنية وعلوم الرياضة**	**نمط التعلم المفضل لدى طلاب كلية التربية البدنية وعلوم الرياضة في جامعة القاسم الخضراء وعلاقته بمتغيري الجنس واليد المستخدمة**
د. مصطفى محمد إبراهيم		أثر مبادرات النشاطات المجتمعية والإنسانية في دعم النشاطات الاقتصادية-

د.حسين حسين زيدان د. هديل علي قاسم	وزارة التربية -- المديرية العامة لتربية ديالى – قسم التعليم العام	اثر مواقع التواصل الاجتماعية بالمنظومة الثقافية والقيمية للشباب لتعزيز مفهوم الهوية الثقافية دراسة ميدانية
أ.د. بشير هادي عودة الطائي	جامعة البصرة – مركز دراسات البصرة والخليج العربي قسم الدراسات الاقتصادية	**دليل التنمية البشرية : الواقع ومؤشرات القياس "مع أشارة خاصة للعراق"**
أ.د. حسين علي عبدالرسول م. احمد منخي كشيش مرتضى طعمة سلطان	جامعة القادسية	دور اصلاح الخدمة في معالجة سلوك شكوى الزبون (دراسة عملية في مصرف الرافدين في محافظة المثنى

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Assessment the influence of thyroid dysfunction on diagnostic type2 diabetes patients: Across sectional study	Osouledeen University college Baghdad	Mohammad Hasan Ali
Qualitative Detection of Staphylococcus aureus Enterotoxin in raw Iraqi milk	Department of Biology, College of Science, University of Babylon	Sura I. A. Jabuk
Allergens sensitization and Allergy modes among atopic diseases (Allergic rhinitis, Bronchial asthma and Atopic dermatitis) in Basrah province Through 2021-2022	Department of microbiology, College of medicine , University of Basrah Center of allergy and asthma diseases , basrah	Ihsan Edan Alsaimay Falih Hmood Mezban Hasan lateef jasim Abbas abduljabbar jerri Israa riyadh amer

	College of medicine , University of Basrah	
Detection and identification of bacterial species isolated from mobile phone among Al-Mustaqbal University College Community /Babil/Iraq	Dep. of Medical Physics , Al-Mustaqbal .University College, /Iraq Dep.of Dentistry\Iraq, Al-Mustaqbal University .College/Iraq Dep. of Medical physics /Iraq. Al-Mustaqbal .University college. /Iraq	**Rawaa M. Mohammed[1], Mohammed F. Jubaz[2], Sara J.Ahmed[3]**
دراسة التركيب الكيميائي لبذور الرمان وادخالها في اطالة العمر الخزني لاقراص البيرغر	**قسم علوم الاغذية / كلية علوم الهندسة الزراعية / جامعة بغداد**	**ا.م .د.بيداء حافظ محمد ا.م. د. اشراق منير محمد علياء محسن غضبان**
Practical Study of Some Antibiotics and Their Effect on Some Pathogenic Bacteria	Department of Biology; College of Science; Mustansiriyah University; Baghdad – Iraq, Department of Biology, Faculty of science and health, Koya University.	*Fatima Rammadan Abdul1, Maysoon K. Abbas2, Ihsan A. Raheem3 and Hanan T.subhi4
تحضير مصفوفات تراكيب أوكسيد الزنك النانوي على قواعد السيليكون بطريقة التحلل المائي الحراري	دائرة بحوث المواد- وزارة العلوم والتكنولوجيا [1,2] [٣]جامعة الكرخ للعلوم / كلية علوم الطاقة والبيئة / قسم الطاقات المتجددة	محمد عبيد كاظم[٣] محمد حسين علي[١] علي جبر عداي[٢]
Spectrophotometric Determination of Lisinopril dihydrate using dye bleaching method in pure and pharmaceutical drugs	*[1]Department of Chemistry, College of science , University of Mosul, Mosul, Iraq* *[2]College of Agriculture and Forestry, university of Mosul, Iraq*	Aws Maseer Nejres[1, a)] and Moath A. Najem[2, b)]
spectrophotometric of phenylpherine Hcl by oxidation and bleaching Alkali blue 6B	*Department of Chemistry / College of Science University of Mosul, Mosul, Iraq*	Ali M.Hussein[1a] and Nebbel S.Othman

Are COVID-19 infection and vaccination booster affecting ophthalmological infections	College of Medicine - of Basrah University Alshefaa general hospital – basrah Al-Mawani teaching hospital - Basrah	Ihasn E. AlSaimary Alzahraa Imad Hmood Imad H. AlMayah Alaa H. AlAsady

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عنوان البحث	مكان الانتساب	اسم الباحث
The side effects of shisha smoke on pregnant mice and their fetuses	Biology Department / College of Education for Pure Sciences / University of Mosul / Mosul / Iraq	Arwa Adress Alnuimy [1], Hani MallAlla Hamodi [2]
دراسة تحليلية لتداعيات جائحة كوفيد-١٩ على بعض المؤشرات الاقتصادية في العراق	كلية جنات العراق للعلوم الإنسانية الاهلية	م. د. فيصل غازي فيصل
إصابة الرباط الصليبي الأمامي: والعودة إلى اللعب والاعتبارات الطويله المدى	Al-Mustafa university collage	مرتضى هادي عبد
Assessment of the removal rate of bacterial biofilm or organic film simulating biofilm by a sodium hypochlorite irrigant delivered into flow cells	[1]Unit of Dentistry, Almustafa University College, Baghdad, Iraq.	Saifalarab Mohmmed[1]
Effect of the Biological Drug Etanercept on levels of Interluekin 2, 17 in Psoriatic Patients	[1, 2]Department of Biology, College of Science, University of Baghdad, Baghdad,	Rasha Hussain Kuba[*1], Ban Noori Al-Qadhi[2], and Ass. Prof. Dr. BasmanMedhat Fadheel[3]

	Iraq [3]Department of Dermatology, College of Medicine, University of Baghdad, Baghdad, Iraq	
Evaluation of Salivary Profile among Adult Type 2 Diabetes Mellitus Patients	Mc.s in Oral Physiology, Dep. of Dentistry, Al-Mustaqbal University College/Iraq. Ph.D in Clinical Immunity and Microbiology , Dep. of Medical Physics , Al-Mustaqbal University college, /Iraq.	Mohammed F.Jubaz [1]& Rawaa M. Mohammed[2]
تحضير وتقييم فعالية المستخلص الكحولي من نبات الكرنب الهندي (اكليل الملك) كمبيد حشري فعال لحشرة الذباب الابيض	وزارة الصناعة والمعادن -هيأة البحث والتطوير الصناعي - مركز بحوث ابن البيطار كلية النسور الجامعة -قسم الصيدلة	فلاح حسن أحميدي[١] -فراس عزيز راهي[٢] - فارس عبد الكاظم دخنه[١] - عبد المجيد حطاب[١] - وليد عبد الواحد حلو[١] -سرى عدنان جابر
Knowledge regarding children's immunization among sample of Iraqi Mothers	*Middle Technical Univ., College of Health & Medical Technology; email: tabarknoori94@gmail.com ** Middle Technical Univ., College of Health & Medical Technology; email: prof.almzory@gmail.com ** Middle Technical Univ., College of Health & Medical Technology	Assistant Lecturer Tabarek A. Noori (MSc)* & Assistant Professor Khadija Shaban Hassan (MSc)** Zaman Jabbar Abd Al-Saied ***
Isolation of *Staphylococcus aureus* from gingivitis patients	Assistant lecturer of Department of medical laboratory tech, Al-Mustafa University College.	*Tuqa.A.KareemHameed **Wasan Q.Turki *** Noor A.Hanon

الفهرست

وزارة التعليم العالي والبحث العلمي

كلية المصطفى الجامعة

البحوث المشاركة في المؤتمر

(المحور العلمي)

ملاحظة : جميع البحوث خاضعة للاستلال الالكتروني

Solving Ordinary Differential Equations Using a New General Complex Integral Transform

Sadiq A. Mehdi
Department of Mathematics
College of Education
Mustansiriyah University
Baghdad, Iraq

Emad A. Kuffi
Department of Materials
College of Engineering
Al-Qadisiyah University
Al-Qadisiyah, Iraq

Jinan A. Jasim
Department of Mathematics
College of Education
Mustansiriyah University
Baghdad, Iraq

Sadiqmehdi71@uomus tansiriyah.edu.iq emad.abbas@qu.edu.iq

jinanadel78@uomus tansiriyah.edu.iq

Abstract: We present a new general complex integral transform in this study. This complex transform properties are studied. The main problem is reduced to a simple algebraic equation using this complex integral transformation. By solving this algebraic equation and using the inverse of the generial complex integral transform, the answer to this main problem can be found. Finally, the solution to linear higher order ordinary differential equations is found using the new general complex integral transform. We also present and discuss a number of key real-life problems, such as pharmacokinetics and nuclear physics.

Keywords: Complex Integral Transform, Jaffari Transform, Ordinary Differential Equations, Nuclear Physics Problem, Pharmacokinetics Problem.

1. ***Introduction:***

In (2020) a research of Hussein Jaffari presented a new general integral transform defined as follows, [8]:

Let $f(t)$ be an integrable function defined for t which is greater than zero $(t \geq 0)$, $p(s) \neq 0$ and $q(s)$ are positive real functions, we define the general integral transform $T(s)$ of $f(t)$ is defined by the formula:

$$T\{f(t);s\} = T(s) = p(s)\int_{t=0}^{\infty} e^{-q(s)t} f(t)dt$$

If the integral exists for some $q(s)$.

The following properties of a new general integral transform " Jaffari transform", [8]:

1. $T\{1\} = \frac{p(s)}{q(s)}$.
2. $T\{t^n\} = \frac{\Gamma(n+1)\,p(s)}{(q(s))^{n+1}}, \quad n > 0.$
3. $T\{\sin(at)\} = \frac{ap(s)}{a^2+(q(s))^2}$, where a is a constant number.
4. $T\{\cos t\} = \frac{q(s)p(s)}{1+(q(s))^2}$.
5. $T\{e^t\} = \frac{p(s)}{q(s)-1}, \quad q(s) > 1.$

Now, the new general complex integral transform, namely (Sadiq- Emad- Jinan) complex transform and denoted by SEJI transform is applied and used to find the solution of ordinary differential equations and it's used in fields like engineering, physics, and single-processing. [5,6,7].

We look at functions in the set C that is defined by a new general complex integral transform defined for functions of exponential order:

$C = \{f(t): \exists M, L_1, and\ L_2$ are greater than zero such that $|f(t)| < Me^{-iL_j|t|}$, if $t \in (-1)^j \times [0,\infty), j = 1,2\}$, where i is a complex number.

The constant M must be a finite value for a specific function $f(t)$ in the set C, but L_1 and L_2 can be finite or infinite.

Definition (1.1): Let $f(t)$ be a function that can be integrated defined for $t \geq 0, p(s) \neq 0$ and $q(s)$ are real functions that are positive, i complex number, the general complex integral transform is defined $T_g^c(s)$ of $f(t)$ according to the formula:

$$T_g^c\{f(t);s\} = F_g^c(s) = p(s)\int_{t=0}^{\infty} e^{-iq(s)t} f(t)dt.$$

If the integral exists for some $q(s)$.

Note:

If $\left.\begin{matrix} p(s) = \frac{1}{s^n} \\ and\ q(s) = s \end{matrix}\right\}$ then $T_g^c\{f(t);s\} = F_g^c(s) = \frac{1}{s^n}\int_{t=0}^{\infty} e^{-ist} f(t)dt$

is complex SEE integral transform, [3].

2. *A New General Complex Integral Transform of Some Important Functions:*

In this section, we introduce the general complex integral transform of some famous functions:

1. If $f(t) = t^n, n \in N$, then $T_g^c\{t^n\} = \frac{(-i)^{n+1} n!\ p(s)}{[q(s)]^{n+1}}$, $q(s) > 0$

Proof: since $T_g^c\{t^n\} = p(s)\int_{t=0}^{\infty} t^n e^{-iq(s)t} dt$

$u = it \Rightarrow du = idt$ or $-idu = dt$ and we know

$-iu = t$, when $t \to 0$ then $u \to 0$ and when $t \to \infty$ then $u \to \infty$, that is:

$$T_g^c\{t^n\} = p(s)\int_{u=0}^{\infty}(-iu)^n e^{-q(s)u}(-i)du,$$

$$= p(s)\int_{u=0}^{\infty}(-i)^{n+1}(u)^n e^{-q(s)u}du,$$

$$= (-i)^{n+1}p(s)\int_{u=0}^{\infty}(u)^n e^{-q(s)u}du.$$

$$= \frac{(-i)^{n+1}p(s)\Gamma(n+1)}{[q(s)]^{n+1}},$$

$$= (-i)^{n+1}\frac{n!\ \ p(s)}{[q(s)]^{n+1}}, \quad n \in N \quad \blacksquare$$

2. If $f(t) = e^{at}$, a is a constant number, then

$$T_g^c\{e^{at}\} = -p(s)\left[\frac{a}{a^2+(q(s))^2} + i\frac{q(s)}{a^2+(q(s))^2}\right], \quad q(s) > a.$$

Proof: Since $T_g^c\{e^{at}\} = p(s)\int_{t=0}^{\infty} e^{at}e^{-iq(s)t}dt$

$$= p(s)\int_{t=0}^{\infty} e^{-(iq(s)-a)t}dt,$$

$$= p(s)\frac{-1}{(iq(s)-a)}\left[e^{-(iq(s)-a)t}\right]\Big|_0^{\infty},$$

$$= p(s)\frac{-1}{(iq(s)-a)}[0-1] = \frac{p(s)}{iq(s)-a}\cdot\frac{-a-iq(s)}{-a-iq(s)},$$

$$= p(s)\left[\frac{-a}{a^2+(q(s))^2} + \frac{(-i)q(s)}{a^2+(q(s))^2}\right],$$

$$= -p(s)\left[\frac{a}{a^2+(q(s))^2} + i\frac{q(s)}{a^2+(q(s))^2}\right]. \quad \blacksquare$$

3. If $f(t) = \sin(at)$, where a is a constant number, then

$$T_g^c\{\sin(at)\} = \frac{-a\,p(s)}{(q(s))^2 - a^2}, \quad q(s) > |a|$$

Proof:

Since $T_g^c\{\sin(at)\} = p(s)\int_{t=0}^{\infty} e^{-iq(s)t}\sin(at)\,dt,$

$$T_g^c\{\sin(at)\} = \frac{p(s)}{2i}\int_{t=0}^{\infty}\left[e^{iat} - e^{-iat}\right]e^{-iq(s)t}dt,$$

$$= \frac{p(s)}{2i}\left[\int_{t=0}^{\infty} e^{-i[q(s)-a]t}dt - \int_{t=0}^{\infty} e^{-i[q(s)+a]t}dt\right],$$

$$= \frac{p(s)}{2i}\cdot\frac{-1}{i(q(s)-a)}\left[e^{-(iq(s)-a)t}\right]\Big|_0^{\infty} + \frac{p(s)}{2i}$$
$$\cdot\frac{1}{i(q(s)+a)}\left[e^{-(iq(s)+a)t}\right]\Big|_0^{\infty},$$

$$= \frac{p(s)}{2(q(s)-a)}[0-1] + \frac{-p(s)}{2(q(s)+a)}[0-1],$$

$$= \frac{-p(s)}{2(q(s)-a)} + \frac{p(s)}{2(q(s)+a)},$$

$$= \frac{-p(s)(q(s)+a)+p(s)(q(s)-a)}{2\left[\left(q(s)\right)^2-a^2\right]} = \frac{-2ap(s)}{2\left[\left(q(s)\right)^2-a^2\right]},$$

$$T_g^c\{\sin(at)\} = \frac{-a\,p(s)}{\left(q(s)\right)^2-a^2} \quad . \quad \blacksquare$$

This result will be essential in figuring out how to calculate the difficult transform of:

4. $T_g^c\{\cos(at)\} = \frac{-i\,p(s)\,q(s)}{\left(q(s)\right)^2-a^2}, \qquad q(s) > |a|.$
5. $T_g^c\{\sinh(at)\} = \frac{-a\,p(s)}{\left(q(s)\right)^2+a^2}, \quad q(s) > 0.$
6. $T_g^c\{\cosh(at)\} = \frac{-i\,p(s)\,q(s)}{\left(q(s)\right)^2+a^2}, \qquad q(s) > 0.$

2.1 The Jafari and A New General complex Integral Transform:

this section, we introduce the Jafari integral transform and the new complex integral transform for some basic functions, see the table below:

Functions $g(t)$	**$T\{g(t)\} = F(s)$ "Jafari Transform"**	**$T_g^c\{g(t)\} = F_g^c(s)$**

$t^n, \quad n \in N$	$\frac{\mathrm{n!}\ p(s)}{[q(s)]^{n+1}}$	$(-i)^{n+1}\frac{n!\ p(s)}{[q(s)]^{n+1}}$
e^{at}, a is constant	$\frac{p(s)}{q(s)-a}, \quad q(s) > a$	$-p(s)\left[\frac{a}{a^2+\left(q(s)\right)^2} + i\frac{q(s)}{a^2+\left(q(s)\right)^2}\right], \quad q(s) > \lvert a\rvert.$
$\sin(at)$	$\frac{ap(s)}{(q(s))^2+a^2}$	$\frac{-a\,p(s)}{\left(q(s)\right)^2-a^2}, \quad q(s) > \lvert a\rvert$
$\cos(at)$	$\frac{q(s)p(s)}{(q(s))^2+a^2}$	$\frac{-i\,p(s)\,q(s)}{\left(q(s)\right)^2-a^2}, \quad q(s) > \lvert a\rvert.$
$\sinh(at)$	$\frac{ap(s)}{(q(s))^2-a^2}$	$\frac{-a\,p(s)}{\left(q(s)\right)^2+a^2}, \quad q(s) > 0.$
$\cosh(at)$	$\frac{q(s)p(s)}{(q(s))^2-a^2}$	$\frac{-i\,p(s)\,q(s)}{\left(q(s)\right)^2+a^2}, \quad q(s) > 0.$

2.2 ***The Inverse of A New General complex Integral Transform:***

If $T_g^c\{\mathrm{g(t)}\} = F_g^c(s)$ is the new general complex integral transform, then

$$g(t) = T_g^{c\,-1}\left[F_g^c(s)\right] = \frac{1}{2\pi i}\int_{\delta-i\infty}^{\delta+i\infty}\frac{i}{p(s)}e^{iq(s)t}F_g^c(s)ds, \ldots (2.1)$$

where δ is positive fixed number, $t \geq 0$. i is complex number ($i^2 = -1$).

is called an inverse of the new complex integral transform.

$F_g^c(s)$ in the right half-plane, is an analytic function of the complex variable $\Re e\ (s) > a$.

The specifics of the estimation in (2.1) are dependent on the nature of the singularities of $F_g^c(s)$ which is often a single valued function with a finite or countable infinite number of polar singularities, depending on the case. It's possible that it has branch points.

$$\int_{L} \frac{i}{p(s)} e^{iq(s)t} F_g^c(s)ds + \int_{\Gamma} \frac{i}{p(s)} e^{iq(s)t} F_g^c(s)ds = \int_{C} \frac{i}{p(s)} e^{iq(s)t} F_g^c(s)ds,$$

$= 2\pi i \times$[sum of residues of $\left(\frac{i}{p(s)} e^{iq(s)t} F_g^c(s)ds\right)$ at the poles in c],

Setting $R \to \infty$, in most situations of interest, the integral over Γ tends to zero, Thus, (2.1) can be reduced to the following formula:

$$\lim_{R\to\infty} \frac{1}{2\pi i} \int_{\delta-i\infty}^{\delta+i\infty} \frac{i}{p(s)} e^{iq(s)t} F_g^c(s)ds$$

$$= \text{sum of residues of } \left(\frac{i}{p(s)} e^{iq(s)t} F_g^c(s)\right) \text{ at the poles in } F_g^c(s).$$

The residue of $\left(\frac{i}{p(s)} e^{iq(s)t} F_g^c(s)\right)$ at a pole z equal to:

$$Res.\left(\left(\frac{i}{p(s)} e^{iq(s)t} F_g^c(s)\right), z\right) = \lim_{q(s)\to z} \frac{1}{(n-1)!} \frac{d^{n-1}}{ds^{n-1}} \left[(q(s)-z)^n F_g^c(s)\right],$$

Where z is a pole of $F_g^c(s)$ and $n \in N$.

We explain the previous method by some propositions.

Propositions (2.2.1):

If $F_g^c(s) = (-i)^{n+1} \frac{n!\ p(s)}{[q(s)]^{n+1}}$, then

$$g(t) = \frac{1}{2\pi i} \int_{\delta-i\infty}^{\delta+i\infty} \frac{i}{p(s)} e^{iq(s)t} F_g^c(s)ds = t^n, \quad n \in N$$

Proof:

The integrand has a single simple pole at $q(s) = 0$, then the residue at this pole will be

$$R_1 = Res\left(\left(\frac{i}{p(s)}e^{iq(s)t}F_g^c(s)\right),0\right),$$

$$= \lim_{q(s)\to 0}\frac{1}{n!}\frac{d^n}{ds^n}\left[[q(s)]^{n+1}\left[\frac{i}{p(s)}e^{iq(s)t}(-i)^{n+1}\frac{n!\ p(s)}{[q(s)]^{n+1}}\right]\right],$$

$$= \lim_{q(s)\to 0}\frac{1}{n!}\left[[q(s)]^{n+1}\left[\left((i)^{n+1}t^n e^{iq(s)t}\right)\frac{(-i)^{n+1}}{[q(s)]^{n+1}}\right]\right],$$

Hence,

$$g(t) = \frac{1}{2\pi i}\int_{\delta-i\infty}^{\delta+i\infty}\frac{i}{p(s)}e^{iq(s)t}F_g^c(s)ds = R_1 = \quad t^n, \quad n \in N$$

Propositions (2.2.2):

$$F_g^{c\,-1}\left\{\frac{-\,p(s)}{\left(q(s)\right)^2-1}\right\} = \sin(t)$$

Proof:

We have:

$$\frac{i}{p(s)}e^{iq(s)t}F_g^c(s) = \frac{-\,ie^{iq(s)t}}{\left(q(s)\right)^2-1},$$

Which has two simple poles at $q(s) = \pm 1$ then the residues at these points are

$$R_1 = Res.\left(\left(\frac{i}{p(s)}e^{iq(s)t}F_g^c(s)\right),1\right),$$

$$R_1 = \lim_{q(s)\to 1}(q(s)-1)\frac{-\,ie^{iq(s)t}}{(q(s)-1)(q(s)+1)} = \frac{-i}{2}e^{it}.$$

$$R_2 = Res.\left(\left(\frac{i}{p(s)}e^{iq(s)t}F_g^c(s)\right),-1\right),$$

$$R_2 = \lim_{q(s)\to -1}(q(s)+1)\frac{-ie^{iq(s)t}}{(q(s)-1)(q(s)+1)} = \frac{i}{2}e^{-it},$$

Then,

$$g(t) = \frac{1}{2\pi i}\int_{\delta-i\infty}^{\delta+i\infty}\frac{i}{p(s)}e^{iq(s)t}F_g^c(s)ds = R_1 + R_2,$$
$$= \frac{-i}{2}\left(e^{it} - e^{-it}\right) = \frac{1}{2i}\left(e^{it} - e^{-it}\right),$$
$$= \sin(t)$$

Propositions (2.2.3):

If $F_g^{c\,-1}\left\{\frac{-i\,p(s)\,q(s)}{(q(s))^2+1}\right\} = \cosh(t).$

Proof:

We have

$$\frac{i}{p(s)}e^{iq(s)t}F_g^c(s) = \frac{q(s)e^{iq(s)t}}{(q(s))^2+1},$$

has two simple poles at $q(s) = \pm i$ then residues at these points will be found

$$R_1 = Res.\left(\left(\frac{i}{p(s)}e^{iq(s)t}F_g^c(s)\right), i\right),$$

$$R_1 = \lim_{q(s)\to i}(q(s)-i)\frac{q(s)e^{iq(s)t}}{(q(s)-i)(q(s)+i)} = \frac{1}{2}e^{-it}.$$

$$R_2 = Res.\left(\left(\frac{i}{p(s)}e^{iq(s)t}F_g^c(s)\right), -i\right),$$

$$R_2 = \lim_{q(s)\to -i}(q(s)+i)\frac{q(s)e^{iq(s)t}}{(q(s)-i)(q(s)+i)} = \frac{1}{2}e^{it},$$

Finally,

$$g(t) = \frac{1}{2\pi i}\int_{\delta-i\infty}^{\delta+i\infty}\frac{i}{p(s)}e^{iq(s)t}F_g^c(s)ds = R_1 + R_2,$$

$$= \frac{1}{2}\left(e^{it} + e^{-it}\right),$$
$$= \cosh(t).$$

By using the same approaches we can prove the following:

1. $T_g^{c-1}\left\{-p(s)\left[\frac{1}{1+(q(s))^2} + i\frac{q(s)}{1+(q(s))^2}\right]\right\} = e^t.$
2. $T_g^{c-1}\left\{\frac{-iq(s)\,p(s)}{(q(s))^2-1}\right\} = \cos(t).$
3. $T_g^{c-1}\left\{\frac{-p(s)}{(q(s))^2+1}\right\} = \sinh(t).$

3. ***The General complex Integral Transform of Derivatives:***

Let $f(t)$ is a continuous function and is piecewise continuous on any interval, then the general complex transform of first derivative of $f(t)$ is given by:

$$T_g^c\{f'(t)\} = p(s)\int_{t=0}^{\infty} e^{-iq(s)t} f'(t)dt, \text{ (integrating by parts)}$$

Let $u = e^{-iq(s)t} \Rightarrow du = -iq(s)e^{-iq(s)t}dt,$

and $dv = f'(t)dt \Rightarrow v = f(t).$

$$T_g^c\{f'(t)\} = p(s)\left[f(t)e^{-iq(s)t}\Big|_0^{\infty} + iq(s)\int_{t=0}^{\infty} e^{-iq(s)t} f(t)dt\right],$$
$$= p(s)[-f(0)] + iq(s)T_g^c\{f(t)\},$$
$$T_g^c\{f'(t)\} = iq(s)F_g^c(s) - f(0)p(s).$$

Therefore, on replacing $f(t)$ by $f'(t)$ by $f''(t)$, we have

$$T_g^c\{f''(t)\} = \left(iq(s)\right)^2 F_g^c(s) - p(s)f'(0) - iq(s)p(s)f(0).$$

Similarly,

$$T_g^c\{f'''(t)\}$$
$$= \left(iq(s)\right)^3 F_g^c(s) - p(s)\left[f''(0) + iq(s)f'(0) + \left(iq(s)\right)^2 f(0)\right].$$

In general,

$$T_g^c\{f^{(n)}(t)\} = \big(iq(s)\big)^n F_g^c(s) - p(s)\Big[f^{(n-1)}(0) + iq(s)f^{(n-2)}(0) + \big(iq(s)\big)^2 f^{(n-3)}(0) + \cdots + \big(iq(s)\big)^{n-2} f'(0) + \big(iq(s)\big)^{n-1} f(0)\Big],$$

or

$$T_g^c\{f^{(n)}(t)\} = \big(iq(s)\big)^n F_g^c(s) - p(s)\left[\sum_{k=1}^{n}\big(iq(s)\big)^{k-1} f^{(n-k)}(0)\right].$$

Theorem (3.1): let $F_g^c(s)$ be the generalization complex integral transform of $f(t)$, $\big(F_g^{c\prime}(s) = T_g^{c\prime}\{f(t)\}\big)$, then

$$T_g^c\{f^{(n)}(t)\} = \big(iq(s)\big)^n F_g^c(s) - p(s)\left[\sum_{k=1}^{n}\big(iq(s)\big)^{k-1} f^{(n-k)}(0)\right].$$

Proof: By Mathematical Induction,

for $n = 1$, $T_g^c\{f'(t)\} = iq(s)F_g^c(s) - p(s)f(0)$.

True for $n = 1$.

Assume that true for $n = m$ that means:

$$T_g^c\{f^{(m)}(t)\} = \big(iq(s)\big)^m F_g^c(s) - p(s)\left[\sum_{k=1}^{m}\big(iq(s)\big)^{k-1} f^{(m-k)}(0)\right],$$

We want to prove that $n = m + 1$

$$T_g^c\{f^{(m+1)}(t)\} = T_g^c\left\{\Big(f^{(m)}(t)\Big)'\right\} = iq(s)T_g^c\{f^{(m)}(t)\} - p(s)\big[f^{(m)}(0)\big],$$

$$= iq(s)T_g^c\{f^{(m)}(t)\} - p(s)f^{(m)}(0),$$

$$= iq(s)\left[\big(iq(s)\big)^m F_g^c(s) - p(s)\left[\textstyle\sum_{k=1}^{m}\big(iq(s)\big)^{k-1} f^{(m-k)}(0)\right]\right] - p(s)f^{(m)}(0),$$

$$= \left(iq(s)\right)^{m+1} F_g^c(s) - p(s) \sum_{k=1}^{m} \left(iq(s)\right)^k f^{(m-k)}(0) - p(s) f^{(m)}(0),$$

$$= \left(iq(s)\right)^{m+1} F_g^c(s) - p(s) \left[\sum_{k=1}^{m} \left(iq(s)\right)^k f^{(m-k)}(0) + f^{(m)}(0)\right],$$

$$= \left(iq(s)\right)^{m+1} F_g^c(s) - p(s) \left[\sum_{k=0}^{m} \left(iq(s)\right)^k f^{(m-k)}(0)\right],$$

$$= \left(iq(s)\right)^{m+1} F_g^c(s) - p(s) \left[\sum_{k=1}^{m+1} \left(iq(s)\right)^{k-1} f^{(m-(k-1))}(0)\right],$$

$$= \left(iq(s)\right)^{m+1} F_g^c(s) - p(s) \left[\sum_{k=1}^{m+1} \left(iq(s)\right)^{k-1} f^{(m+1-k)}(0)\right],$$

$$= T_g^c\left\{f^{(m+1)}(t)\right\}.$$

So the theorem is true for $n \in N$. ■

4. ***Application of A New General Complex Integral Transform:***

In this section, we introduce three real life problems: Pharmacokinetics problem, nuclear physics and Beam problem

Problem (4.1): We consider a problem from the field of pharmacokinetics to find the concentration of drug in the blood at any given time t during continuous intravenous injection of drug and find its solution in this problem for physical explanation of the present method. The following is a 1st order linear ordinary differential equation with constant coefficients that can be used to solve this problem[3,2,4]:

$$\frac{dh(t)}{dt} + \mu h(t) = \frac{\sigma}{vol.} \quad , \qquad \text{where } t > 0 \quad \cdots (4.1)$$

with $h(0) = 0$ (4.2)

Here $h(t)$ is the amount of a drug in the blood at any given time t, μ elimination at a fixed speed, σ: The rate of infusion (in mg/ min.), vol. The total amount of medication distributed.

A new general complex integral transform of eq. (4.1), gives:

$$T_g^c\left\{\frac{dh(t)}{dt}\right\} + \mu\, T_g^c\{h(t)\} = \frac{\sigma}{vol.}\, T_g^c\{1\}. \quad \dots\dots\dots\dots\dots (4.3)$$

Applying theorem (3.1), we get:

$$-h(0)p(s) + iq(s)F_g^c(s) + \mu\, F_g^c(s) = \frac{\sigma}{vol.}\left(\frac{-ip(s)}{q(s)}\right). \quad \cdots (4.4)$$

$$(iq(s) + \mu)F_g^c(s) = \frac{-\sigma ip(s)}{vol.q(s)}. \qquad (4.5)$$

Applying inverse a new general complex integral transform on eq. (4.5) we get:

$$h(t) = \frac{\sigma}{vol.} T_g^{c-1}\left\{\frac{-ip(s)}{q(s)(iq(s)+\mu)}\right\},$$

$$= \frac{\sigma}{vol.} T_g^{c-1}\left\{\frac{A}{q(s)} + \frac{B}{iq(s)+\mu}\right\},$$

$$= \frac{\sigma}{vol.} T_g^{c-1}\left\{\frac{(iA+B)q(s) + A\mu}{q(s)(iq(s)+\mu)}\right\},$$

$$A\mu = -ip(s), iA + B = 0,$$

$$\Rightarrow A = \frac{-i\,p(s)}{\mu} \Rightarrow i\left(\frac{-i\,p(s)}{\mu}\right) = -B \Rightarrow B = \frac{-p(s)}{\mu},$$

$$h(t) = \frac{\sigma}{vol.} T_g^{c-1}\left\{\frac{-i\,p(s)}{\mu\, q(s)}\right\} + \frac{\sigma}{vol.} T_g^{c-1}\left\{\frac{-p(s)}{\mu(iq(s)+\mu)}\right\},$$

$$= \frac{\sigma}{vol.}\left(\frac{1}{\mu}\right) + \frac{\sigma}{vol.}\frac{1}{\mu} T_g^{c-1}\left\{\frac{-p(s)}{(iq(s)+\mu)} \cdot \frac{-iq(s)+\mu}{-iq(s)+\mu}\right\},$$

$$= \frac{\sigma}{\mu\, vol.} + \frac{\sigma}{\mu vol.} T_g^{c-1}\left\{\left[\frac{-\mu\, p(s)}{(q(s))^2+\mu^2} + \frac{ip(s)q(s)}{(q(s))^2+\mu^2}\right]\right\},$$

$$= \frac{\sigma}{\mu\, vol.} + \frac{\sigma}{\mu vol.} T_g^{c-1}\left\{-p(s)\left[\frac{\mu}{(q(s))^2+\mu^2} - \frac{iq(s)}{(q(s))^2+\mu^2}\right]\right\},$$

$$= \frac{\sigma}{\mu\, vol.} - \frac{\sigma}{\mu vol.} T_g^{c\,-1}\left\{-p(s)\left[\frac{-\mu}{\left(q(s)\right)^2+\mu^2} + \frac{iq(s)}{\left(q(s)\right)^2+\mu^2}\right]\right\},$$

$$= \frac{\sigma}{\mu\, vol.}\left[1 - e^{-\mu t}\right].$$

Continuous intravenous drug administration requires a certain concentration of drug in the blood at all times.

5. ***Problem (4.2): The New General Complex Integral Transform in Nuclear Physics:***

Consider a linear ordinary differential equation of first order:

$$\frac{dg(t)}{dt} = -\lambda g(t).$$

In order to understand radioactive decay, this differential equation is essential, where g(t) reflects the number of undecayed atoms in a radioactive isotope sample at the time "t" and λ is a constant of decay, [1,5].

We can make use of (apply) the new general complex integral transform to find the solution of this equation.

Re arranging the above differential equation, we obtain:

$$\frac{dg(t)}{dt} + \lambda g(t) = 0.$$

On both sides of the new general complex integral transform, we obtain $T_g^c\left\{\frac{dg(t)}{dt}\right\} + \lambda T_g^c\{g(t)\} = 0,$

then

$$-g(0)p(s) + iq(s)F_g^c(s) + \lambda F_g^c(s) = 0\ ,$$

$(iq(s) + \lambda)F_g^c(s) = g(0)p(s),$ here $g(0) = g_0$.

Then

$$T_g^c\{g(t)\} = \frac{g_0 p(s)}{iq(s)+\lambda} \cdot \frac{\lambda - iq(s)}{\lambda - iq(s)},$$

$$T_g^c\{g(t)\} = \frac{g_0 p(s)\lambda - i g_0 p(s) q(s)}{(q(s))^2 + \lambda^2},$$

$$T_g^c\{g(t)\} = -p(s) g_0 \left[\frac{-\lambda}{(q(s))^2 + \lambda^2} + \frac{iq(s)}{(q(s))^2 + \lambda^2}\right].$$

On both sides, we receive the inverse of the new general complex integral transform:

$$g(t) = g_0 T_g^{c-1}\left\{-p(s)\left[\frac{-\lambda}{(q(s))^2 + \lambda^2} + \frac{iq(s)}{(q(s))^2 + \lambda^2}\right]\right\},$$

$$g(t) = g_0 e^{-\lambda t}.$$

Which of the two formulas for radioactive decay is correct?

4.3 Problem to Beams

A beam which is hinged and its ends, $x = 0$ and $x = L$ (Fig. (1)) carries a uniform loud w_0 per unit length. Find the deflection at any point p.

Solution:

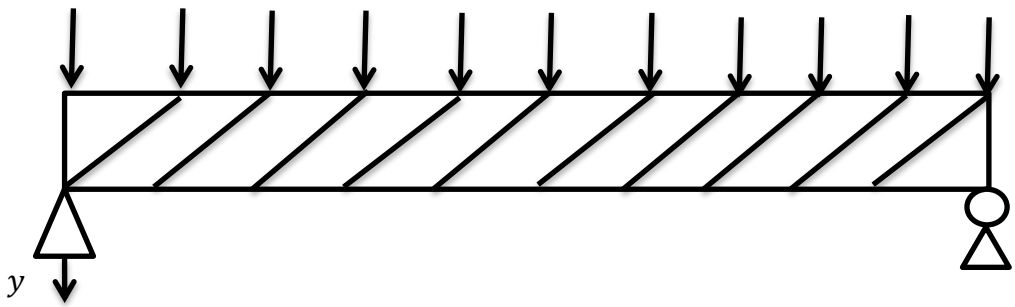

Fig.(1)

The following is the standard ordinary differential equation, together with the associated boundary and initial conditions:

$$\frac{d^4 y}{dx^4} = \frac{w_0}{EI}, \qquad 0 < x < L \qquad \cdots (4.5)$$

$$y(0) = y''(0) = 0, \qquad y(L) = y''(L) = 0 \qquad \cdots (4.6)$$

Where E is young's modulus, I is the cross section's moment of intertia about an axis normal to the plane of bending and EI is the beam's flexural rigidity. As a result, the problem's physical quantities are::

$y'(x), \quad M(x) = EIy''(x)$ and $s(x) = M'(x) = EIy'''(x),$

Which represents the slop, bending moment, and shear at a location, respectively$p$.

Taking a new general complex integral transform of both sides of eq. (4.5), we get if $F_g^c = T_g^c\{y(x)\},$

$$[iq(s)]^4 F_g^c(s) - p(s)\left[y'''(0) + iq(s)y''(0) + \left(iq(s)\right)^2 y'(0) + \left(iq(s)\right)^3 y(0)\right] = \frac{w_0}{EI}\left(\frac{-ip(s)}{q(s)}\right).$$

$$[iq(s)]^4 F_g^c(s) - p(s)\left[y'''(0) + \left(iq(s)\right)^2 y'(0)\right] = \frac{-w_0}{EI} i\frac{p(s)}{q(s)},$$

$$[iq(s)]^4 F_g^c(s) - p(s)\left[c_2 + \left(iq(s)\right)^2 c_1\right] = \frac{-iw_0}{EI}\frac{p(s)}{q(s)},$$

$$[iq(s)]^4 F_g^c(s) = \frac{-iw_0}{EI}\frac{p(s)}{q(s)} + p(s)\left[c_2 - c_1\left(q(s)\right)^2\right],$$

$$F_g^c(s) = \frac{-iw_0}{EI[q(s)]^5}p(s) + \frac{p(s)}{[q(s)]^4}\left[c_2 - c_1\left(q(s)\right)^2\right],$$

$$F_g^c(s) = \frac{-iw_0 p(s)}{EI[q(s)]^5} + \frac{p(s)c_2}{[q(s)]^4} - \frac{c_1 p(s)\left(q(s)\right)^2}{[q(s)]^4}.$$

Integrating to find the solution:

$$y(x) = c_1 x + \frac{c_2 x^3}{3!} + \frac{w_0}{EI}\frac{x^4}{4!}.$$

or

$$y(x) = c_1 x + \frac{c_2 x^3}{6} + \frac{w_0}{EI}\frac{x^4}{24}.$$

From the last two conditions in eq. (4.6), we find:

$$c_1 = \frac{w_0 L^3}{24EI}, \qquad c_2 = \frac{w_0 L}{2EI}.$$

Thus, the required deflection is:

$$y(x) = \frac{w_0}{24EI} x(L-x)(L^2 - Lx - x^2).$$

The bending moment and shear can be calculated at any point p on the beam, particularly at the ends.

Conclusion:

The novel general complex integral transform for solving ordinary differential equations has been proven in terms of definition and applications (pharmacokinetics problem, nuclear physics problem and beams problem).

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Analysis of Novel Five-Dimension Hyper Chaotic System

Sarah S. Ahmed, Sadiq A. Mehdi

Computer Science Department, College of Education, Mustansiriyah University, Iraq
Sarahshihab1989@uomustansiriyah.edu.iq,
sadiqmehdi71@uomustansiriyah.edu.iq

Abstract— A unique five-dimensional (5D) hyperchaotic system with fourteen parameters is introduced in this work. Equilibrium Point, waveform analysis, Lyapunov exponent, and Sensitivity Dependent on Initial Condition (SDIC) analysis are used to demonstrate the proposed system's chaotic behavior. One of the many confusing definitions is that the suggested system is chaotic if it has a positive value of Lyapunov exponent or fulfills Sensitivity Dependent on Initial Condition on its domain, waveform analysis is an indication of the chaotic novel 5D system. When the duration of the period becomes large, the space between beginning conditions becomes large, and a small change in the beginning values causes a significant sensibility in the chaotic behavior. The Mathematica program was used to simulate the dynamics of a novel 5D hyperchaotic. Since it has two positive Lyapunov exponents, the waveform in the time domain is non-cyclical, It also has a higher sensitivity in terms of beginning conditions, the suggested system is hyperchaotic.

Keywords—
Five-Dimension Hyperchaotic, Sensitivity Dependent on Initial Condition, Equilibrium Point, Lyapunov Exponents and Lyapunov Dimensions**,** Waveform Analysis.

I. INTRODUCTION

In 1979, when O. E. Rossler discovered the first hyper-chaotic system[1], there have been numerous examples of hyper-chaotic systems constructed and intensively studied[2]–[4]. Hyperchaotic, which have dynamic traits that are more complex, advanced geometric patterns, with more than one positive Lyapunov exponent than nonhyperchaotic systems[5], [6], have a wide range of applications in encrypted transmission [7], [8], image encryption[9], neural networks[10], mathematics and other fields[11]. Various chaotic three-dimensional systems were introduced, including the design system of Rossler [12], the design system of LÜ [13], the design system of Jia [14], and many others. Chaotic behavior occurs when a dynamical system develops with precise values for parameters and initial conditions. [15], [16].

This paper presents an analysis of a hyper5-D chaotic structure with five state variables, nine parameters, and five terms for cross-product nonlinearities. The attributes of the new system's dynamic behavior are investigated using the Mathematica program. Many researchers studied the five-dimensional chaotic system as follows in this section: In 2020 [17],P. Trikha and L. S. Jahanzaib, The suggested anew 5-D hyper-chaotic system and its dynamical characteristics, such as phase plots, , Lyapunov Exponent ,time series, equilibrium point and bifurcation diagram. In 2020 [18], S. A. Mehdi and F. H. Abbood proposed a five-dimensional chaotic system and according to this proposal he was found to have more complex dynamic features ,the Lyapunov values: LE1 = 0.315207, LE2 = 0.135137 and LE3 = -0.082011, LE4 =-0.275085, LE5 =-11.9927. In 2021 [19], Z. Peng, W. Yu, J. Wang et al , created a hyperchaotic five-dimensional system For safe communication. Key characteristics like equilibrium stability and Lyapunov exponents are examined: $Ly1 = 0.17826$, $Ly2 = 0.110013$, $Ly3 = 0$, $Ly4 = -5.18539$, $Ly5 = -28.108$. in 2021 [20] , Javad Mostafaee ,et al , introduce a novel 5–D nonlinear hyperchaotic system with appealing and complicated behaviors .The Lyapunov was used to prove the novel controller's stability in both phases.

2. CONSTRUCTION OF NEW FIVE-DIMENSIONAL CHAOTIC SYSTEM

The chaotic sequences of the system are established on initial conditions and parameters. As a result, predicting their behavior is tougher, Furthermore, the chaos is much more complicated. There is a significant advantage to being hyper-chaotic. The new five-dimensional hyperchaotic system is formed in this section, and it eventually becomes hyperchaotic. A new system's dynamic behaviors are obtained as following way:

$$\frac{dx}{dt} = -a\,x + b\,y + u + c\,e^{u}$$

$$\frac{dy}{dt} = -y + dx - xz - w$$

$$\frac{dz}{dt} = -ez + xy + fe^{u} \qquad (1)$$
$$\frac{du}{dt} = gu - xz + hw$$
$$\frac{dw}{dt} = -hw + iy - fxz + e^{u}$$

Where x, y, z, u and w ∈ $\Re^{+}$ referred to as the system's states and a, b, c, d, e, f, g, h, and i are positive real numbers with values of (8,5,1.1,23,1.5,0.1,2,0.5,18), and the initial conditions for (x_0, y_0, z_0, u_0, w_0) are (0.2,0.5,2.9,0.6,0.4) correspondingly. When these values are chosen the system (1) becomes hyper chaotic.

3. THE PROPOSED CHAOTIC SYSTEM'S DYNAMIC ANALYSIS

The essential attributes and the new's complicated dynamics system (1) are examined in this section. The following are the basic properties of the dynamic system.

A. Equilibrium Point

We can see that the system (1) has three points of equilibrium:

$$0 = -a\,x + b\,y + u + c\,e^{u}$$
$$0 = -y + dx - xz - w$$
$$0 = -ez + xy + fe^{u} \qquad (2)$$
$$0 = gu - xz + hw$$
$$0 = -hw + iy - fxz + e^{u}$$

When a, ***b, c, d, e, f, g, h*** and ***i*** values (8,5,1.1,23,1.5,0.1,2,0.5,18) respectively, and the initial conditions for (x_0,y_0,z_0,u_0,w_0) assumed as (0.2,0.5,2.9,0.6,0.4) respectively.The one equilibrium point becomes :

E_0\{x= 0.0564753, y= -0.00405835, z= 0.0480778, u= -0.323711, w= 1.30027\}, the system's Jacobian matrix (1), let

$$f = \begin{cases} f1 = \dfrac{dx}{dt} = -a\,x + b\,y + u + c\,e^{u} \\ f2 = \dfrac{dy}{dt} = -y + dx\text{-}xz - w \\ f3 = \dfrac{dz}{dt} = -ez + xy + fe^{u} \\ f4 = \dfrac{du}{dt} = gu - xz + hw \\ f5 = \dfrac{dw}{dt} = -hw + iy - fxz + e^{u} \end{cases} \qquad (3)$$

$$J = \begin{bmatrix} \frac{\partial f_1}{\partial x} & \frac{\partial f_1}{\partial y} & \frac{\partial f_1}{\partial z} & \frac{\partial f_1}{\partial u} & \frac{\partial f_1}{\partial w} \\ \frac{\partial f_2}{\partial x} & \frac{\partial f_2}{\partial y} & \frac{\partial f_2}{\partial z} & \frac{\partial f_2}{\partial u} & \frac{\partial f_2}{\partial w} \\ \frac{\partial f_3}{\partial x} & \frac{\partial f_3}{\partial y} & \frac{\partial f_3}{\partial z} & \frac{\partial f_3}{\partial u} & \frac{\partial f_3}{\partial w} \\ \frac{\partial f_4}{\partial x} & \frac{\partial f_4}{\partial y} & \frac{\partial f_4}{\partial z} & \frac{\partial f_4}{\partial u} & \frac{\partial f_4}{\partial w} \\ \frac{\partial f_5}{\partial x} & \frac{\partial f_5}{\partial y} & \frac{\partial f_5}{\partial z} & \frac{\partial f_5}{\partial u} & \frac{\partial f_5}{\partial w} \end{bmatrix} \qquad (4$$

$$J = \begin{bmatrix} -a & b & 0 & 1+ce^{u} & 0 \\ d-z & -1 & -x & 0 & -1 \\ y & x & -e & fe^{u} & 0 \\ -z & 0 & -x & g & h \\ -fz & i & -fx & e^{u} & -h \end{bmatrix} \qquad (5)$$

For the point of equilibrium E_0\{x=0.0564753, y=-0.00405835, z=0.0480778, u=-0.323711, w=1.30027\}, When the parameters with following values: (8,5,1.1,23,1.5,0.1,2,0.5,18). The following is the outcome of the Jacobian matrix:

$$J=\begin{bmatrix} -8 & 5 & 0 & 1+1.1*e^{-0.323711} & 0 \\ 23-0.0480778 & -1 & -0.0564753 & 0 & -1 \\ -0.00405835 & 0.0564753 & -1.5 & 0.1*e^{-0.323711} & 0 \\ -0.0480778 & 0 & 0.0564753 & 2 & 0.5 \\ -0.1*0.0480778 & 18 & -0.1*0.00405835 & e^{-0.323711} & -0.5 \end{bmatrix}.$$

Let |I-J0|=0 to obtain its eigenvalues. Equilibrium eigenvalues are the eigenvalues correspond to the equilibrium state. E0(0.0564753,-0.00405835,0.0480778,-0.323711,1.30027) are found as follows: $\lambda_1 =$ -15.4355, $\lambda_2 =$5.74513, $\lambda_3 =$ 1.49833, $\lambda_4 =$ 1.09602 +2.24752 i and $\lambda_5 =$ 1.09602 -2.24752 i.

where I represent the imaginary number unit. As a result, E0 is the equilibrium point, The results reveal that λ_1, λ_2 and λ_3 are real numbers, both positive and negative respectively, whereas λ_4 and λ_5 are a pair of negative real eigenvalues for complex conjugate eigenvalues portions. As a result, E0 is a saddle-focus point, and all of equilibrium points unstable.

B. Lyapunov Exponents and Lyapunov Dimensions.

Lyapunov exponent is a numerical measurement method to the sensitive reliance on the initial conditions, according to the theory of nonlinear dynamical systems. It's the rate at which two neighboring orbits diverge (or converge). Furthermore, the nonlinear dynamical system (1) has five Lyapunov exponents with a=8,b=5,c=1.1,d=23,e=1.5,f=0.1,g=2,h=0.5, and i=18. Are acquired as follows: **LE_1**=1.58398, **LE_2**= 0.31333, **LE_3**= -0.143648, **LE_4**= -0.795701 and **LE_5**= -10.5783. The finding that the greatest LE is positive indicates that the system has chaotic properties. Because the L1 and L2 Lyapunov exponents are positive, whereas the other three are negative. As a result, the system is hyperchaotic**.** The

fractal dimension is also a typical feature of chaos, as estimated using LE in the Kaplan-Yorke dimension .and D_{KY} expressed as[21]:

$$D_{KY} = j + \frac{1}{|L_{j+1}|}\sum_{i=1}^{j} L_i \qquad (7)$$

Where j :the nonnegative Lyapunov exponent, and j: the largest value of i which fulfills both $\sum_{i=1}^{j} L_i > 0$ and $\sum_{i=1}^{j+1} L_i < 0$ at the same time. According to the sequence of Lyapunov exponents, Li: descending order of a sequence. DKY: the top bound of the system information dimension. $L_1+L_2+L_3+L_4 >0$ and $L_1+L_2+L_3+L_4+ L_5 <0$ respectively, the Kaplan-Yorke of the novel chaotic can be represented as follows:

$$D_{KY} = j + \frac{1}{|L_{j+1}|}\sum_{i=1}^{j} L_i$$

$$D_{KY} = 4 + \frac{1}{|L_{j+1}|}\sum_{i=1}^{4} L_i = 4 + \frac{L_1+L_2+L_3+L_4}{L_5}$$

$$= 4 + \frac{1.58398 + 0.31333 + -0.143648 + -0.795701}{10.5783}$$

= 4.09056

which means System (1) has a fractional Lyapunov dimension. The new system features non-periodic orbits due to its fractal character. In addition, neighboring trajectories diverge. As a result, this nonlinear system is truly chaotic.

C. Phase portraits

Consider the following values: a=8, b=5, c=1.1 , d=23, e=1.5 , f=0.1, g=2, h= 0.5, and i=18. In figures, the phase portraits are shown (1,2,3.4,5,6,7,8). The novel hyperchaotic attractor appears to have a dynamical behavior that is both complex and unpredictable. The simulation studies is done using the MATHEMATICA

application. This system displays a wide range of chaotic dynamics features. Figures (1,2,3,4) exhibit strange attractors in three dimensions, while Figures (1,2,3,4) illustrate strange attractors in two dimensions (5,6,7,8). Because the topology resembles the form of a butterfly in flight flapping wings, The expression "Butterfly Effect" was meant to describe this phenomenon.

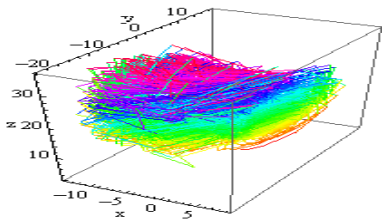

Figure 1. Three-dimensional (x-y-z) illustration of chaotic attractors

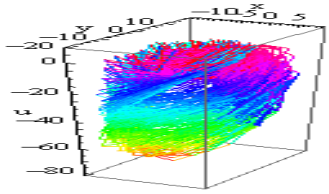

Figure 2. Three-dimensional (u-x-y) illustration of chaotic attractors

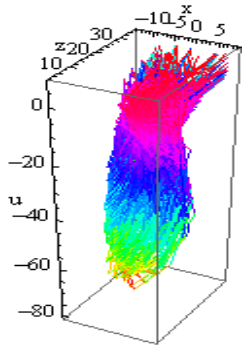

Figure 3. Three-dimensional (u-z-x) illustration of chaotic attractors

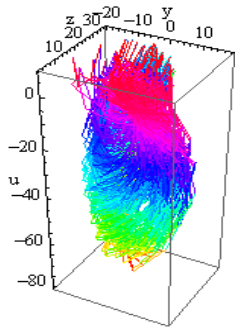

Figure 4. Three-dimensional (u-z- y) illustration of chaotic attractors

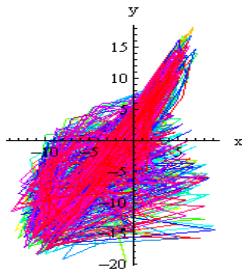

Figure 5. Three-dimensional x–y illustration of chaotic attractors

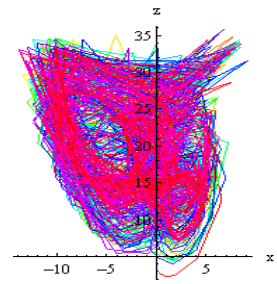

Figure 6. Three-dimensional x–z illustration of chaotic attractors

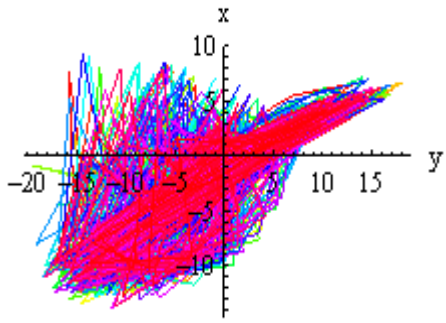

Figure 7. Three-dimensional y–x illustration of chaotic attractors

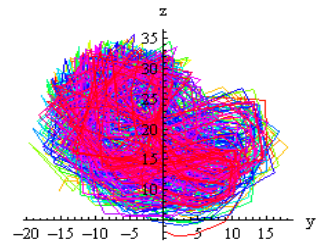

Figure 8. Three-dimensional y–z illustration of chaotic attractors

D. Waveform analysis

A chaotic system's waveform, as is well known, must be acyclic. To show that the suggested structure is disordered. The duration (time) versus phase graph derived from the MATHEMATICA simulation is shown in Figures (9,10,11). Figures illustrate the time domain waveforms (x(t), y(t), z(t)) has aperiodic waveforms.

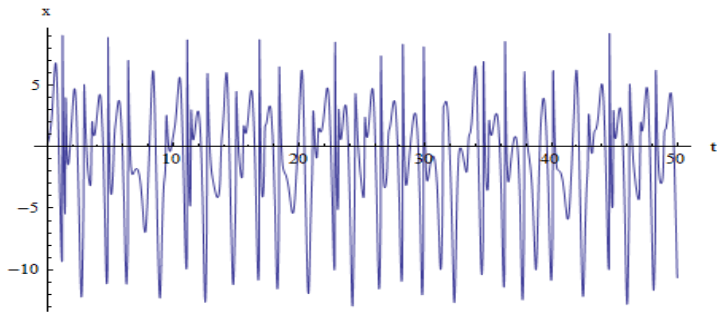

Figure 9. The chaotic system's time versus x

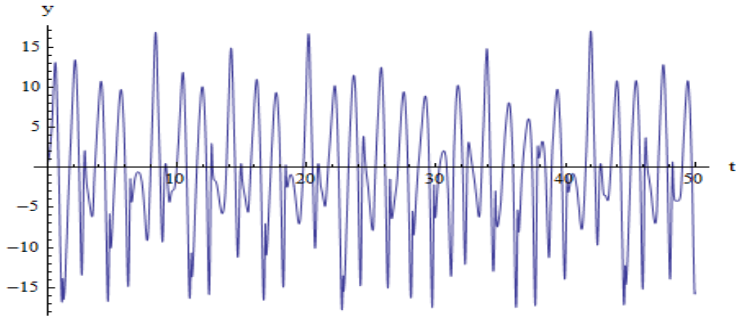

Figure 10. The chaotic system's time versus y

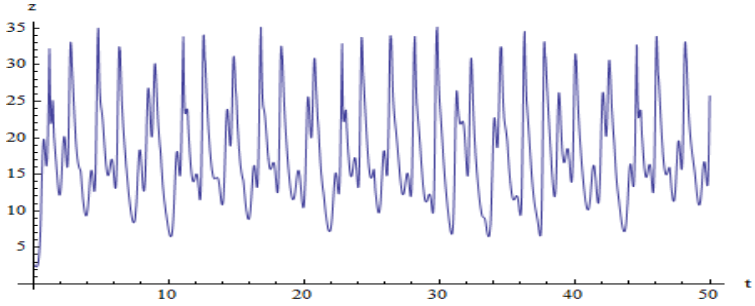

Figure 11. The chaotic system's time versus z

D. Sensitivity to initial conditions

Long-term uncertainty is perhaps the most distinguishing aspect of a system in chaos. This is because solutions are very dependent on initial conditions. No matter how near two different initial conditions are, eventually, become significantly unattached. As a result, for every finite amount of precision digits in the starting condition, there will come a time in the future when it will be

impossible to make accurate forecasts about situation of the system. The chaos paths is particularly sensitive to beginning conditions, as seen in Figures (12,13). The system's initial values: x(0)=0.2, y(0)=0.5, z(0)=2.9, u(0)=0.6, and w(0)=0.4. x(0)=0.2, y(0)=0.5,z(0)=2.9,u(0)=0.600000000001, and w(0)=0.4 for the line that is solid, and x(0)=0.2, y(0)=0.5,z(0)=2.9,u(0)=0.600000000001, and w(0)=0.4 for the line that is dashed .

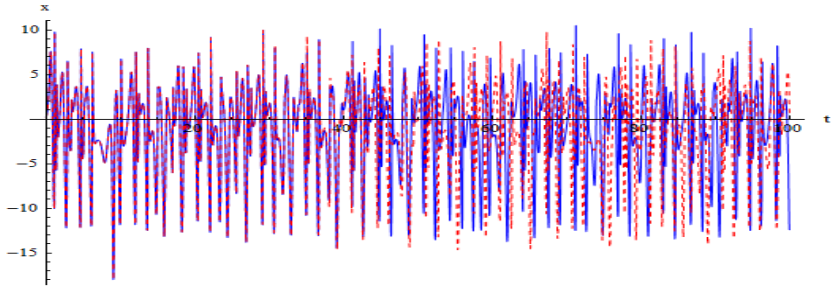

Figure 12. Tests of the innovative system x's sensitivity (t)

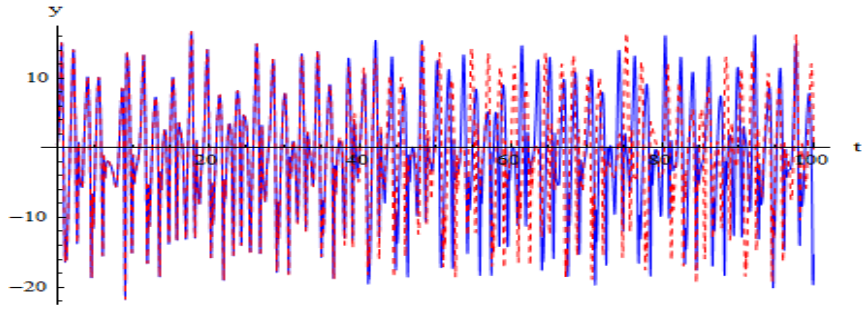

Figure 13. Tests of the innovative system y's sensitivity (t)

4. CONCLUSION

This work presents and analyzes a novel five-dimensional hyperchaotic system with five cross-product nonlinearities terms and nine parameters. It has the five Lyapunov exponents and contains sophisticated dynamical behaviors and all chaotic system features. Some of the suggested system's distinguishing characteristics have been demonstrated. Because it has two Lyapunov exponents, the designed scheme is hyperchaotic. Sensitivity on initial Condition, Equilibrium point, Lyapunov Exponents, and Lyapunov Dimensions were used to evaluate the dynamics of the

proposed new system, and the complex attractor for the proposed system was utilized to examine the dynamic behavior. proved the sensitivity by making minor alterations in the initial condition in this suggested system. The suggested system is shown to be aperiodic because the time-domain waveform has noncyclical properties. We can deduce that proposed system is a hyperchaotic system based on the testing results since it has two Lyapunov positive exponents, a non-cyclical time-domain waveform, and higher sensitivity in relation to the starting values. We advocate adopting this five-dimensional approach to generate random keys for data steganography in future studies.

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Examination Applying ISO 9000 in Iraqi Construction Industry

Noralhuda M. Azize

Lecturer, College of education for girls, University of Thi-Qar, Iraq

Noralhudmohammed212@utq.edu.iq

ABSTRACT

The purpose of this study is to investigate the current situation of implementation of a quality management system (QMS) based on ISO 9000 in Iraqi construction sectors. This study focused particularly on appling ISO 9000 as well as obstacles facing its implementation in construction sector. The quality systems of ten building firms in different area in Iraq will be evaluated and examined in this article. The examination was carried out in accordance with the ISO 9000 standard. the results found the firms' quality systems are applied in a variety of ways, from a casual surface application to a thorough system application. The ISO 9000 provisions dealing with inspection and test status, inspection and testing, non-conformance product control, and handling, storage, and preservation are the most often followed. Design control, internal audits, training, and statistical methodologies are the provisions that have been the least adhered to. In general, all ten Iraqi construction contractors agree that the ISO 9000 quality management system is advantageous to their companies and that it provides considerable benefits. ISO 9000 QMS, on the other hand, cannot be extensively accepted and implemented owing to practical constraints, the major obstacles facing the implementation of ISO 9001 QMS were no existence of government regulations for mandatory implementation, lack of top management support and commitment, and inadequate employee's culture toward quality.

Keywords: construction, Iraq, quality management system, hazard, contractor

INTRODUCTION

Stakeholders have frequently denounced the Iraqi civil engineering projects as being of low construction quality. Building quality failure is a global problem, according to the conclusions of a quality research conducted by the International Federation of Engineers-Conseils on construction [1,2]. Because each undertaking has a certain amount of risk., In the engineering and construction industries, quality assurance is crucial. Quality is described in the construction business as meeting the needs of the designer, contractor, regulatory agencies, and project owner [1]. The term "high-quality building project" brings up images of design clarity and application, regulatory compliance, construction economics, simplicity of operation and maintenance, and energy efficiency [3]. In the field of building, it is a regulation that projects must be completed on schedule, within budget, and to

the appropriate quality level. In the construction industry, quality may be disregarded in order to save money and/or shorten the project's length. Quality assurance and quality control are used to check quality in the construction industry. Due to the large number and scope of construction projects in Iraq, prominent international construction firms have flocked to the country, resulting in fierce rivalry. Despite the fact that quality management systems are still relatively new in Iraq, particularly in the construction industry, big construction businesses looking for a competitive edge are paying close attention to the notion. From the standpoint of developing nations, the usage of ISO 9000 in construction enterprises has not been properly investigated. That is, only a few studies on ISO 9000 applications in the construction industry have included examples from poor countries. For this study, the ISO 9000 standards were utilized to assess the quality systems of 10 major construction businesses in Iraq. The conclusions of the evaluation are presented in this document. The level of execution, as well as the contractors' perspectives, are investigated [2].

ISO IN CONSTRUCTION INDUSTRY

ISO 9000 is a global standard that serves as the foundation for a quality management system that can be used to a wide range of sectors and businesses. It explains how a supplier may set up a quality system that demonstrates both a commitment to quality and the capacity to satisfy client demands[3]. The American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASMENQA-1,)'s Quality Assurance Program Requirements for Nuclear Facilities, 1989, is based on ISO 9000 and is quite similar to it [4]. Quality management in construction is distinct from quality management in manufacturing and other service industries. The construction business comprises not just product quality, but also the overall management style required to suit the needs of designated clientele. According to Hoyle (1997), producing desirable quality products does not happen by accident, but rather requires the use of a quality system[5]. "Quality management" is defined by Lam et. al. (1994) as "that aspect of the overall management function that determines and implements the quality policy," and "quality system" is defined as "the organizational structure, responsibilities, procedures, processes, and resources for implementing quality management" in the construction industry [6]. The ISO 9000 series of quality management systems is the most often used by construction firms [5]. This standard is essentially a generic one that construction companies may successfully

apply to various projects. Additional quality systems, standards, and awards include Six Sigma, the EFQM Excellence Model, and the Malcolm Baldrige National Quality Award Criteria. ISO 9000, on the other hand, is widely recognized in the manufacturing, industrial, and service industries[7]. Because it focuses largely on what firms should do to improve quality management and continuous improvement, this is the case. Although ISO 9000 standards are widely accepted in the construction industry, its use is not as widespread as it is in other industries, such as manufacturing. The construction business has unique characteristics that make the ISO 9000 standard difficult to execute. Some of these characteristics are as follows [7]:

- While most construction projects are unique combinations of people, equipment, and materials brought together in unique locations under unique weather conditions, most manufacturing is a mass-production system in which all of these factors are consistent with producing typical products over and over again.
- In the vast majority of cases, performance testing as a foundation for building acceptability is not feasible.
- Separate contracts for design and construction are typical since it's hard to reject the entire finished project once it's tied to the buyer's land.
- Rejection decisions a faulty portion of a built project must be made quickly before the next set of pieces is built or installed.
- When it comes to the procurement of a constructed project, there are more parties engaged than when it comes to the purchase of produced items. Quality construction needs collaboration from all parties involved. In contrast to manufacturing, this complicates the interaction and responsibilities of a large number of people and groups.
- A construction company's organizational structure fluctuates based on the project's nature, but a manufacturing company's structure is virtually constant. This has an impact on the efficiency with which the responsible personnel communicate and interact.
- Because construction projects are complex and might take years to complete, workforce turnover is higher than in manufacturing, jeopardizing long-term planning precision.

The influence of ISO 9000 standards varies based on how businesses interpret them. It can be considered as a way to increase the overall quality of operations or as a sales strategy based on a higher-quality image [6].

LITERATURE REVIEW

The ISO 9000 standards have been in use in almost every sector since 1987. Customer-centricity and an in-house leadership environment are two of the system's key concepts. The ISO 9001:2000 certificate numbers are shown, the construction sector has surpassed it as the largest[8]. Unlike other businesses, the construction industry's goods and services are unique, meaning they are not duplicated. The commodities and services provided by each project have their own design and construction process, as well as their own process sequence and modules. It is typical to incorporate suppliers and subcontractors in these procedures to keep them operating smoothly[7]. This makes it difficult to define and implement projects and processes using prototypes and repeatable methodologies. Construction projects are also associated with a slew of problems. Local implications, environmental concerns, social reactions, cost, and completion time are just a few examples of consequences that should be considered throughout the design phase. All of this has underlined the need to look at whether the ISO 9000 is ever appropriate for construction companies. According to certain studies, the ISO 9000 is not suitable for construction firms. Based on interviews with 12 Swedish construction companies that held an ISO 9000 certificate in 2000, Landin (2000) [4] "contends that quality management system requirements are overly abstract and difficult to implement. Despite the fact that increased competition is expected, particularly in the construction industry, and that as a result, the firm will begin to work more effectively, the industry is expected to struggle to meet its needs due to the diversity of processes in construction applications and the requirement to produce a unique product/service for each project, it is stated that the industry will struggle to meet its needs". Similarly, another study based on a questionnaire survey of ninety three construction companies in Singapore found that, Regardless matter whether they have ISO 9000 quality certificates or not, it is proven how ISO 9000 certification has been reflected in their implementation. The results show that certification has no effect on the quality management software used by enterprises or the product/service quality supplied [6]. However, some study suggests that the ISO 9000 is a useful tool for construction companies[6]. Pheng

and Wee (2001) conducted a case study on this topic [9], "the effective implementation of ISO 9000 may minimize the flaws arising from the application of construction projects, as well as the prevention and repetition of errors. With the usage of this platform in a condominium project, the buildability rate has grown, the effectiveness has increased, and the costs have decreased. For these sorts of initiatives, it is stated that an adequate and acceptable work platform may be formed" [9]. For a variety of reasons, construction businesses get ISO 9000 certification. To satisfy their clients, engage the firm's resources, and manage the sought-after in-house quality procedures, construction businesses should strive for ISO 9000 certification. There are several building firms, on the other hand, obtain this certification at the request of their customers or as a requirement of the public tender authority. On the contrary, many firms use ISO 9000 certification as a tool to build a reputation and recruit new customers. Another research of thirty-three Hong Kong contractors who were ISO 9000 certified found that involvement in public projects as a requirement of their clients was the key reason for adopting the standard. [10]. The benefits of having a QMS for businesses, according to a study conducted by Ofori et.al (2002), "include the strengthening of the corporate image, the development of operation procedures, an increase in competitive power, an increase in output, increased communication among firm employees, and a reduction in material waste" [11]. In their study, Yates and Aniftos (1997) provide the findings of a comprehensive questionnaire survey done for US construction firms. As a result of the questionnaire, the enterprises mentioned safeguarding their worldwide market shares, the convenience of adding new projects, and having a competitive edge as positives, and higher workloads and expenses imposed by standardization as drawbacks [12]. There are conflicting perspectives on why ISO 9000 is important, as well as the benefits and downsides of utilizing it in the construction industry, according to A.M. Turk (2005)[13]. ISO 9000 QMS has been proven to be an effective strategy for decreasing material and labor waste in operations such as production and distribution, as well as enhancing profitability and market share in a variety of sectors. Furthermore, it is recognised that the offered product or service will be presented ideally as a consequence of certification to ISO 9000, which will raise the firm's marketing potential and market share while also enhancing its image. Benefits of ISO 9000 include enhancing the firm's operational processes, boosting productivity, raising the firm's self-confidence, improving customer satisfaction, improving supplier performance, and tighter controls on subcontractors. In addition to goods and

services, ISO 9000 certifies processes. The important factor to remember here is that if the procedures are well-managed, so will the goods or services supplied [10].

OBJECTIVES

The main objective of this paper is to examine the implementation of ISO 9000 Iraq construction companies, this includes implementation, the current practice ISO 9000 principles and elements, and barriers to effective implementation.

METHODOLOGY

Twenty significant construction contractors in various parts of Iraq were chosen for the study with the support of the Department of Construction and Projects. The chosen contractors were contacted and informed about the study's scope. Only ten contractors consented to take part in the study since they all had some sort of quality control system in place. The selection of 10 contractors was deemed sufficient for an exploratory research because this study used a nonprobabilistic sample. Table 1 shows the contact person's contractor number, years of experience, number of employees, specialization, and position.

Table 1 contractors background

Clause	Description	Clause	Description
4.1	Management Responsibility	4.11	Inspection measuring and test equipment
4.2	Quality system	4.12	Inspection and test status
4.3	Contract review	4.13	Control of nonconforming product
4.4	Design control	4.14	Corrective and preventive action
4.5	Document and data control	4.15	Handling, storage, packaging, and delivery
4.6	Purchasing	4.16	Quality records
4.7	Purchaser supplied product	4.17	Internal audits
4.8	Product identification and traceability	4.18	Training
4.9	Process control	4.19	Servicing
4.10	Inspection and testing	4.20	Statistical techniques

The review included personal structured interviews with key representatives as well as document inspection. Each interview lasted somewhere between three and five hours. A questionnaire form was used as a checklist. The first portion of the questionnaire is intended to collect information on the contractors' overall interest in and impressions of the ISO 9000 standards. The second portion examines the ISO 9000 provisions and poses specific questions about them (Table 2 lists the clauses). Contractors were asked if they have a quality system in place that satisfies each ISO 9001 clause, as well as if these procedures are documented and carried out.

Table 2 lists of the clauses

Contractor No.	Years in business	type of Construction	Position of contacted person
1	35	reinforced concrete and steel work	Projects Managers
2	30	electrical, piping, piping mechanical, structural steel	Projects Managers
3	18	buildings, mechanical, electrical, and HVAC	Projects Managers
4	16	buildings (schools)	Projects Managers
5	4	building, civil	Operations Engineer
6	5	roads, sewer	Operations Engineer
7	10	mechanical, electrical, civil	Projects Managers
8	20	building, civil	Operations Engineer
9	15	roads, sewer	Operations Engineer
10	8	buildings (schools)	Projects Managers

RESULT AND DISCUSSION

Two of the ten contractors are ISO 9001-certified, three are expecting to get certified in the near future, and five have recruited outside consultants to help them create formal quality systems and prepare for registration. The other four contractors want to get registered as well, but not anytime soon. The ISO 9000 standards, according to the majority of contractors, are applicable to the construction business. Two contractors have worries about the guidelines' ability to improve the quality of building projects. These contractors did not make any exceptions to any of the provisions in the criteria that apply to their businesses. Table No. 3 indicates the proportion of organizations that have implemented ISO 9000 clauses, with the caveat that some clauses, such as clause 4.4 "Design Control", have a weakness in their implementation. When asked why this provision isn't used by any of the companies in the research sample, they claim it's because there aren't enough project allocations compared to what's needed.

Existence of infringement on plots of land allocated for investment projects, which makes it impossible to implement the project due to the difficulty of the evacuation procedures, and clause 4.13 "Control of nonconforming product" was 5%, with the research sample's response that this clause is one of the most difficult aspects of the quality system because it requires the contractor's personnel to admit openly and in writing that they have done something wrong. As a result, the contractor may fail to tell the consumer. The nonconformance findings given by quality control workers are either disregarded or overturned by project engineers, according to certain contractors. This is due to the quality control personnel's lack of power (ISO 9001). Only a few people said the nonconformances were undocumented. All contractors agreed that clause 4.15's packing, preservation, and delivery requirements apply to non-construction materials. The top-ranked contractors demonstrated that the acquired project materials and equipment are handled appropriately and in such a way that their quality is not damaged due to improper handling, lifting, and rigging when they arrive on site or during construction. Also, that supplies and equipment are carefully stored before being used or installed in the project to guarantee that they are preserved securely.

· **Table 3 Percentage of implementation ISO 9000 in constriction companies**

Clause	Percentage of implementation	Clause	Percentage of implementation
4.1	25.5	4.11	44
4.2	30	4.12	77.4
4.3	33	4.13	5
4.4	0	4.14	28
4.5	10	4.15	60
4.6	22.3	4.16	28
4.7	38	4.17	10
4.8	50	4.18	10
4.9	50	4.19	13
4.10	85.2	4.20	20

Interview identified various obstacles that discourage successful implementation of the ISO 9000 standard in constructions industry :

- Costly, particularly at the beginning.

- Change resistance exists at all levels of the organization.
- Workforce productivity loss owing to time spent learning and implementing the new system in addition to their usual responsibilities.
- Management interference
- Limited ability of personnel
- Remote job sites, making it hard to control and track the quality system implementation in all sites
- Communication problems between personnel because of language differences
- Cultural differences within the workforce

While the clause (4.10) was verified by 85 percent of contractors, it indicated that inspection and testing activities are done at all phases of the project, including receipt, storage, field fabrication, installation, and transfer to the client. Inspection and testing procedures define the quantitative and qualitative acceptance criteria for construction workmanship and materials, and the clause (4.12) found that 77.4 percent of contractors have well-documented procedures for determining the acceptability of construction items based on inspections and tests conducted throughout the construction process. This criteria applies to all materials, equipment, and building work that must be examined and tested. To differentiate between inspected and uninspected building objects, the contractors apply tags, markers, or routing cards. This sort of method safeguards against the use of inappropriate.

CONCLUSIONS

There is a misperception concerning the goal of the ISO 9000 standards. They think that all that is essential is a constant, low or high degree of quality, and that they should "write what they do and do what they write." This misunderstanding must be replaced with the correct concept of "plan-docheck-act," in which the quality system is examined and updated on a regular basis to ensure continual improvement and achievement of the organization's quality policy goals. The quality management systems of ten construction companies were examined. A quality system can be as simple as an inspection and testing system or as intricate as an ISO 9000 quality system. The most compelling reasons for registering are top management's aim to improve project quality and current or expected customer demand. The following ISO 9000 requirements are the most commonly followed: " inspection and test status; inspection and testing; control of nonconformance product; and handling, storage, and preservation". The quality system documentation, implementation methodology, and separation between nonconformance disposition and corrective procedures all had misconceptions. Establishing improvement priorities is another area where contractors fall short.

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Assessment the influence of thyroid dysfunction on diagnostic type2 diabetes patients: Across sectional study

Mohammad Hasan Ali * moh55alialnaser@gmail.com

Osouledeen University college Baghdad –Iraq Mobil: 07710896729

Ass.Prof Dr. Ali M Al-Gharawi ** aligarawi@ouc.edu.iq

Osouledeen University college Baghdad –Iraq

Abstract

Background: The two endocrines dysfunction: thyroid problem and diabetes complication has gained great attention for endocrinologist. These two endocrines are a common metabolic clutter, and critical cause of dismalness and health threats worldwide. Patients with diabetes have the next predominance of thyroid disarranges when compared with common population. Several studies make attention that altering thyroid function complicates the management of diabetes and associated consequences.

Aim of research: The objective of the current research was to discovery the predominance of thyroid problem (dysfunction) in subjects with type 2 diabetes mellitus(T2DM) and correlated with high risk of type2 diabetes. **Materials Methods and subjects:** Across sectional study was conducted from October 2019 to January 2020 at the center which is specialized for endocrinology and Diabetes. 220 patients diagnostic with Type 2 DM or recently detected cases were included and compared with 60 apparently healthy groups in this work.

All the patients were evaluated for thyroid dysfunction by examines thyroid hormones "triiodothyronine (T3), thyroxine (T4), and thyroid-stimulating hormone (TSH)". These parameters were analyzed by Electrochemiluminescent assay (ECLassay).The advantages of this system include high sensitivity, large dynamic range, non-toxic , stable conjugate 12 month and precisely controlled. The relationship of predominance of thyroid clutter with sex male/female distribution, age (30>70) distribution, hemoglobin A1C, duration of diabetes, family history of diabetes, body mass index(BMI), usage of oral antiglycemic agents and insulin, and thyroxin for hypothyroid and Neomecazol for hyperthyroid patients. The interpretations were taken and measurably analyzed. **Results:** The patients in this study range in age from 30 to 70 years old. Thyroid indicators were abnormal in 26.35 percent of Type 2 DM patients in our study. Hypothyroidism was the most common condition (19.54 percent), followed by hyperthyroidism (6.8%), with 162 euthyroid patients. Thyroid abnormalities were found to be more common in females (19.44 percent) than in males (6.86 percent), with a significant Pvalue <0.05. The results of this investigation revealed a significant relationship between hypothyroid parameters and BMI, with a pvalue of 0.05. In T2DM compared to control groups, there was no significant association between thyroid hormones and diabetes duration (Pvalue >0.05)

.**Conclusion:** Thyroid disorder has a higher predominance and can occur in type 2 diabetic patients, implying that people with type 2 diabetes should have their thyroid function evaluated on a regular basis.

Keyword: Thyroid parameters, Type2 diabetic, hemoglobin A1C, ECL analyzer

1- Introduction

Diabetes mellitus (DM) is a multi-complicated disease marked by a persistent increase in blood glucose levels. It occurs when the body is unable to create enough insulin to meet its own requirements, either due to impaired insulin production, insulin action, or both. Diabetes affects 300 million individuals worldwide, and its prevalence is rising. [1]. Chronic high blood glucose has a number of risky effects on the body, including neuropathy (nerve damage), nephropathy (kidney illness), and retinopathy (eye disease) (eye disease) [2]. Type 2 diabetes affected over 90% of those surveyed. Furthermore, type 2 diabetes already kills 5 million people each year, largely from cardiovascular illnesses, and by 2030, it will be the seventh leading cause of death worldwide. [3].The thyroid is a butterfly-shaped gland in the neck that is found right below the Adam's apple and above the collarbone. [4]. Thyroxine (T4) and triiodothyronine (T3) are two hormones produced by the thyroid gland that enter the bloodstream and regulate the metabolism of the heart, liver, muscles, and other organs. [5] The thyroid gland works as part of a feedback mechanism concerning the hypothalamus, a region of the brain, and the pituitary gland, which is located within the brain [6,7]. Hypothyroidism (underactive thyroid gland) and hyperthyroidism (overactive thyroid gland) are the two most common thyroid disorders [8]. Thyroid problems are more common among diabetics. Thyroid disorders affect about 6% of the general population. Thyroid disorders, on the other hand, are more common in patients with diabetes, with rates ranging from 10% to 25%. [9].This difference in

results promotes overproduction thyroid hormone leads to increased glucose synthesis in the liver, fast glucose absorption through the intestines, and insulin resistance. In hypothyroidism, liver glycogen secretion and breakdown both decrease, resulting in increased glycogen levels and a range of irregularities in blood lipid levels. [10,11]. Thyroid hormones are insulin antagonists; both insulin and thyroid hormones are involved in cell metabolism, and changes in one can lead to a functional deficiency in the other. [12,13].

2- Aim of study

The current study's goal is to discover the predominance of thyroid dysfunction in patients with type 2 diabetes mellitus and conjointly the impact of the type 2 diabetes on other biochemical factors among diabetic patients.

3- Subjects, Material and Methods:

This cross-sectional study was conducted on a group of 220 patient's diagnosed type2 diabetes mellitus whose ages ranged between (30-70) years with maximum 80 years at Baghdad city. At a specialized center for endocrinology and diabetes, blood samples were collected., during the period from October 2019 to January 2020.Patients in this study were recruited and underwent investigation for thyroid function;[total thyroxin (TT4), total triiodothyronine (TT3),and thyroid-stimulating hormone (TSH)]. Those patients were being treated for both diabetes and co-existing illnesses. All of the patients gave their written informed consent for the study. Pregnant women and those on glucocorticoids or amiodarone were excluded. One hundred and sixty two apparently euthyroid individuals with compared with case study. Sixty healthy subjects no previous history of thyroid disorders or any diabetic disease was selected as a control group. Their age and gender matched that of the patients group. Brief bio-data collection, clinical history and physical examination were performed and recorded on proforma

designed for this study. Clinical and analytical tests were performed on all patients. Gender, age (years), DM duration (years), and body mass index were all recorded as clinical factors (BMI). For the determination of glucose levels in the fasting state, For the determination of glucose levels in the fasting state, venous blood samples were taken after a 12-hour fast. Estimation of glucose levels was carried by auto analyzer assay [13]. About 5 mL of venous blood was sucked with a disposable syringe, 2 mL was transferred to an EDTA container tube, and the blood was gently agitated with a blood shaker to prevent clotting. Whole blood was used for estimation of HbA1c using an automated clinical chemistry analyzers. Fasting plasma sugar ≥126 mg/dl, postprandial blood sugar ≥200 or Glycated hemoglobin [HbA1c] ≥ 6.5%. After allowing blood samples to coagulate, they were centrifuged at 3000 RPM for 10 minutes to separate serum, which was then transferred to another tube and frozen at (-20c) for thyroid profile analysis., serum thyroixine (TT4), triiodothyronine (TT3) and thyroid stimulating hormone (TSH) these parameters were measured by using Electrochemiluminescent assay(ECLassay)[14]. This assay is technique depend on electro generated chemiluminesence that mix the two advantages of electrochemical and photoluminescence analysis [15]. The advantages of this system include high sensitivity, large dynamic range, non-toxic, stable conjugate 12 month and precisely controlled [16]. Ethics committee was taken from ministry of health. We excluded pregnant women and patient taking amiodarone . Results were analyzed using SPSS ver. 18.00 and Microsoft excel micro soft office (2010) for *T* test and The significance between the means was determined using the chi-square test, with a P-value of 0.05 considered significant. The findings of continuous measures were provided as a mean standard deviation, whereas categorical measurements were presented as a number (N) and a percentage (%).

4- Results

The subjects in this present study were 220 Iraqi type 2 diabetic patients compared with 60 apparently non diabetic health subjects. In this current study, the socio-demographic and clinical data are reported.

. Figure (1) explain the total prevalence of thyroid dysfunction were 58(26.34%) and hypothyroid was 43(19.54%) while hyperthyroid recorded 15(6.8%).

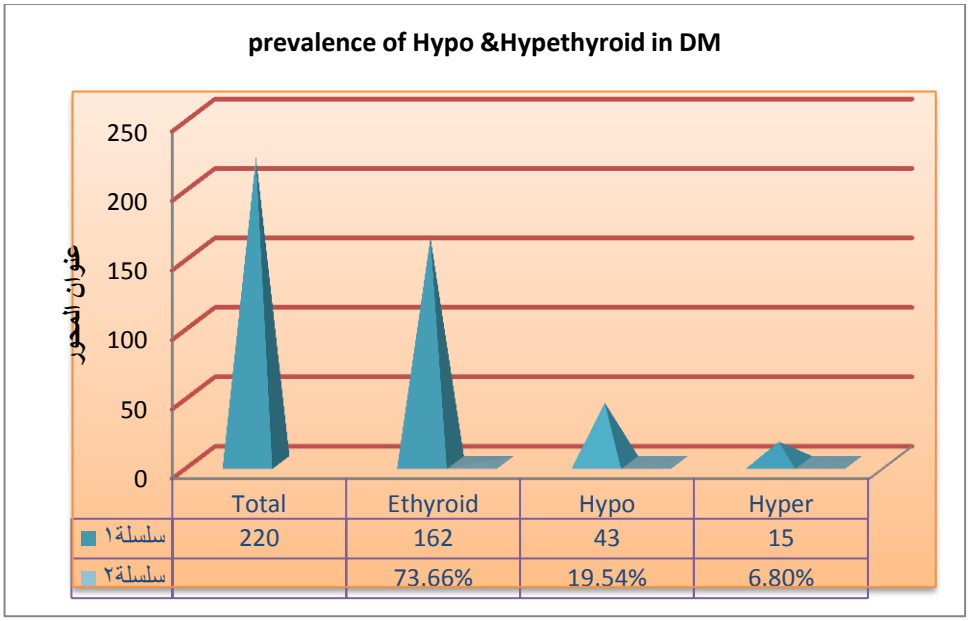

Figure (1) Prevalence Thyroid dysfunction among Type 2DM

Table (1) Comparison of studies- Thyroid dysfunction is common among diabetics.

Studies	Prevalence of Thyroid disease in T2DM	Hypothyroidism	Hyperthyroidism
Subhodip pramank etal.2018	26 %	23 %	3 %
Ashok K hurana etal.2016	16.5%	12 %	4.5 %
Madavarama	12.2 %	10.12 %	2.8

Sreelatha etal .2017			
Subekti etal.2017	9.9 %	7.59 %	2.31 %
Vikram Bvikhe etal.2013	30 %	22 %	8 %
Gorjeet Singh etal.2011	30 %	23.7 %	6.3 %
Present study	26.34%	19.54%	6.80

In comparison to the control group, Table (2) illustrates the connection between the two groups by age. There was a substantial difference at P≤0.05, according to the result. Regarding the age distribution of the two samples, Table (2) shows again the association between the two groups according to gender, the result had been indicated that there was a significant difference at P≤0.05 for the distribution of gender between the two samples. The association between BMI shows the different groups according to BMI, the result had been indicated that there was a significant difference at P≤0.05 for the distribution of BMI groups between the two samples. In the study group BMI ranged between (25-29.9) recorded high percent n=29(13.17%), compared with control BMI 60%.According to the duration of treatment of diabetes the result had been showed that there was a non-significant differences at P>0.05.The assessment of parameters TSH the high levels in diabetics with hypothyroid dysfunction was 14(6.36%) while hyperthyroid low levels was 8(3.6%) compared with euthyroid and diabetic control. Parameters T4 the low levels was 3(1.36%) and high levels was 2(0.9%). HbA1c values greater than 7.8 mmol/L showed glycemic control, whereas euthyroid levels were less than 7 mmol/L and control group HbA1c levels were less than 6.2 mmol/L and blood glucose levels were fewer than 126 mg/dl.

Table (2) Distribution of studied sample according to clinical and socio-demographic characters

Variable	Thyroid dysfunction			
	Hypothyroidism n= 43(19.54) %	Hyperthyroidism n=15(6.8)%	DM control N= 60	Significant Pvalue
Gender				
Male	12(5.5)	3(1.36)	15(25)%	0.03
Female	31(14.0)	12(5.44)	45(75)%	S
Age				
30-40	4(1.80)	2(0.9)	38%	0.01
41-50	7(3.19)	1(0.4)	32%	
51-70	32(14.5)	8(3.6)	22%	S
71-80	0	4(1.8)	8%	
BMI				
<25	8(3.63)	11(5)	28%	0.04
25-29.9	29(13.17)	3(1.36)	60%	S
≥30	6(2.72)	1(0.4)	12%	
Duration of DM				
1-5 year	12(5.45)	6(2.72)	0	o.27
6-10 year	20(9)	5(2.26)	0	NS
>10 year	11(5)	4(1.8)	0	
Parameters Test				
TSH (0.025-5)µUl/ml	4.9±2.2	0.6±5.1		
Low	1(0.45)	8(3.6)		
Normal	28(12.72)	7(3.17)		
High	14(6.36)	0		
T4 (60-120) µUl/ml	85±9.5	145±15.5		
Low	3(1.36)	0		
Normal	38(17.26)	5		
High	2(0.9)	10		
HbA1c >7.0mmol/L	>7.8	>7.2		
Blood glucose (>126mg/dl) (≤6.5mmol/L)	>7	>7		

Table (3) shows the etiological diagnosis of thyroid gland removal of goiter which diagnosed by ultrasound the multi-nodular recorded n=11 for each hypo and hyperthyroid and single nodular recorded n=1 while diffuse was recorded n=2.Fine needle aspiration procedure detect colloid n=4 and hashimotos n=4 and gravies disease was recorded n=4.

Table (3) Characteristics of thyroid status regarding an etiological diagnosis

The aetiology	Thyroid status		
	Hypothyroidism	Hyperthyroidism	
Goiter removed			
Yes	11	0	
No	32	15	
Thyroidectomy	7		
Auto-Immune	27	3	
Nodular	9	12	
Ultrasound			
Multi-nodular goiter	11	11	
Single nodular	1	1	
Diffuse	2	3	
Normal	11	0	
Small size	5	0	
Not done	13	0	
Fine needle Aspiration			
Colloid	4	1 hyper-cellular	
Hashimotos	3	3 Graves disease	
Not done	36	11	

Table (4) shows the type of drug used for therapy of diabetic patients according to status of pancreas function and insulin production treatment by take oral anti-glycemic agent, insulin or combined drug. Hypothyroidism is treated by replacing the thyroid hormone that has been deficient. The most common form of

thyroid hormone is a synthetic derivative, levothyroxine and for treatment of hyperthyroidism, dependent on the cause of the disorder; it must be checked for Long-term oral anti-thyroid medicines such as Neomercazol and propylthiouracil (PTU) are useful in regulating thyroid hormone production. Throughout the duration of treatment, blood tests must be performed regularly.

Table 4: Distribution of studied sample according to type of treatment

Thyroid status	**Medication in take**						
	OAA	insulin	Dietary	OAA Thyroxin	Insulin OAA	Insulin Thyroxin	Combined drug
Euthroid	93	46	23				
Hypothroid	15	7	2	2	8	6	3
Hyperthyroid	Neomercazol						

5- Discussion

Thyroid function is necessary for energy metabolism to function properly. and glucose homeostasis. In diabetes, aberrant thyroid function can have a big impact on blood glucose control. Both hyperthyroidism and hypothyroidism can affect the progression of diabetes, although their consequences vary depending on how well they are managed. [17] In this study, 162 (73.66 percent) of 220 diabetic individuals were found to be euthyriod i.e 43(19.54%) had hypothyroidism and 15(6.8%) had hyperthyroidism [18]. Thus a total of 58(26.34%) patients showed thyroid disorder. These data reveal that the diabetic population has a significant rate of aberrant thyroid hormone levels. which is supported by the various studies (Table 1) In a study by Subhodip pramank etal.2018[19] 23 % of patients had hypothyroidism and 3 % had hyperthyroidism a total of26%.Both studies Vikram

Bvikhe and Gurjeet Singh et al. [20,21] showed maximum prevalence of a total prevalence 30% subclinical hypothyroidism (22%,23.7%) followed by hyperthyroidism (8 %,6.3%) respectively [22,23]. These studies are agreement with current study. Hypothyroidism is a less common thyroid condition among type 2 diabetics (12 percent vs. 7.59 percent) respectively totally of 16.5% and 9.9% in the studies of Ashok K hurana,and Subekti. [24,25]. Studies reported to the "National Health and Nutrition Examination Survey" (NHANES III Study), disorder of hypothyroidism and hyperthyroidism were illustrated in 4.6% and 1.3% of the total participants respectively[26].

The presence of both raised and low levels of thyroid hormones levels in diabetics may be due to treatment of diabetic patients. Because of variances in drug use, gender, and patient age, the prevalence of TD differs around the world. [27]. Thyroid disorder becomes more common as people get older all throughout the world, and women have a higher prevalence than men. This variable prevalence studies suggested that medication therapy by metformin drug had small size thyroid goiter and nodules with lower risk [28,29].

6- **Limitations**

A few limitations have to be recognized. Thyroid work categorization was based on biochemical characteristics. For about 25% of the members who were categorized as subclinical hypothyroid or hyperthyroid, we may not affirm subclinical thyroid brokenness owing to the nonattendance of FT4 estimation. This may have driven to a few misclassification. Another limitation of this of this cross- sectional study is needed to distinguish between T1 and T2 DM and necessary to extend of the examining sizes.

7-Conclusion;

In conclusion; thyroid disorder and Diabetes mellitus type2 they are frequently

coexist and impact thyroid capacities. In this study the predominance of thyroid dysfunction was 26.35%. Hypothyroidism was more predominant disorder represented 19.54% than hyperthyroidism was 6.8%.Thyroid disorder are more in females (19.44%) than males (6.86%).Hormone TSH and blood HbA1c preferred test for diagnosis of thyroid dysfunction and screening of diabetic patients. This suggests that type 2 diabetics should have their thyroid evaluated.

8- Conflict of interest statement

The authors declare no conflicts of interest regarding the publication of this paper.

9- Acknowledgement

The researchers would like to thank all individuals who contributed to the completion of this work.

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in raw Iraqi milk

Sura I. A. Jabuk

Department of Biology, College of Science, University of Babylon, Iraq

Abstracts:

Food-borne diseases generally correlate with pathogens, such as *Staphylococcus aureus* affects public health through its association with animals and their products. One hundred raw milk samples were collected from the Iraqi supermarket to detect the present s. aureus enterotoxin by using an ELISA kit. The result showed that 37 milk samples from 100 contain enterotoxin in a percentage of 37% after measuring the optical density at 450nm. Toxicogenic *S. aureus* is capable of causing food disease because of its production of heat-stable toxins.

Keywords: ELISA kit, Toxicogenic *S. aureus*, Milk

Introduction

Staphylococcal Enterotoxins Superantigens (SAgs) were originally referred to as staphylococcal enterotoxins (SEs), as they caused common food poisoning symptoms such as severe diarrhea and vomiting (Otto *et al*., 2010).

More than 23 different type of staphylococcus enterotoxin and 11 type like toxins for examples SEA , SEE, SEG , SEJ, SEL , SEQ, SER ,SELK SELQ, SELU and SELX) are described (Holtfreter *et al*., 2006 ; Otto *et al* . , 2014).

The staphylococcal enterotoxins activate a large fraction of T lymphocytes via the direct crosslines of certain Vβ cell receptor T domains with preserved histocompatibility complex molecules in class II (MHC II) structures (Barnes, 2009; Bachert *et al*., 2010) **.** The released SAgs systemically act to stimulate many T-Cells to produce a considerable quantity of pro-inflammatory cytokines responsible for developing signs of diarrhea, hurry, discolor, heavy fever, vomiting, and hypotension (Bhunia, 2018).

Enzyme-Linked Immunosorbent Assay based on antibody-antigen recognition is considered the standard screening technique for SE detection because of its, portability, simplicity, reliability, and speed. Furthermore, several commercially

available ELISA kits, such as the sandwich ELISA, are used to detect SEs in food on a regular basis (Sundararaj *et al*.,2019; Ji *et al*., 2020; Gholafrouz *et al* ., 2020). The study aimed to determine the prevalence of *S. aureus* enterotoxin in raw Iraqi milk samples.

Materials and Methods:

- **Sample Collection:**

Collected 100 samples of raw milk from the Iraqi supermarket using a sterile container and carried them to the microbiology laboratory to detect the presence of *S.aureus* enterotoxin.

- **Detection of Enterotoxin by ELISA Kit**

The kit is sandwich ELISA used to detection of the *S. aureus* enterotoxin in Milk samples *according to* the manufacturing procedure. The color change from blue to yellow. Measured the absorbent at 450 nm. O.D of positive control should be ≥1.00. O.D of negative control should be ≤ 0.15. Cut off value= negative control +0.15. The sample is considered positive when the O.D.is ≥ cut off. The sample is considered negative when the O.D.is < cut off.

Result and Discussions:

The *S.aureus* enterotoxin ELISA kit was used for detecting the present enterotoxin antigen. The result showed that 37 milk samples from 100 contain enterotoxin in a percentage of 37% after measuring the optical density at 450nm. The optical density of cut-off=0.277. The sample is considered positive when the O.D.is ≥ cut off. The sample is considered negative when the O.D.is < cut off (0.277).

Milk contamination is common throughout the handling, processing, and distribution of the product. As a result, it can be used to boost personal health. As a result, stringent management and monitoring systems have been recommended as a way to reduce the danger of spreading germs from animals to people. In comparison with canned food, commercially canned foods are considered healthy when manufactured under carefully regulated conditions. When canned food shows signs of spoilage, leakage spurt, de-smell, or mold, do not use it (Walaa and Alaa,2021).

The SE gene combinations within these strains indicate that MGEs encoding various SE genes can pass frequently, thereby contributing considerably to their pathogenicity.

Cows are considered the primary source of enterotoxigenic *S. aureus* strains in raw milk. Cows with S. aureus mastitis can pass the bacteria onto their milk. Because of the importance of these toxins in both public health and the food industry, a reliable method for identifying enterotoxin strains in milk is required (Rahimi *et al* ., 2012).

Conclusion:

Because it produces heat-stable toxins, S. aureus can cause foodborne illness. This information should be taken into account when determining risk and developing relevant public health measures. S. aureus infection must be avoided from the farm to the table. Rapid and continuing surveillance, as well as improved diagnostic procedures, are needed to limit the risk of infection from S. aureus and SEs implicated in milk products.

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Allergens sensitization and Allergy modes among atopic diseases (Allergic rhinitis, Bronchial asthma and Atopic dermatitis)

in Basrah province Through 2021-2022

Ihsan Edan Alsaimay[*1] Falih Hmood Mezban[2] ,

Hasan lateef jasim[3] , Abbas abduljabbar jerri[3] , Israa riyadh amer[3]

[1]Department of microbiology, College of medicine , University of Basrah

[2]Center of allergy and asthma diseases , basrah

[3] Third stage students , College of medicine , University of Basrah

Key word: atopic diseases Allergic rhinitis, Bronchial asthma ,Atopic dermatitis ,allergy , allergens , polycheck technique

summary

Back ground: Atopic diseases are group of diseases which are very common in population and occur in all ages include Allergic rhinitis, Bronchial asthma ,Atopic dermatitis.

Aim: To determine allergens sensitization of atopic diseases in Basrah population through two years (2021 -2022).

Method: Estimation of allergic status for 234 patients which admitted to the health center and determine allergens sensitization by polycheck technique.

Results : Number and percentage of patient with atopic diseases were determined in this study, the age group 21_30 years records high percentage (26.50%) in male and female respecting with high significant difference P≤0.01 (p= 0.0492) The majority of atopic diseases was for age group 21_30 years for both sexes, reached 27.36% for male and 25.78% for female respectively with high significant difference P≤0.01(p= 0.0431 for male , p=0.0462 for female). The results shows that 55(23.5%) of patients both male and female with Allergic rhinitis , 99 (42%) of the patients with Bronchial asthma and 80 (34.19) of patients with Atopic dermatitis with no significant different (p= 0.176) for both sexes The age group 21_30 years recorded highly percentage for male and female respectively in comparison with other age groups.

*Corresponding author: Prof .Dr. Ihsan Edan Alsaimary, Department of Microbiology, University of Basrah, Collage of Medicine, Basrah, Iraq. Tel: 009647801410838, E-Mail: ihsanalsaimary@gmail.com , Ihsan.alsaimary@uobasrah.edu.iq

INTRODUCTION

Atopic disease associated with chronic systemic inflammation(Czarnowicki,et al.,2015) . Multiple comorbid chronic health problems , including disrupted sleep(Brockmann ,et,.2014) . hypertension and cardiovascular isolation ,(Zhang and Silverberg, 2015), obesity (Silverberg,2015) . (Juhn,2014) Warts and extra cutaneous diseases , and depression , anxiety , and various other psychiatric comorbidities .(Yaghmaie, et al., 2013). There is greater

risk of low bone mineral density in some patients with atopic disease (i.e. bronchial asthma , allergy rhinitis , dermatitis .(Li,et al .,2015) .

Bronchial asthma has been recognized as a significant health condition (Jackson and Staffort, 2009) . the etiological origins of asthma frequently vary between disease carriers ; for this reason, asthma has suggested better identified in terms of its physical symptoms rather than its cause(Boehlke, et al., 2014). Usually considered from a clinical point of view to consist of one or more of the following presented in acute attack: chest tightness , wheezing, shortness of breath and cough(Currie and Baker, 2012) .

Allergy rhinitis is allergic sensitization to airborne allergens for instance ,allergic sensitization usually systemic , the site of exposure to the sensitized allergen is typically localized to allergic disease . When antigen-presenting cells ingest allergens and present them to naive T cells, the sensitization begins in the mucosa. T cells divide into Th2 cells and cause naïve B cells to shift and become B cells and memory B cells that generate IgE. Immunological responses are caused by IgE-mediated reactions to harmless antigens or allergens and cause acute allergic symptoms, such as rhinitis(Borres, M.P.,MEbisawa, and P.A Eigenmann, 2011) .

Dermatitis it is skin allergen reactivity . Interestingly, IgE detects very small quantities of antigen, making it a "gatekeeper," as foreign particles are first identified in areas of interface with the setting. When these foreign particles, such as pollen, cat dander or peanut proteins, are harmless, IgE transitions from beneficial to life-like. Threatening IgE mediates allergic responses, such as atopic dermatitis. (Larché,; Akdis, and Valenta,2006).

The study aim is to determine the most common sensitizing aeroallergen in the patients with skin allergies in Basrah city through 2021 and 2022 .

MATERIAL AND METHODS

Study population

Retrospective study to two hundreds thirty four patients attending to center of allergy , asthma diseases and dermatitis in Basrah city who had a skin allergies with their age range from (one day – above 60 years) were included in study . The study performed during the period from 2021 to 2022 .

Poly check test

Test performance

A-To start the assay:all component was tested at room temperature and be mixed well.

B- Reagents lots provided with the actual kit was used only.

C-Powder wash buffer has to be diluted with demineralized water at least 30 minutes prior to use avoid foaming.

D- The membranes of the test cassettes shouldn't dry during the assay.

E-All incubation steps are performed at room temperature (18-24 c)and with constant shaking.

F- A flatbed scanner with CCD sensor and scanning resolution of 600 DPI was used for interpretation of the test result.

G- Performance was tested by automated system additional information sheets are available.

1- A sufficient number of polycheck allergy cassette was prepared and mark them-only on the long side of the cassette.

2- The cassettes was moisture with 1 ml wash buffers, by tapping upside-down on absorbent paper.

3- Overlay allergy cassettes with 250 micro leter of polycheck start solution (blue cap)and incubate for 60 seconds (always pipette into the gap).Tap the cassettes carefully upside-down on absorbent paper.

4-A 200 micro leters of the respective patients serum was add into the cassette and incubate for 60 minutes on a shaker place the MTP-holder on the middle of shaker.

5- A 3 times was decanted and washed with 1ml of polycheck wash buffer . Tap the cassettes carefully upside-down on absorbent paper .

6- A 250 micro leters was add wash buffer and incubate for 5 minutes on a shaker.

7-Repeat step 5 .Decant and tap the cassettes carefully.

8-A 250 micro leter of polycheck anti-IgE antibody was pipeted and incubated for 45 minutes on ashaker.decant and wash 3 times with 1 ml wash buffer. Tap the cassettes carefully on absorbent paper .

9- A 250 micro leters polycheck enzyme –labeled anti-ligand was add and incubated for 20 minutes on shaker .decant and wash as described in 7 .Tap the cassettes carefully on absorbent paper.

10- A 250 micro leter of polycheck substrate solution was add. and incubated for 20 minutes in the dark .decant and wash as described in 7.

11-Air dray the membrane and evaluate the polycheck allergy cassettes using scanner and the Biocheck imaging software .Fig.1

Figure (1) Mini Rocker-Shaker

Table (1) :Polycheck®-Kit Components(Biocheck Gmbh.Germany)

Components	Content	Preparation	Store at	Shelf Life
Polycheck® Allergy Cassettes	24 (12) Cassettes	ready to use	2 – 8 °C with desiccant in a sealed plastic bag	see expiry date
Start Solution Buffered protein solution	Manual: 2 (1) x 3.5 ml Automat: 1 x 10 ml	ready to use	2 – 8 °C	see expiry date
Anti-IgE Antibody Monoclonal (murine) Antibody labelled with ligand	Manual: 2 (1) x 3.5 ml Automat: 1 x 10 ml	ready to use	2 – 8 °C	see expiry date
Enzyme-Labelled Anti-Ligand Ligand conjugated to alkaline phosphatase	Manual: 2 (1) x 3.5 ml Automat: 1 x 10 ml	ready to use	2 – 8 °C	see expiry date
Substrate Solution 5‘bromo-4‘chloro-3‘ indolylphosphate and 4‘ nitroblue tetrazolium, buffered	Manual: 2 (1) x 3.5 ml Automat: 1 x 10 ml	ready to use	2 – 8 °C protect from light	see expiry date

Wash Buffer Phosphate Buffer, pH 7.4	2 (1) pouches	dissolve in 1 liter demineralised water	2 – 8 °C avoid foaming	30 days after dissolving; until the expiry date,

RESULTS AND DISCUSSION

According to their residence, the distribution of atopic diseases patients in this study revealed that atopic disease was more prevalent in Central areas(40.7%) than peripheral areas(29.3%) as shown in table.2 .Similar result was also produced by (Kilpelainen et al., 2000), the farm environment reduce risk of atopic disease in young adults in the presence or absence of family history of, besides people who lived in Central areas are in continuous and direct exposure to air pollution on a daily basis and were more likely to develop atopic disease. (Eseverri et al., 1998). studied the risk factors for development of asthma and among these risk factors, he found that all of the patients were from central areas.

Sensitization to pollen was higher in central areas than peripheral areas despite pollen counts are higher in peripheral areas and this can be due to development of immunological tolerance to pollen allergens in peripheral areas or due to adjuvant effects of central pollution.(Riedles, et al., 2000) found out that exposure to stables and/or farm milk is protective only if prior to one year of age and so if the mother exposes to these factors during pregnancy, also it could be due to many factors, breast feeding, lack of immunization, in addition to the exposure to the products of milk. Laboratory animal studies indicated that air pollutants make mucus membranes of airways tracts become more permeable, leading to the development of allergic reactions.(Kauffman et al.,2002). found out that IgE levels are significantly lower in those who permanently live in the country and in particular in those who live for > or = 10 years, in addition, positive skin prick tests (SPT) were significantly less prevalent in those who permanently lived in the country. (Majeed et al., 2008). found out that most of the asthmatic children lived in the central areas of Hyderabad.

Table-2- Distribution of atopic diseases according to gender and residency

Gender	Residency				Total	%
	Central		Peripheral			
	number	%	number	%		
Male	63	46.3	43	43.8	196.1	45.30%
Female	73	53.7	55	56.1	237.8	54.70%
Total	136	40.7	98	29.3	234	100.00%
probability	alue (p) =0.0862				Not significant	

Table -3- Distribution of a topic diseases for both gender according to various age groups

Age group	Male		Female		Total	
	Number	%	Number	%	Number	%
1 day < 2 years	0	0	0	0	0	0%
2-10 years	7	6.60%	11	8.59%	18	8%
11-20 Y	17	16.04%	24	18.75%	41	17.52%
21-30 Y	29	27.36%	33	25.78%	62	26.50%
31-40 Y	23	21.70%	26	20.31%	49	20.94%
41-50 Y	16	15.09%	18	14.06%	34	14.53%
51-60 Y	9	8.49%	8	6.25%	17	7.26%
above 60 Y	5	4.72%	8	6.25%	13	5.56%
Total	106	45.30%	128	54.70%	234	100%
Statistics probab	0.0431	significant	0.0462	significant	0.0492	

The statistical analysis showed no highly significant differences between male and females, according to the total percentages of allergic diseases for various age groups (P>0.01)

The table showed that the highly allergic disease was in the age group 21-30 yrs (62 patients in percentage %) while other age groups :

Less than 2 years 0%

2-10 yrs 8%

11-20 yrs 12.52%

21-30 yrs 26.50%

31-40 yrs 20.94%

41-50 yrs 14.53 %

51-60 yrs 7.26%

Above 60 yrs 5.56%

Table (3) showed the mean ages. There was no substantial difference between the groups in terms of ages.0.The patient's age range was (2 and > 60) years and this was consistent with most AI research, such as (Creticos, et al., 1996).Regarding the age group, the highest percentage (26.5 %) was (21-30) years old and the lowest percentage (5.5 %) was (above 60) years old.the researcher suggests that this outcome could have shown higher prevalence of bronchial asthma in individuals from 21-30 years old. (Hassan, 2009) endorsed this outcome. Females were more affected than males as shown in table (2). The percentage of females was(54.7%), where as that of male was(45.3%).Throughout data analysis, the majority (54.7%) were females, this indicates in majority of studies that atopic diseases incidence were in females more than in males. Prolong exposure to allergic irritant in work places or due to hormonal change between men and women. and this agrees with study of (Maddox and Schwartz, 2002) which stated that women aged 40 years have greater prevalence of asthma of the same age group. Also, (Mingomataj et al., 2008). found that the percentage of females was (62.6 %) while that of male was (37.4 %).This sex difference may be due to female sex hormones.

Table -4- occurrence of various types of atopic diseases according to gender

Gender	Atopic diseases							
	Allergy rhinitis		Bronchial Asthma		Atopic Dermatitis		Total	
	Number	%	Number	%	Number	%	Number	%
Male	28	26.42%	41	38.68%	37	33.94%	106	45.30%
Female	27	21.09%	58	45.31%	43	33.59%	128	54.70%
Total	55	23.50%	99	42.31%	80	34.19%	234	100.00%
probability value(p)	0.176		Not significant					

Table.4 showed the analysis revealed a high percentage (57.69%) of the study samples of other allergies not present (42.31 %) from samples of other allergies present because the researcher assumes this finding is attributable to experience of asthma patients who are subjected to continuous weekly

Treatment at the Basrah Allergy and Asthma Center . Hong,et al, did not confirm these outcomes (2012).

Atopic disease	Gender	Allergens																								
		D1	D2	D201	M1	M2	M3	M5	M6	F95	G2	GX7	F49	FX77	F4		FT5	F2	E1	W6	W9	F14	DP	io6	Total
Atopic dermitis	Male	3	7	3	8	5	5	6	7	0	2	3	2	4	0		1	0	0	0	1	2	3	2	64
	Female	8	9	4	11	6	2	10	9	1	4	6	1	5	1		3	1	2	0	3	1	1	1	81
Allergy rhinitis	Male	11	11	5	1	1	1	0	1	1	6	11	0	2	0		0	0	1	3	5	1	20	7	88
	Female	14	13	7	2	2	1	1	2	1	9	13	1	1	1		1	0	1	4	2	1	19	4	100
Bronchial asthma	Male	41	41	9	3	1	1	2	3	0	4	7	1	3	1		0	1	0	1	4	3	7	13	146
	Female	55	34	12	4	4	3	3	3	1	2	4	1	2	1		1	0	1	3	6	1	13	16	170
Total		132	115	40	29	19	13	22	25	4	27	44	6	17	4		6	2	5	11	21	9	63	43	649
	p= 0.0361			significant																					

Table -5- Distribution of atopic diseases according to various allergens in each gender

Table.5 showed that two hundreds and thirty four patients attending to center of allergy and asthma diseases in Basrah city who had a chest and skin allergies with their age range from (1 day - >60) years

Many investigators have shown temporal relationship between respiratory symptoms and exposure to allergen (Bousquet et al., 1990; Hammarlund et al., 1990). Sensitization to house dust mites was the commonest for both asthma and allergic rhinitis; sensitization to the mould was significant with asthma while grass to allergic rhinitis (Wohrl et al., 2006).

World wide, the commonest cause of perennial allergic rhinitis is allergy to house dust mite species including "Dermatophytes, pteronysinnus, Dermatophytes, Farinae and Dermatopytes, Eurgluphus". Other major perennial- allergen including domestic pets (cats, dogs, rabbits and horses) (Isik et al., 2011).

House Dust Mite and other allergens have been shown to be capable of causing may of elements of allergy (Abramowitz et al., 1980; Petersen and Skov, 2003).

One study showed that the most common allergen was the house dust mite followed by grass then domestics pets (dogs and cats) (Wood et al., 1999).

This study showed that the most common inhalant allergen was (mites). Followed by (alternaria), then (grass), and followed by other aeroallergens as show in table 6 ,and this agreed with above studies.

Other study demonstrated that sensitization to single allergen presented in (52%) of cases while sensitization to more than single allergen presented (48%) of cases (Anderson, 1992).

Exposure of sensitive patients with asthma to inhalant allergens has been shown to increase airway inflammation , airway hyper responsiveness, asthma symptoms , the need for medication and death due to asthma (Novembre et al., 1995).

The important finding of this study was that dermatophytes was the common inhalant allergens that had an association with asthma.It has been over 60 years ago since scientists proposed the exposure to dust mite was a cause of asthma in

Germany (Bernstein et al., 2008). Subsequently others (Bernstein et al., 2008) in the 1960s confirmed the association.

dermatophytes, alternaria and grass found to be the dominant risk factor for allergy (Nolte and DuBuske, 1997)

Inhalation of these allergens in sensitized subjects can cause immediate and late bronchoconstriction and wheezing (Ewan and Coote, 1990; Crobach et al., 1998; Wohrl et al., 2006; Bernstein et al., 2008; Nolte and DuBuske, 1997; Williams et al., 1992; Tschopp et al., 1998; King et al., 2008; Goldberg and Confino-Cohen, 1997; Dreborg, 1989).

Table -6- The role of various allergens in different types of atopic diseases for both sexes and various age groups in central and peripheral part of Basrah

Groups		Sex	Case History			Habit.		Allergen
	Male	Female	Allergy rhinitis	Bronchial Asthma	Atopic Dermatitis	Central	Peripheral	
1 day < 2 years	0	0						
2-10 years	7		2	2	3	5	2	D1,F49,F75,F2,m2 FX77, Dp
		11	3	3	5	4	7	Gx7,F95,G2,D1,D2
11-20 years	17		5	7	5	10	7	D1,D2,M3,F4,DP,GX7,W6 F49
		24	4	12	8	12	12	D1,D2,DP,G2,D201,GX7 M1,M3,F49,E1,M2,M6
21-30 years	29		7	14	8	16	13	D1,D2,G2,DP,D201,M2/M6,D1/D2 FX77,F95,W9,W6,F14
		33	8	18	7	19	14	D1,D2,G2,DP,D201,W6,W9,M5,F4, FX77
31-40 years	23		8	6	9	13	10	M5,FX77,W6,DP,D2,F14,M5,D201
		26	6	9	11	17	9	M1,M3,D201,IX267,DP,GX7,W6,D1
41-50 years	16		3	5	8	9	7	D1,D2,D201,F49,W6,DP
		18	4	9	5	11	7	D201,w6,f49,dp,d1,d2,g2
51-60 years	9		3	5	1	6	3	D1,D2,dp,g2,gx7,w6,m5
		8	1	4	3	5	3	D1,d2,w6,gx7,dp,m5,fx77,m3
Above 60 years	5			2	3	4	1	W6,dp,d1,d2,m5,m3
		8	1	3	4	5	3	D1,d2,g2,m3,d201,w6
Total (234)	106	128						
p= 0.0431 significant			p= 0.1321 not significant				p=0.192 not significant	

A	B	C
Sympol	Abbreviation	
D1	D. pteronyssinus	
F49	Apple	
F75	Egg Yolk	
F2	Cow's milk	
M2	Cladosporium herbarum	
FX77	Seafood Mix IV	
Dp	Mite	
GX7	6 Grass Mix	
F95	Peach	
G2	Bermuda Grass pollen	
D2	D.farinae	
M3	Aspergillus fumigatus	
F4	Wheat flour	
W6	Mugwort pollen	
D201	Blomia tropicalis	
M1	Penicillium notatum	
E1	Cat epithelia	
M6	Alternaria alternate	
W9	Plantain pollen	
F14	Soybean	
M5	Candida albicans	
i06	Cockroach	
GX7	6 Grass Mix	

Table .7 abbreviation of allergens name

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DNA sequencing and recording of a new Interleukin 4 gene among patients with bladder cancer

Ihsan E. AlSaimary Sahar A. AlObaidi, Murtadha M. ALMusafer,

Department of microbiology\ collage of medicine\ university of Basrah\ Basrah.

Key words: interleukine , bladder cancer, DNA sequencing

Summary

Aim: The aim of this study was to determine Immunomolecular expression of inflammatory interleukins (IL-4, IL-6 & IL-10) by using ELISA, conventional PCR and Sequencing technologies, to give acknowledge about the roles of these interleukins in patients with bladder cancer in Basrah province.

Method: A case-control study included 85 confirmed bladder cancer patients and 80 individual as a control group. Data about age, gender, smoking, alcohol drinking, family history, occupation, residency and clinical findings for all patients with urothelial carcinoma were collected.

Results : Interleukin-4 cytokine have been shown to play important roles in modulating the immune system for tumor growth .The current study evaluates the expression of IL-4, which discovered (90 percent positive expression) with a molecular weight of 180bp, followed by sequencing to find a variety of mutations in the forward and reverse strands.

Conclusion: DNA sequencing and recording of a new Interleukin 4 gene among patients with bladder cancer was carried in the present study

***Corresponding author: Prof .Dr. Ihsan Edan Alsaimary, Department of Microbiology, University of Basrah, Collage of Medicine, Basrah, Iraq. Tel: 009647801410838,**

E-Mail: ihsanalsaimary@gmail.com and Ihsan.alsaimary@uobasrah.edu.iq

Introduction

Urothelial carcinoma is a disease in which the lining of the bladder lose their ability to regulate their growth and begin to divide uncontrollably, this abnormal growth can form a tumor, This abnormality may be caused by secondary chronic inflammation of lower urinary tract, stones, smoking and exposure to various chemicals, exposure to carcinogens products and compounds, and secondary schistosomiasis (Cohen *et al.*, 2000). Bladder cancer is a heterogeneous either, low-grade, superficial papillary lesion or high-grade, invasive tumor that usually has metastasized at the time of presentation (Ferri, 2003). Transitional cell carcinoma accounts for almost 5% of all human cancers and represents 95% of all urothelial tumors (Ashoor, 2007). It is the second most common tumor of the genitourinary tract, it's also the second most common cause of death from these cancers

(Williams *et al*., 2001). It is the most common malignant tumor in the Western countries and the fifth most common cancer among males with an incidence of 29.8 per 100.000 males per year (Ashoor, 2007).in addition, it is the most common malignant tumor in the Middle East and Africa where Schistosomiasis is a prevelant problem (Kadhim, 2009). In Iraq it's the third most common malignant tumor with incidence 6.6% in both males and females reported by Iraqi cancer registry (ICR), It's the second most common tumor in males (10.3%) and the eighth in females (3%)(ICR, 2000).

Interleukin-4 (IL-4), a member of the α-helical cytokine family, is produced by activated CD4+ T cells, basophils, and mast cells. IL-4 is the central differentiation factor driving Th2 development, eliminating extracellular pathogens, and inhibiting Th1 differentiation. Therefore, IL-4 plays an important role in surveillance and elimination of transformed cells . Numerous epidemiologic studies have examined the association of IL-4 gene polymorphisms with cancer risk (Muller-Hermelink, *et al.,* 2008). Moreover IL-4 receptor (IL-4R) as a heterodimeric complex can bind to the Th2 cytokines IL-4 and IL-13, High level expression of IL-4R has been observed in colorectal carcinoma, In addition, polymorphisms of IL-4R were involved in the etiology of various cancers, including pancreatic cancer, bladder cancer and cervical cancer (Luo, *et al.,* 2015) Interleukin-4 as a Th2 cytokine is structurally and functionally related with IL-13, They regulate immune responses and the immune microenvironment, not only under normal physiological conditions, but also in cancer, IL-4 cytokines bind to it's high-affinity receptor and form various configurations of receptor subtypes. Many studies have reported that IL-4 and IL-13 bind to IL-4Rα and IL-13Rα1 chains, forming functional receptors in cancer cells, After forming ligand-receptor complexes, both cytokines initiate signal transduction and mediate biological effects, such as tumor proliferation, cell survival, cell adhesion and metastasis, In certain cancers, the presence of these cytokine receptors may serve as biomarkers of cancer aggressiveness (Suzuki, *et al.,* 2015). IL-4 is a cytokine which has a role in the modulation of the humoral immune response and It's also interferes with the secretion of the pro-inflammatory cytokines (TNF-a), IL-6 and IL-1, moreover IL-4 also inhibits macrophages and involved in cancer formation, but on the other hand IL-4 was significantly reduced in BC patients after instillation of combination immunotherapy (Groah, *et al.,* 2002).In a series of studies, it's suggest that overexpression of IL-4 receptors on cancer cells provides targets for therapeutic agents for cancer therapy, In addition, interleukin-4 cytokine and it's receptor (IL-4R) have been shown to play important roles in modulating the immune system for tumor growth, IL-4 it's receptors seem to play a major role in cancer stem cells and provide unique targets to eradicate these cells, IL-4 attributes in cancer biology and pre-clinical and clinical studies

pertaining to recombinant immunotoxins designed to target these receptors (Suzuki, *et al.,* 2015).

Materials and methods

Sampling

A Case-control study was conducted between October 2020 to July 2021 which carried for patients with bladder carcinoma according to minimum sampling size equation that depend on the disease ratio, the total number of bladder cancer patients involved in this study are (85) individual were taken from Basrah oncology center in Basrah province, the age of patients range from 30->60 years and (80) individual considered as control group after they were checked and confirmed to be free from any urological or any other clinical problems. during collection process data about each patient were reported in questionnaire paper for each one, which included age, gender, family history, smoking, alcohol drinking, occupation, residency and clinical findings. Five ml of venous blood was taken from 165 participant (85 for patients and 80 for control), 2ml kept in EDTA tube for molecular study (nucleic acid extraction) which kept at -20 for preservation prior use. All controls that involved in this study (80 individual) were checked to be sure that they were free from any urological disease, tumor, allergies and other infectious disease.

Conventional PCR Technique

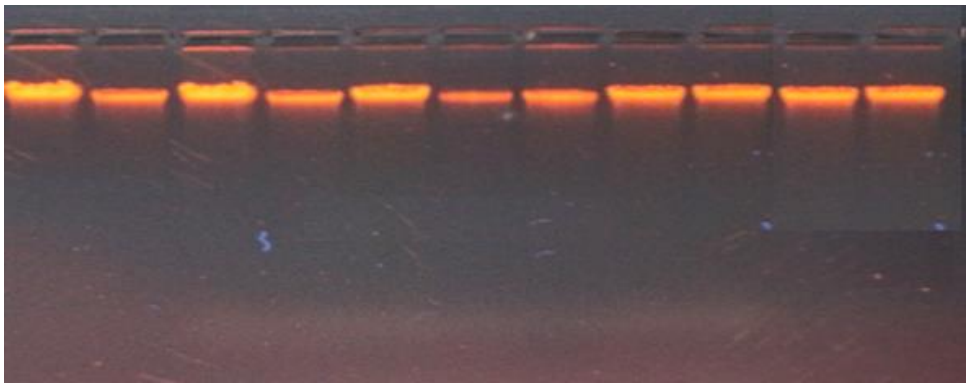
DNA extraction: very high quality and purity DNA have been extracted from whole blood of patients with bladder cancer and control group by using DNA extraction kit (ZYMO RESEARCH, Quick-DNA™ Miniprep kit) which give very high quality and quantity of DNA and every sample was extracted separately and then run on gel electrophoresis for result confirmation.

DNA extraction kit (ZYMO RESEARCH, Quick-DNA™ Miniprep kit): Table (1) illustrate the components of DNA extraction kit and figure (1) show the extracted DNA on 1% agarose gel running on electrophoresis and detected by using UV imaging system .

Table (1):The components of DNA extraction kit

Components	Amount
Genomic Lysis Buffer	50 ml
DNA Pre-Wash Buffer	15 ml

g-DNA Wash Buffer	50 ml
DNA Elution Buffer	10 ml
Zymo-Spin™ IICR Columns	50
Collection Tubes	100



Figure(1) Show DNA product extracted from whole blood after running on 1% agarose gel electrophoresis and viewed by using UV imaging system.

Conventional PCR mix components: the table below show the component of PCR reaction mix.

Table (2) PCR master mix volume

PCR mix		**Volume**
Promega Green Master mix		12.5 µl
Extracted DNA		5 µl
Nuclease free water		5.5 µl
Primer	Forward primer	1 µl
	Revers primer	1 µl
Total		25 µl

primers of the markers that used in the study: Table (3) Illustrate the primer sequence and product size of IL-4**.**

Table (3) show Interleukin 4 primer.

Genes	Primers sequence	M.W	Reference
IL-4	F: CCCCCACCAGTGGCTACC	182bp	(Mohan, *et al.*,2009)
	R: CCAGGAATGAGGTCTTGGAA		

Preparation of agarose gel: 1% of agarose gel was Prepared by mixing 1 gram of agarose powder with 100ml of already prepared TBE buffer in Pyrex conical flask , then dissolved the mixture very well in microwave oven for about 4 min at medium temperature until it start boiling with no thread appearance throughout agarose liquid, allow the agarose to cool until 50 C° then ethidium bromide was added to the gel (5µl of the stain per 100ml of agarose gel), after that the gel poured into the mold and let it at room temperature to solidify and be ready to use.

Thermal Cycler working Programs: In this study different temperatures were used for each step (denaturation, annealing and extension) as it's has been mentioned in the table (4).

Table (4) Illustrate the thermal cycles of PCR

Gene	Temperature (°C)\ Time					Cycle No.
	Initial denaturation	Cycling temperature			Final extension	
		Denaturation	Annealing	Extension		
IL-4	95\5 min	95\45 sec	60\30 sec	72\30 sec	72\5 min	40

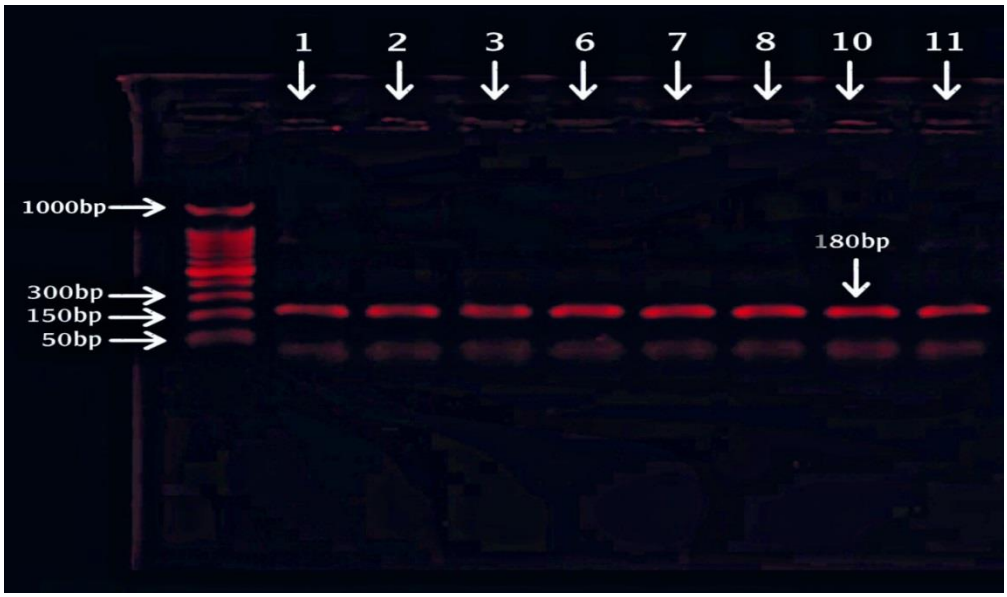
DNA Sequencing: The sequence of the nucleotide of interleukins genes was known in 2samples, as 25 microliters of each sample of the PCR product with the Primers of the nucleotide of interleukin 4 gene were sent to Macro-gene in the Korea and after obtaining the results (Appendix 2) all the results were compared directly with the nucleotide of the nucleotide of interleukin 4 (IL4) Available in the internet (http: NCBI Reference Sequence) by computer program (BioEdit Pro. version: 7.0.0). The results were registered in NCBI under accession numbers (LC634417 & LC634418)Which is available on the website.

Statistical analysis

Statistical analysis was carried out by using SPSS VER.23 two way T test (student's T-test) and chi square to find out the statistical differences between all variables. probability less than 0.05 is significant ($P<0.05$)

Results

PCR amplification results which was done on the extracted DNA have been confirmed by using gel electrophoresis which appear as compact DNA separated bands which were results from the accurate and specific binding between the target DNA template and its specific primer, these bands viewed under UV imaging system and appear as illuminating orange bands due to ethidium bromide stain, only bands with expected molecular size 180bp (IL-4 specific primer) were observed. As shown in the figure below.



Figure(2) show positive PCR amplification result for IL-4 which have 180bp M.W in compression with ladder size, lane(1,2,3,6,7,8,10) for patients and (11) for control were positive samples on 1% agarose gel on (70 voltage for 45 min)

DNA sequencing of IL-4

Forward primer identity

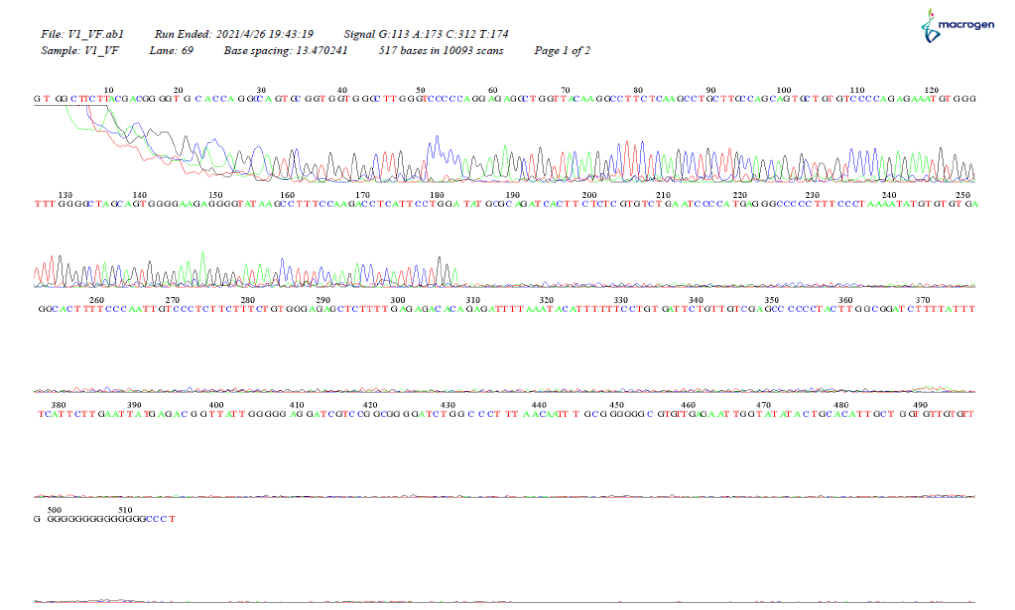
Homo sapiens interleukin 4 receptor forward (IL4R), transcript variant 3, mRNA
Sequence ID: NM_001257406.2 Length: 3491Number of Matches: 1
Range 1:1817 to 1984

Score	Expect	Identities	Gaps	Strand
298 bits(161)	3e-76	166/168(99%)	2/168(1%)	Plus/Plus

```
Query  17    GGGT-GCA-CCAGGCCAGTGCGGTGGTGGGCTTGGGTCCCCCAGGAGAGGCTGGTTACAA  74
             ||||  ||| ||||||||||||||||||||||||||||||||||||||||||||||||||
Sbjct  1817  GGGTGGCACCCAGGCCAGTGCGGTGGTGGGCTTGGGTCCCCCAGGAGAGGCTGGTTACAA  1876

Query  75    GGCCTTCTCAAGCCTGCTTGCCAGCAGTGCTGTGTCCCCAGAGAAATGTGGGTTTGGGGC  134
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Sbjct  1877  GGCCTTCTCAAGCCTGCTTGCCAGCAGTGCTGTGTCCCCAGAGAAATGTGGGTTTGGGGC  1936

Query  135   TAGCAGTGGGGAAGAGGGGTATAAGCCTTTCCAAGACCTCATTCCTGG  182
             ||||||||||||||||||||||||||||||||||||||||||||||||
Sbjct  1937  TAGCAGTGGGGAAGAGGGGTATAAGCCTTTCCAAGACCTCATTCCTGG  1984
```



IL-4 forward primer Phylogenetic tree

The program that used to draw the phylogenetic tree PROMEGA-6.

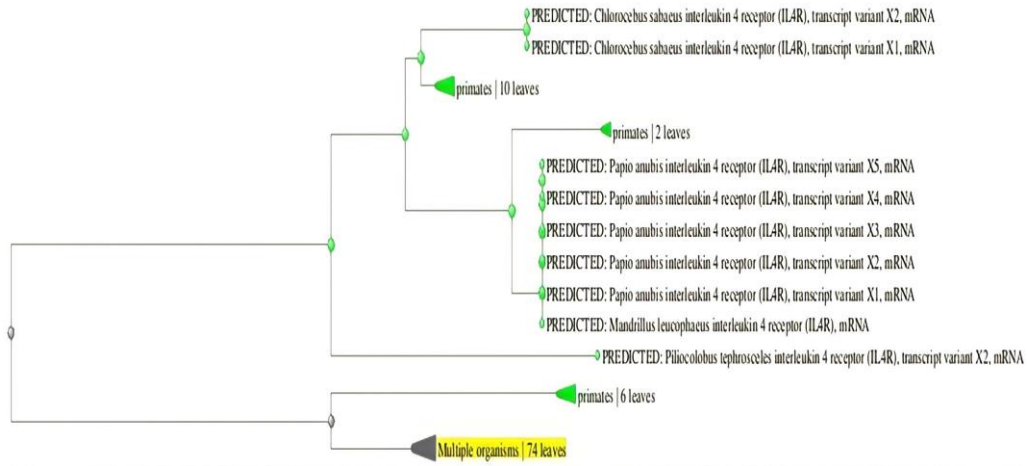


Figure (3): phylogenetic tree analysis for IL-4

IL-4 forward primer mutations

Table below shown the most common types of mutations in the IL4 gene, sequence in this study.

Table (5) most common types of mutations in the IL4 gene

No. of sample	Wild type	Mutant type	Site
1	G	-	5
1	C	-	9

DNA sequencing for IL-4 reverse primer

Homo sapiens interleukin 4 receptor reverse (IL4R), transcript variant 3, mRNA
Sequence ID: NM_001257406.2 Length: 3491Number of Matches: 1

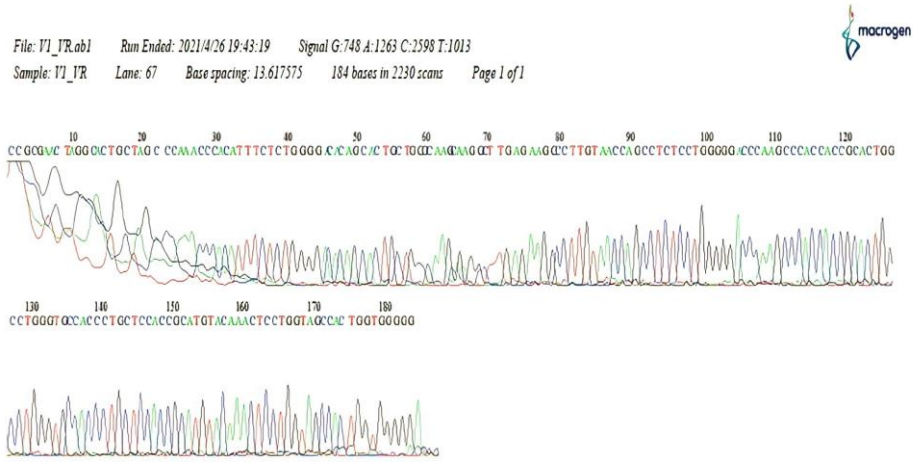
Range 1:1817 to 1984

Score	Expect	Identities	Gaps	Strand
294 bits(159)	1e-75	169/173(98%)	3/173(1%)	Plus/Minus

```
Query  13    CACTGCTAG-CCCAAACCCACATTTCTCTGGGGACACAGCACTGCTGGGCAAGCAAGGCT  71
             ||||||||| ||||||||||||||||||||||||||||||||||||| ||||| |||||
Sbjct  1944  CACTGCTAGCCCCAAACCCACATTTCTCTGGGGACACAGCACTGCTGG-CAAGC-AGGCT  1887

Query  72    TGAGAAGGCCTTGTAACCAGCCTCTCCTGGGGGACCCAAGCCCACCACCGCACTGGCCTG  131
             ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Sbjct  1886  TGAGAAGGCCTTGTAACCAGCCTCTCCTGGGGGACCCAAGCCCACCACCGCACTGGCCTG  1827

Query  132   GGTGCCACCCTGCTCCACCGCATGTACAAACTCCTGGTAGCCACTGGTGGGGG  184
             ||||||||||||||||||||||||||||||||||| ||||||||||||||||
Sbjct  1826  GGTGCCACCCTGCTCCACCGCATGTACAAACTCCTGATAGCCACTGGTGGGGG  1774
```



Phylogenetic tree

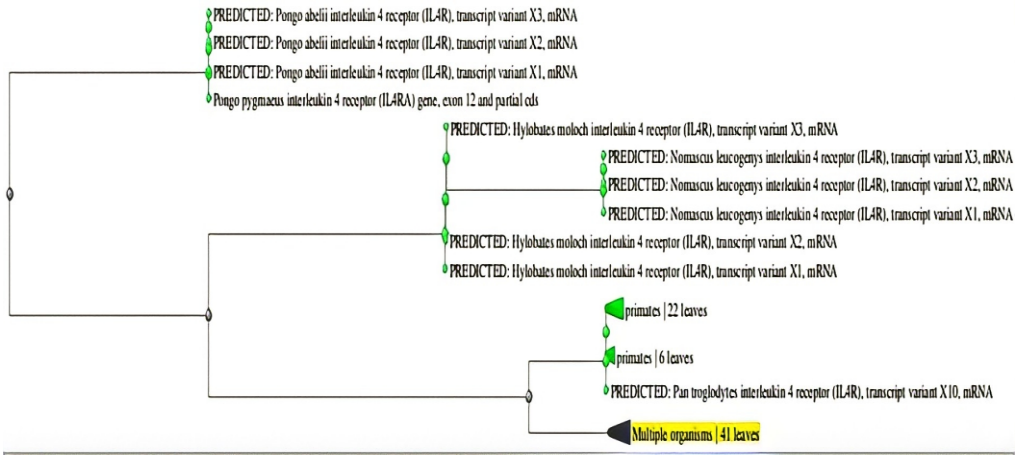


Figure (4): phylogenetic tree analysis for IL-4

IL-4 reverse primer mutations

The Table below show the most common types of mutations in the IL4 gene, sequence in this study.

Table (6) The most common types of mutations in the IL4 gene

No. of sample	Wild type	Mutant type	Site
R			
2	C	-	10
2	-	G	60
2	-	A	66

IL-4 Gene recording at NCBI.

The present study able to discovered and recorded a new gene for IL-4 forward locus LC634417.1 on wild gene under a new accession NO. by the name of study researchers in gene bank of NCBI.

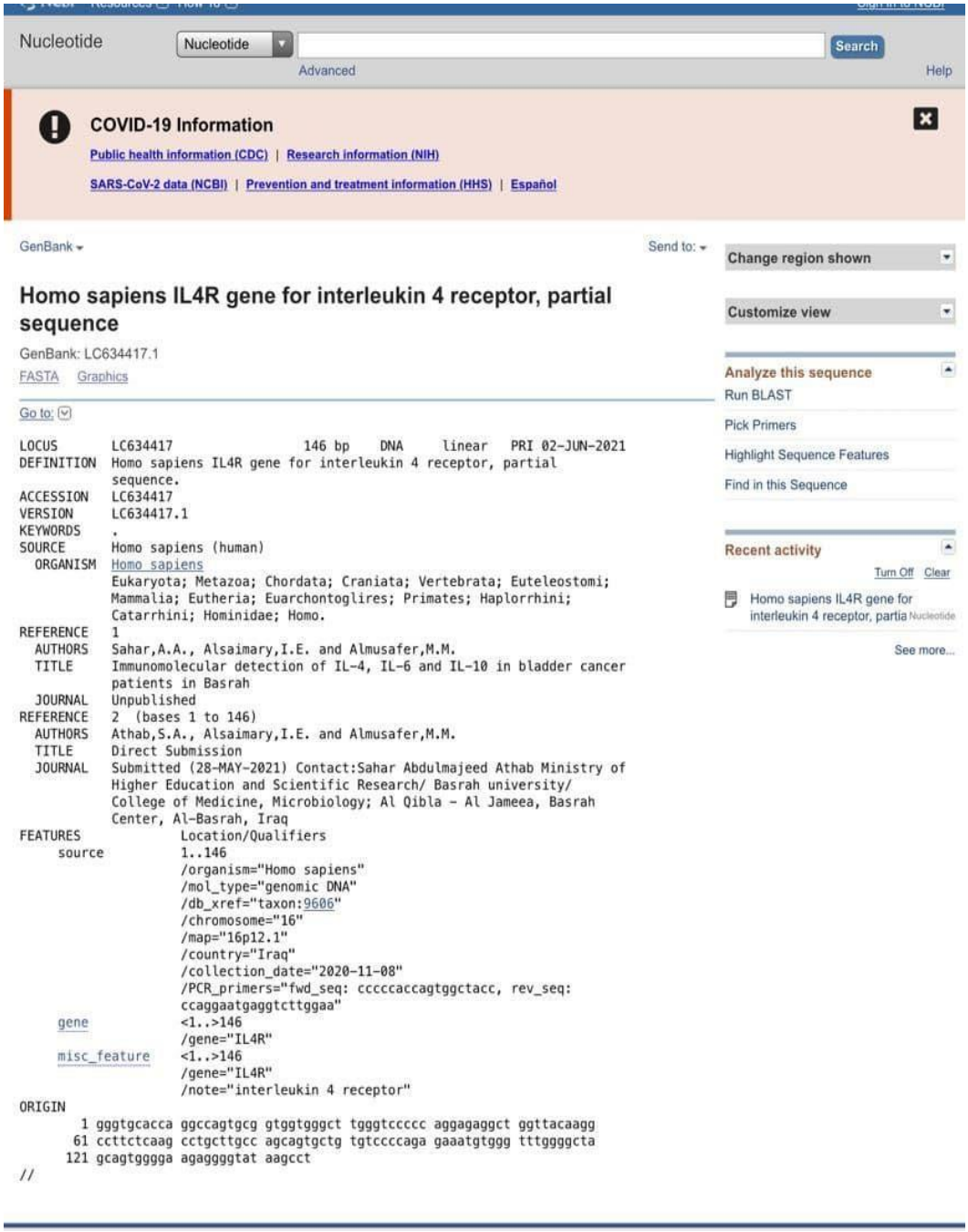


Figure (5): IL-4 gene recording at NCBI

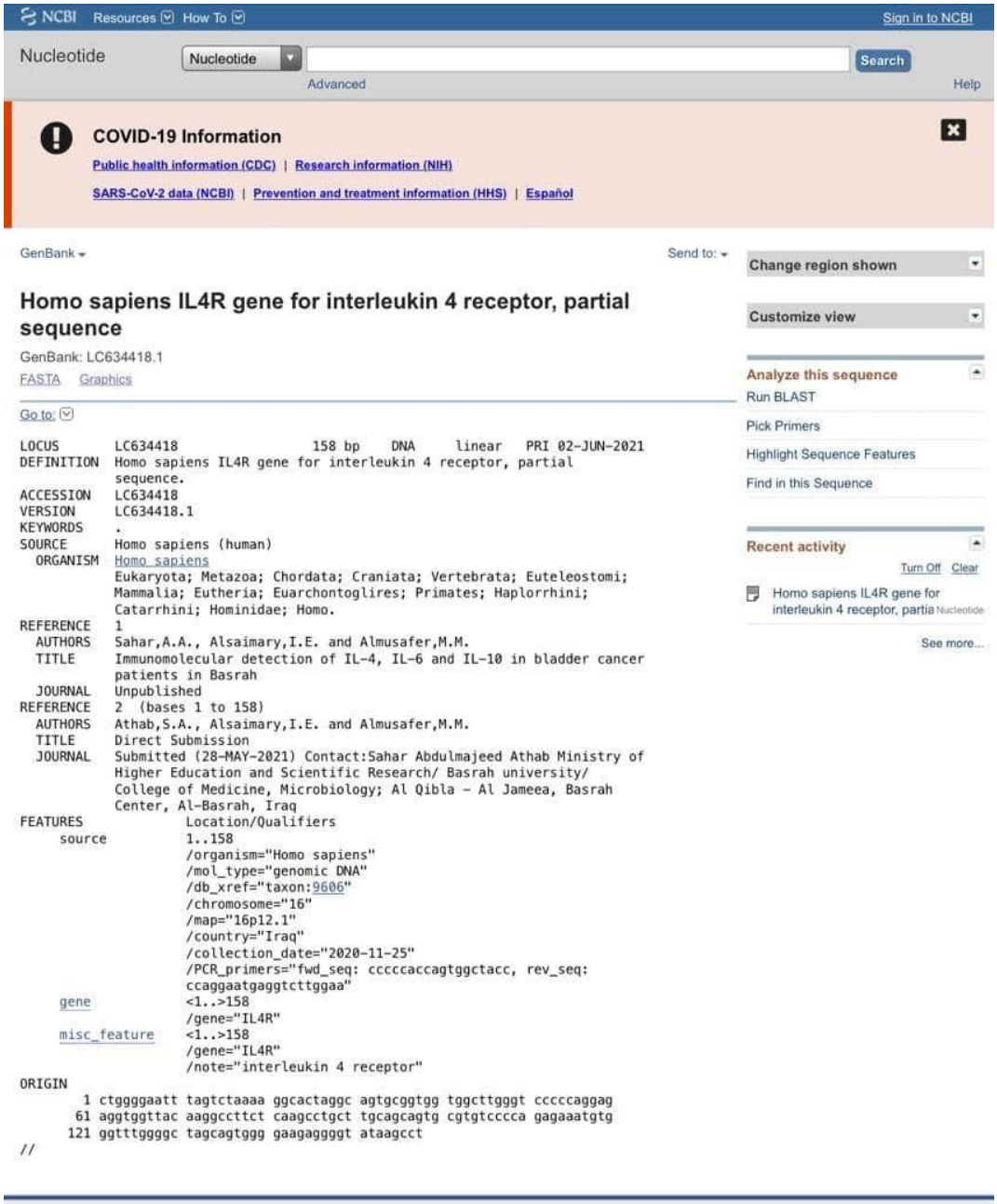


Figure (6): IL-4 gene recording at NCBI

Discussion

Sequencing results of the current study for IL-4 showed obvious convergence between our gene IL-4 isolate and that of gene bank database (NCBI) with identity ratio reach 166\168 (99%) for forward IL-4 and 169\173(98%) for revers IL-4 identity. there were two deletion mutations appeared in forward IL-4 were: (**G & C)** at the sites **5,9** respectively, as well in the revers IL-4 there is single deletion mutation (**C)** at the site **10** and two insertion **(G**) at the site **60 & (A)** at the site **66**, and there is no similarities between our IL-6 & IL-10 genes and those preserved of gene bank database (NCBI) may be due to plenty of mutations in our genes, or no recorded of interleukins genes related to human bladder cancer in NCBI

There are no previous studies IL-4, IL-6 & IL-10 sequencing in relation with bladder cancer, so our study was the first international study interested in this subject and we will compare our result with results from other disease.

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Are

infection and vaccination booster affecting ١٩-COVID ophthalmological infections

[1],Alzahraa Imad HmoodIhasn E. AlSaimary[1] ,

[3]Alaa H. AlAsady ، [2]Imad H. AlMayah

University of Basrah -College of Medicine 1:

2:Alshefaa general hospital – basrah

Al-Mawani teaching hospital - Basrah 3:

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Summary

Aim: The aim of this study was to see how likely it is to spread ١٩-the " 'Eye Infections " among patients with COVID.

Method: if there is any correlation between the covid-19 patients andCOVID(control) persons can show eye -Non positive ١٤٢cases; we got ٢٥٦infections. This study included)COVID-Non ١١٤and ١٩-with COVID . control under approval of ethical committee.

Results: the distribution of eye infections sThis search show patients ١٩-years of COVID(٦٠<-١) samong various age group The data about (age, residency, vaccination, . and control symptoms, chemotherapy, infection type. In addition the and females show differences of these standards between males and ١٩-that the females are more likely to get infected with CoviD .Eye infections

Conclusion: There are differences between vaccinated and non vaccinated patients with eye infections associated with covid-19

***Dr. Ihsan Edan Alsaimary, . Corresponding author: Prof Department of Microbiology, University of Basrah, Collage of :Mail-E ،٠٠٩٦٤٧٨٠١٤١٠٨٣٨Medicine, Basrah, Iraq. Tel: ihsanalsaimary@gmail.com**

Introduction

COVID-19 affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalizatio -known as COVID ،٢٠١٩Coronavirus disease is an emerging infection which is caused by the severe acute ،١٩ that was first (٢-SARSCoV) ٢-espiratory syndrome coronavirusr An infection in your eye can show up in . [١]reported in Wuhan city, many different ways. A lot depends on which part of your eye has the id, Cornea problem. For instance, you can get symptoms in your:{Eyel clear surface that covers the outside of your iris) , Conjunctiva (thin,) moist area that covers the inside of the eyelids and outer white part of Eye infections can cause .[٣Is my Eye Infected ,). [ )٢your eye)} g redness, pain, itching, and blurry bothersome symptoms, includin vision. Different germs can affect various parts of the eye. As a result, each type of eye infection may require different treatment. While many minor eye infections heal well on their own, others can be cause permanent vision loss. Eye infections can be serious and may .caused by either viruses or bacteria, or occasionally by a fungus(4) , .[٥types of eye infections, their symptoms, and how to treat them,). [You may have symptoms in one or both eyes when you have an infection, the probems or symptoms you may notice (Pain or discomfort, Itchy eyes, Feeling that something's on or in your eye, light sensitivity(Eye hurts when it's bright) , Burning in your eyes, ur eyelashes, Small, painful lump under your eyelid or at the base of yo Eyelid is tender when you touch it , Eyes won't stop tearing up , Irritation in your eyes); Some other problems you may get are fever, trouble wearing contacts, and swollen lymph nodes near your ear and e changes like (Discharge out you have blurry vision . You could hav of one or both eyes that's yellow, green, or clear ; Pink color in the whites" of your eyes ; Swollen red, or purple eyelids ; Crusty lashes " and lids, especially in the morning Is my Eye Infected ,By Rachel It's an infection of your conjunctiva and usually gives] Reiff Ellis , on .your eyes a pink tint(6) It can be caused by a bacteria or virus, although sometimes you might get it from an allergic reaction or lts, irritants. It's common to get pinkeye when you have a cold. In adu

it is most commonly caused by a virus, and in children it is most likely Types of conjunctivitis include:{ Viral: Affects adults)٧(bacterial ; more than children and is the most common type of conjunctivitis , ts children , Gonococcal: Bacterial: A pinkeye that commonly affec Common in newborns and sexually active teenagers, Chlamydial: Typically occurs alongside a genital infection , Allergic: Occurs when allergens enter the eye, such as pollen, dust mites, or pet dander (8) inflammation of your cornea that can be caused Keratitis ": This is an by bacteria, viruses, or parasites in water. It's a common problem for people who wear contact lenses." Stye " : It can crop up as painful red bumps under your eyelid or at the base of your eyelashes. TWo mon types of endophthalmitis include (Exogenous com endophthalmitis, Endogenous(9)is a bacterial or fungal " Cellulitis infection. It can affect the skin and the eyes. Two types of cellulitis eyelids, may affect the eyes : Preseptal cellulitis; This type affects the Orbital cellulitis: This type affects the eyeball or causes swelling of the eye or eyelid. Symptoms of cellulitis in the eye include (bulging of the eye, red eyelids, swelling around the eye, vision changes, such as trouble moving the eye normally, fever, ، double vision or blurriness is inflammation of the eyelids. Causes include "fatigue)." Blepharitis bacterial infection, allergies, clogged oil glands in the eyelids, and certain skin conditions. There are two main types of blepharitis ,Posterior blepharitis); symptoms Of blepharitis(Anterior blepharitis (redness and swelling of the eyelids, itchiness in the eyelid, watery eyes , burning or stinging in the eyes, feeling of an object or und the eyes, grit in the eye, eyelids that appear greasy, flaky skin aro ٨)،crusty eyelashes or lashes sticking together, sensitivity to light) Uveitis " : is)١٠(common Eye infections and How to treat them , inflammation of the uvea, which is the middle layer of the eyeball that uveitis include (redness in one or both contains the iris. Symptoms of eyes, sensitivity to light, blurry vision, a sudden appearance of ،(particles, or "floaters" in vision11).Eye herpes is spread by contact infection, not through sexual ١-with someone who has an active HSV Symptoms tend to infect one eye at a time, and .(٢-at's HSVcontact (th include (eye pain and irritation of the eye, sensitivity to light, blurry

vision, eye tissue or corneal tears, thick, watery discharge, eyelid (inflammation12.)

The present study aimed to determine the main ophthalmological infections among covid-19 patients .

Material and methods

th ٢٩to ٢٠٢٢th February٨This study was conducted between ٢٠٢٢March

and eye infections where ١٩-which carried for patients with COVID (١٤٢)the total number of cases was ، their PCR was positive Shifaa -individual were taken from the epidemiological ward of Al Mawania General Hospital , the age of -General Hospital and Al considered as control (١١٤)years and (٦٠< -١)patients range from ng collection process data about each duri ، (١٩-COVID-group (Non patient were reported in questionnaire paper for each one , which included (gender , age , Residency, vaccinations) , in addition clinical or not , the chemotherapy ١٩-findings which involve having COVID nd symptoms they show related with eye infection (lid they take , a swilling , red eye, tearing, congestion, discharge,ocular pain) of the . disease which we have highlight in the current study

Statistical analysis

two ٢٣SPSS VER. Statistical analysis was carried out by using test) and chi square to find out the statistical -way T test (student's T is ٠,٠٥differences between all variables. probability less than .(٠,٠٥significant (P<

Results

A total of the total cases were females , while the rest (%٦٠)١٥٢ .were males patients (%٤٠)١٠٤

Distribution of population study according to gender (١)Table

Gender	.No	%
Male	١٠٤	%٤٠,٦
Female	١٥٢	%٥٩,٤
Total	٢٥٦	%١٠٠

According to the table (2) have the highest rate ٦٠the ages above cases . ٢٥٦of the total (%٣٧)٩٦and Eye Infection ١٩-of COVID While patients from the central residence have the highest rates -because hospitals are closer for them. In addition the Non (%٦١)١٥٧ ts are more than the vaccinated ones , Due to the Vaccinated patien .lack of awareness of the people and their desire to vaccinated

Age composition of the samples is significant variant between male Vaccination status was not .(٠,٠٥>and female patients (p value tly different in relation to sex distribution. Similarly, significan residence did not a significant statistical difference between sex .groups

illustrate demographical factors affecting eye infection (٢)Table patients and Control ١٩-among COVID according to age groups and others.

age group	female		male		total	
	.No	%	.No	%	.No	%
١٠_١	٢	%٠,٧	٥	%١,٩	٧	%٢,٧
٢٠-١١	٤	%١,٥	٩	%٣,٥	١٣	%٥

٣٠-٢١	٤	%١,٥	١	%٠,٣	٥	%١,٩
٤٠-٣١	٧	%٢,٧	١٢	%٤,٦	١٩	%٧,٤
٥٠-٤١	٣١	%١٢	١١	%٤	٤٢	%١٦,٤
٦٠-٥١	٣٩	%١٥	٣٥	%١٣	٧٤	%٢٩
٦٠<	٦٥	%٢٥	٣١	%١٢	٩٦	%٣٧
p:value	٠,٠٤١٣					significant
chi : ^{٢}x square	١,٢٤٦					

residency	female		male		total	
	.No	%	.No	%	.No	%
central	٩٦	%٣٧	٦١	%٢٣	١٥٧	%٦١
peripheral	٥٦	%٢٢	٤٣	%١٧	٩٩	%٣٨
p:value	٠,٠٦١٧					Not Significant
chi : ^{٢}x square	٤,٣٨٩					

vaccination						
Non vaccine	١١٩	%٤٦	٦٥	%٢٥	١٨٤	%٧٢
P:value	٠,٠٣٤					Significant
chi square : ^{٢}x	٢,١٦٧					
st١vaccine	١٦	%٦	١٧	%٦,٦	٣٣	%١٣
nd٢vaccine	١٧	%٦,٦	٢٢	%٨	٣٩	%١٥
rd٣vaccine	٠	%٠	٠	%٠	٠	%٠
p:value	٠,١٣٥					Not Significant
chi square : ^{٢}x	٤,٣١١					

Clinical presentations showed in table(3) significant variation between male and female patients and that the most symptom of eye from the ١٠٤is the ocular pain ١٩-infection patients with COVID cases , while ٢٣n with patients , then congestio ٤١total cases , tearing patients with lid swilling and discharge. ٣for erd eye and ٧ (٠,٠٣٨١value = -Statistically the differences are significant with (P

clinical features of eye infections among patients with (٣)Table ١٩-COVID

Symptoms	female		male				total
	.No	%	.No	%	-COVID ١٩	Control	
lid swilling	٤٢	%١٦	٢٨	%١١	٣	٦٧	١٤٠
Ocular pain	٥٨	%٢٢	٤٧	%١٨	١٠٤	١١	٢٢٠
tearing	٦٣	%٢٥	٣٥	%١٤	٤١	٥٧	١٩٦
congestion	١٤	%٥,٤	٢١	%٨	٢٣	١٢	٧٠
discharge	٣٩	%١٥	٢٥	%١٠	٣	٦١	١٢٨
red eye	١٦	٦,٢٥ %	٢٧	%١٠,٥	٧	٣٦	٨٦
p:value	٠,٠٣٨١					significant	
chi square : ^{٢}x	٧,٣٤٦						

to specific gender in ١٩No particular predilection of covid .relation to receiving booster doses of the vaccine

٠,٧٣٢value = -significant with (P-Statistically the differences are Not (

(٤)Table : booster vaccination among patients with eye infections

١٩-With COVID		female		male		total	
		.No	%	.No	%	.No	%
yes	vaccinated	٠	%٠	٢	%٠,٧	٢	(st١)٢
	-Non vaccinated	١١	%٤,٢	٨	%٣	١٩	%٧,٤
No	vaccinated	٢٩	%١١	٦٧	%٢٦	٩٦	(st١)٧١ (nd٢)٢٥
	-Non vaccinated	٢٣	%٨,٩	١٤	%٥,٤	٣٧	%١٤,٤
p:value	٠,٧٣٢						Not significant
chi square : $x^{٢}$	٢,٤٤٦						

Distribution of medical treatment did not show significant variation over sex groups.

infections Types of chemotherapy for patients with eye (٥)Table

Chemotherapy		female		male		total	
		.No	%	.No	%	.No	%
Topical antibiotic	Eye drops	٥٢	%٢٠	٥٢	%٢٠	١٠٤	%٤١
	Eye drop & Ointment	٢٧	%١٠,٥	٢٢	%٩	٤٩	%١٩
topical & Systemic .A.B		٧	%٢,٧	٤	%١,٥	١١	%٤,٢
p:value	٠,٠٤٦٩						significant
chi square : x^2	٤,٦٢٣						

Similarly, type of eye infection was significantly different in relation to sex. According to the information of the table below, the showed the highest infections with ١٩-patients with COVID infection which is the most common eye (%٦,٢٦)١٦conjunctivitis . spreaded

(٠,٠٥value = -Statistically the differences are significant with (P

patients and ١٩-Type of eye infections among COVID (٦)Table Control

Infection type	١٩-with COVID		١٩-No COVID			
	female	male	female		male	
	.No	.No	.No	%	.No	%
Eye stye	١	١	٣٤	%١٣	١٩	%٧,٤
chalazion	١	٠	٢٦	%١٠	٢٣	%٨,٩
viral keratitis	١	٠	٤٦	%١٨	١٦	%٦,٢٥
conjunctivitis	(%٦,٢٦)١٦	٩	٣١	%١٢	٣٨	%١٤,٨
total	١٩	١٠	١٣٧	%٥٣	٩٦	%٣٧,٥
P:value	٠,٠٣٩٢					significant
chi square : $x^{٢}$	٨,٩٢١					

Discussion

pandemic has (١٩COVID) ٢٠١٩The coronavirus disease presented major challenges to ophthalmologists.In certain instances, ١٩-conjunctivitis can be the first presenting symptoms of COVID swilling , red eye, in addition to the other symptoms (lid [٨infection.[tearing, congestion, discharge,ocular pain) that maybe an indicator for infection . In this study most symptoms of eye ١٩-eye and COVID years age group were as (٦٠<)infection which appeared among from (٤١)cases , tearing ٢٢٠ from total (١٠٤)followed ocular pain (٧)cases , red eye (٧٠)from total (٢٣)cases , congestion (١٩٦)total cases , discharge (١٤٠)from total (٣)cases , lid swilling (٨٦)from total cases . Statistically the differences were significant (١٢٨)from total (٣) and (٠,٠٤١٣value = -years (P (٦٠<)age groups especially the for the were almost all of the (٠,٠٣٨١value = -the Ocular pain symptom (P from total (١٠٤)suffer from ocular pain ١٩-patients with COVID ye patients , in addition the highest type of e ١٩-COVID (١١٤) patients suffer from is " Conjunctivitis " ١٩-infection that COVID Conclusions [٩]in this study , and according to another study (%٦,٢٦) tissue -Data aggregation for coronaviruses shows a relatively low eye n manifestation of tropism. Conjunctival congestion is an uncommo similar to all human coronaviruses' infections. In a low ١٩-COVID percentage of patients, the virus can be excreted in ocular fluids at ٢-Cov-different stages of the infection, regardless of positive SARS ads in ocular tissue seem to have throat swab. Albeit high viral lo . relatively low prevalence(13,14,15)

Apart from age groups and clinical presentations, all of the studied ١٩variables were not significantly different in relation to sex of covid .patients

between January ،١ ٢٠٢٠ and uaryJan ٣١، ٢٠٢١، 46 case

reports, 8 case series,11 cross sectional/cohort observationalstudies, 5 prospective interventional studies,

3animal models/autopsy studies and 6 reviews/meta-analysis were included. Conjunctivitis is the most common manifestation and can develop at any stage of the disease. Direct effect due to virus, immune mediated tissue damage, activation of the coagulation cascade and prothrombotic state induced by the viral infection, the associated comorbidities and drugs used in the managementare responsible for the findings in the eye.(16,17,18,19,20) The viral ribonucleic acid (RNA) has been isolated from ocular tissues but the role of eye as a route for infection is yet to be substantiated. Ophthalmic manifestations may be the presenting feature of ١٩-COVID infection or they may develop several weeks after recovery. Ophthalmologists should be aware of the possible associations of ocular diseases with SARS-CoV-2 in order to ask relevant history, look for specific signs, adviseappropriate tests and thereby mitigate the spread of infection as well as diagnose and initiate early treatment for life and vision threatening complications.(20-30)

COVID-19, first reported in Wuhan in China in December 2019, spread to all parts of the world to the proportion of a pandemic by March 2020. -CoV-SARS ٢ is a member of the coronaviridae ،family Betacoronavirus genus and is an enveloped stranded-single RNA virus. The COVID-19 illnesscan range from asymptomatic or mild flu-like symptoms to severerespiratory distress.(40-46) It is now known that it can have effects on almost all organs of the body including the cardiovascular, neurological, and

gastrointestinal systems. An ophthalmologist was the first to report the virus in Wuhan and himself actedcontr and succumbed to the disease while treating a patient for .glaucoma Ophthalmic manifestations are variedin terms of ،presentation ،severity and .timing Wu et al. suggested that ophthalmic manifestations are more common in patients with severe systemic disease with abnormal blood and inflammatory parameters.[13] Based on the findings in the eyes of the patients, it has been suggested that exposure of unprotected eyes can also lead to infection with SAR-CoV-2 virus.[18] The theories about routes of transmission of the virus to the eyes include direct inoculation of conjunctiva by droplets, migration of upper respiratory tract infection through the nasolacrimalduct or lacrimal gland involvement by the hematogenous route.[29] Samples collected with Schirmer strips and conjunctival swabs have detected the viral RNA in very few patients. Low sensitivity of ،PCR-RT significantly lower viral load in conjunctival samples as compared to ،nasopharynx and sampling timing related to disease can account for the low .yield A negative result does not exclude the possibility of the virus being present in tears or ocularsurface and the presence of the virus in ocularsamples does not imply an .infection As discussed before, there is no evidence of viral replication in ocular tissues.[39] Keeping in mind that the conclusions of different studies are still blurred, it is advisable to use goggles, slit lamp breath

shields, and sanitization techniques while examining patients.(45-50)

The review of available literature stssugge that there is very low risk of transmission through the ocular.surface This could be because of the very fact that although ٢-ACE receptors and ٢TMPRSS have been demonstrated on conjunctival and corneal ،epithelia the number of these receptors is very low as compared to the respiratory .tissues The binding capacity of the virus to the receptors on ocularsurface also appears to be ،low mediated by the lactoferrin in tears which prevents attachment of the virus to heparan sulfate proteoglycans which pshel in its subsequent binding to ٢-ACE .receptor Serum IgA may also play a protective [٤٩role.[

The medications that have been used to treat ١٩-COVID also have ocular.toxicities term-Long use of chloroquine and hydroxychloroquine can lead to retinaltytoxici but it is not expected or seen with the brief periodof use for .١٩-COVID Lopinavir/Ritonavir may cause reactivation of autoimmune .conditions Ribavirin has not been used much for ١٩-COVID but is known to cause ،retinopathy retinalvein ،occlusion sserouretinal،detachment arteritic-non ischemic optic neuropathy and -Vogt Harada-Koyanagi (VKH) .disease Interferon has been associated with ،retinopathy ،VKH،conjunctivitis ،uveitis optic ،neuropathy corneal ،ulcers epithelial defects and Sjogren's .syndrome Tocilizumab has been reported to produce cotton wool spots and retinal.hemorrhages Systemic corticosteroids are known to cause ،cataract

glaucoma and central serous.chorioretinopathy The risk of threatening-life fungalinfection in predisposed alsindividu cannot be .overemphasized Central retinalvein occlusion has been reported in patients receiving .IVIG These points should be kept in mind by an ophthalmologist during the history and examination of

[١٥-٨patients.[

The ophthalmic features can develop at any point in the disease .course The median time of appearance from the time of development of ١٩-COVID symptoms/diagnosis of -neuro ophthalmic features is ٥ ،days of ocularsurface and anterior segment manifestations is ٨,٥ days and posterior segment dan orbital pathology is ١٢ .days Future Directions and (٦٣-٥٥Conclusion(

The prevalence of ophthalmic manifestations among ١٩-COVID patients ranges from [٣].%٣٢-٢ The causalrelation with ٢-CoV-SARS is yet to be established with certainty for any of these .conditions Whether they are a result of -pre existing systemic ،condition whether the virus ،has in ،fact aggravated the underlying ،condition whether the virus causes direct damage to the ،nerves ،vessels and other structures or whether it is ultimately het body's own immune system responsible for the ،pathology are some of the unanswered questions which would take larger based-population studies with standardized methods of ،examination investigations and data collection to .resolve While the viral RNA sha been identified in different parts of the

،eye its replication and infectivity is not .established The transmission of the virus via eye secretions is being actively .investigated There is an imminent need for establishing based-evidence guidelines for rophylacticp use of antifungals in patients with high risk of cerebral-orbito-rhino mucormycosis diagnosed with ١٩-COVID who require .corticosteroids Thromboembolic complications are well .established Studies to establish risk factors for ophthalmic rvascula occlusions in ١٩-COVID patients followed by development of anticoagulation prophylaxis regimen keeping ophthalmic implications in mind are also .required As we enter the phase of ،vaccination a substantial proportion of the population has already been posedex to the ٢-CoV-SARS ،virus either in the form of overt clinical disease or contact with a patient diagnosed with ١٩-COVID with subclinical .illness Several countries of the world are experiencing resurgence of cases with mutated .strains We can elydefinit expect to see more manifestations of the disease in the eye and even clusters of similar .cases For ،now we have tried to present a broad overview of the various possible features that have been published till date from around the fworld and the stage o

the disease when they can be expected to help ophthalmologists keep in mind the importance of asking specific history about ١٩-COVID ،infection contact with infected person or related .symptoms ١٩-COVID should be included in the lists of causes fo

common ophthalmic pathologies elucidated .above It should also be suspected when there is

unusual presentation of a disease in an age group or population phenotype where it is not expected like histiocytic lesion in an elderly .individual gKnowin that many of these manifestations can be the presenting feature can help diagnose the infection early and limit the disease .transmission Tests like nasopharyngeal swab for ،PCR-RT antibody titers for previous infection for patients with ophthalmic aintscompl or computed tomography of the paranasal sinuses to look for sinusitis along

with a scan for the chest in risk-high patients by physicians treating ١٩-COVID cases need to be advised conscientiously and .logically Ophthalmologists are also encouraged to report cases seen in association with COVID-19 to add to the pool of knowledge on a global level.(50-64)

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Study of global financial crises and their effects on accounting systems

Dear: Asaad Sasaa Agrab[1], Abdalameer Zamil Latif [2]. Ghaith hakim malik[3]
abdulameer.zamil@qu.edu.iq [٢] gaith.malik@qu.edu.iq[3]
asaad.saad@qu.edu.iq[1]

Department of Chemical Engineering College of Engineering AL-Qadisiyah University, Iraq ١
Department of Chemical Engineering College of Engineering AL-Qadisiyah University, Iraq ٢
College of Computer Science and Information Technology AL-Qadisiyah University, ٣
Iraq

Abstract

This examination paper plans to concentrate on the effect of monetary emergencies on bookkeeping and monetary announcing, by investigating the main monetary emergencies looked by the worldwide monetary local area, with an attention on the two emergencies of the American market in 2002 and the worldwide monetary emergency in 2008. I propose that the bookkeeping calling has been significantly impacted by these emergencies, as the bookkeeping calling was one of the reasons for these emergencies, which was reflected in the expanded worldwide interest in making a few changes and giving enactment and laws that help the degrees of divulgence, straightforwardness and corporate administration.

Keywords: Financial, crises and repercussions.

Introduction

In the course of recent hundreds of years, the world has been presented to many emergencies, a large portion of which were delegated monetary emergencies as a result of their affiliation ,Absolutely monetary perspectives, identified with trade rates, world stock trades, or the overall degree of costs. Then again, actually a number A set number of these emergencies got incredible interest in contemplating and breaking down its causes and repercussions.

It is noticed that regardless of the variety of monetary emergencies during the past periods, a set number of them left genuine repercussions at the worldwide level, just as plainly affected the suspected and practice of bookkeeping and detailing processes thusly, the analyst will address the most significant of these emergencies and their repercussions, as follows:

1. American market emergency - 2002 Promotion.
2. The worldwide monetary emergency - 2007/2009 Advertisement.

American monetary market emergency 2002 Advertisement

The American economy saw a few monetary and bookkeeping disappointments toward the start of the third thousand years because of monetary control Also, authoritative debasement in significant American organizations, which incorporated a few organizations, including Enron, Worldcom, Merck, Tyco and Wellbeing South, which drove a portion of these organizations to chapter 11 and enormous misfortunes for partners, public economies and the worldwide economy, and the resulting loss of the monetary local area's trust in data The bookkeeping remembered for the monetary reports of these organizations and the

increment in the assumptions hole among clients and the distributed monetary reports)

Enron was the most conspicuous organization that imploded in the US of America, and it was working in the field of advertising power and gaseous petrol, where the cost of the organization's portion on 1/1/2001 was sold at more than $90 per share, and from that date until the start of the late spring of 2001 Enron's presentation was surveyed by 19 speculation research organizations, where 12 organizations gave it a solid purchase proposal, while 5 different organizations gave it a purchase suggestion. Furthermore, the organization's yearly report in 2000 showed that the His return didn't prompt any crucial bookkeeping issues, however he declared on 4/8/2001 the abdication of the organization's leader following a half year from his situation for individual reasons (Jordan Financial Screen, 2014.

On October 16, 2001, the organization revealed its misfortunes for the second from last quarter of the year, because of which the worth of the offer tumbled to 33 dollars, and on October 28, with the rise of issues with organizations with particular purposes, which were utilized by Enron to get to the capital market and stow away from hazards. An exceptional advisory group was framed from the organization's directorate, and the report of this board of trustees presumed that a portion of the organization's workers are straightforwardly engaged with organizations with specific purposes, and that they acquired huge number of dollars shamefully. The panel likewise presumed that Numerous tasks were pointed toward accomplishing helpful outcomes in the fiscal summaries, and they don't rely upon real financial destinations or hazard move. In the meantime, the worth of the organization's portions experienced a total breakdown, and the SEC mentioned on October 22, 2001

Data about units outside the organization's monetary record, and its portion value tumbled to about $20. On November 12 of that very year, the organization reported its changed benefits for the period 1997/2000, which prompted misfortunes of $600 million, and its portion value dropped to almost 8 dollars, and on December 2, the organization sought financial protection techniques and its portions became useless).

Bookkeeping repercussions of the American monetary market emergency:

The breakdown of a gathering of huge partnerships in the last part of the 1990s and mid 2000s in the US The US of America, uncovered the requirement for great corporate administration that attempts to help corporate responsibility, social responsibility, hazard the board, and revelation and straightforwardness rehearses (Ntimetal., 2013, p.363). One of the examinations showed that the fall

of American organizations in 2002 is because of the shortcoming of interior control frameworks and the expansion in regulatory and bookkeeping defilement, and that bookkeeping debasement is because of the job of evaluators and their accentuation on the lucidity of fiscal summaries and their appearance of monetary focuses and action In opposition to the truth and reality (Jordan Financial Screen, 2014, pg. 4), as occurred on account of Arthur Anderson's office being engaged with the breakdown of Enron and its supporting of the organization's control of its budget summaries, which prompted the exit of Arthur Anderson's office in the wake of being one of the main five workplaces on the planet .Because of what the American monetary market was presented to, the American specialists started to set up changes addressed in:

1. The issuance of the Sarbanes-Oxley Act in July 2002, which addresses an immediate response to the disappointments of organizations and bookkeeping, as the vast majority of the fault for these disappointments was coordinated to the sheets of chiefs. Obligations allocated to him by investors.The Sarbanes-Oxley (SOX) Act was planned to reestablish financial backer trust in the capital business sectors also, that is by upgrading believability and straightforwardness in monetary reports by accentuating precise, complete and ideal revelation of fiscal summaries (Akhigbe and Martin, 2006, p.990). The SEC has shown that great corporate administration and monetary announcing is the genuine objective paying little mind to The size of the organization, regardless of whether it is huge or little) (Wonglimpiyarat, 2009, p.300.

Sarbanes-Oxley Law zeroed in on three fundamental tomahawks: evaluating, monetary detailing and corporate administration, as follows :

A. An as to inspecting: A higher committee for bookkeeping oversight in broad daylight organizations was framed, and an association An authoritative assignment that creates and fortifies audit guidelines, as well as reinforcing the autonomy and authority of the survey advisory group. Revealing review expenses and connections, and restricting examining workplaces from playing out every one of the review administrations. also, counseling administrations for a similar organization.
B. In regards to the monetary report: the law requires individual underwriting from the top of the leader the executives and the top of the office .Fiscal summaries guarantee the precision of organizations' monetary reports, and the law requires the SEC to survey the fiscal summaries each 3 years, also, the law required expanded exposure of spending plan things and

authoritative commitments. business-to-the board standards, partner standards, and brief exposure of critical changes in conditions what's more, corporate money.

C. In regards to Corporate Administration: The law expects organizations to reveal moral codes to As well as assessing the viability of inside review and hazard control and the board. The law showed that it should be finished Denying both the CEO and the CFO of their compensation assuming the organization should be reestablished The planning of its fiscal summaries, and the head of the senior administration faces criminal punishments notwithstanding respectful punishments in An instance of investors being cheated.

Make a progression of audits of the posting rules for the New York Stock Trade - NYSE and the American Stock Affiliation NASDAQ was set up in August 2002, determined to fortify the job of the governing body and managing public business organizations. These references included:

A. most of the Governing body of organizations enlisted in NYSE should be autonomous individuals, and the organization should have a free survey advisory group comprising of no less than 3 individuals, including a monetary master.
B. That the NYSE-recorded organization incorporates a completely free pay board of trustees.
C. The presence of a free individual from the corporate administration advisory group of the organization enlisted in NYSE.
D. The presence of a standard gathering plan for the non-chief heads of the organization enlisted in NYSE. It is important to hold a yearly gathering of the autonomous overseers of the organization enrolled in NYSE.

3. SEC was framed in 2002 Promotion, the Private Area Gathering to survey the bookkeeping calling, known as the Public Responsibility Board (PAB), and one of the interests of this committee was assessing the nature of bookkeeping data)

Considering the past show, the accompanying ends can be reached:

1. The American market emergency impacted the certainty of financial backers in the monetary business sectors, and uncovered weaknesses in the monetary business sectors The integrity of the boards of directors, disclosure and transparency.

2. That the audit profession was one of the reasons for the emergence of this crisis, and this appears through the exit of one of the auditing offices The major in the profession of auditing is the office of Arther Anderson.
3. Corporate governance was a prominent feature in response to this crisis, and there is a global trend towards tight Supervising the management of companies to prevent them from abusing their powers and urging them to protect the rights of shareholdersstakeholders and improve their accounting practices.
4. This crisis resulted in the issuance of legal legislation such as - SOX, in addition to an amendment to the rules of registration in the market American money, and some standards and interpretations have been issued by the FASB.

Bookkeeping repercussions of the worldwide monetary emergency

Bookkeeping and divulgence issues have gotten incredible consideration since the start of the new worldwide monetary emergency by most states, and discussion has seethed over the viability of hazard the executives and revelation rehearses.

This brought about the holding of the G-20 culmination, the gathering of the money pastors of the G-8 industrialized nations in June 2009, the Committee of Priests of the European Association, and the warning gathering for the monetary emergency radiating from the IASB and FASB, and these gatherings gave incredible consideration Pondering the job of bookkeeping and monetary announcing with regards to the new monetary emergency, as this premium mirrored the expanded acknowledgment of the requirement for a sound means of bookkeeping and revelation for organizations to accomplish monetary dependability and the worldwide monetary framework. The trial results additionally showed the requirement for organizations to execute new corporate administration frameworks, to accomplish business

These new frameworks should contain decides that limit the entrance of significant investors to managerial and administrative positions, increment the level of outside individuals on sheets of chiefs, lessen the level of originators' support in warning capacities, and further develop data straightforwardness. The new worldwide emergency has prompted an expansion in light of a legitimate concern for the Association for Financial Participation and Advancement in a few issues, for example:

1. The viability of the governing body assuming liability for deciding chief compensation.
2. Promoter for full straightforwardness with respect to compensate frameworks.
3. Empowering investors to talk about the prizes and enact the Say on Pay Voting rule.
4. Insufficiency of intentional divulgence leads at times.

In this unique circumstance, some likewise accept that handling the worldwide monetary emergency, restricting its belongings, and keeping away from its repeat Its event relies upon a few things, including:

1. Building up new government rules and enactment for corporate administration. -
2. Apply the standards of corporate administration that as of now exist. -
3. Change of monetary announcing and bookkeeping frameworks to all the more likely uncover hazards.
4. Upgrade the revelation of leader compensation.

It addressed the worldwide response to inadequacies in corporate administration, monetary revealing and practices .Bookkeeping, in a gathering of significant changes will be introduced beneath:

1. The issuance of the report of the Monetary Solidness Gathering - FSF in April 2008, which contained 68 proposals to fortify monetary business sectors and foundations. These suggestions included 3 proposals identified with working on monetary announcing. These proposals framed the center of IASB's reaction to the monetary emergency and incorporate three themes: exposure and normalization And acknowledgment, where these suggestions demonstrated:

- IASB ought to further develop bookkeeping guidelines and revelation of wobbly sheet tasks.
- The IASB should expand thoughtfulness regarding principles exposure of assessments, systems, and vulnerability related with gauges.
- The IASB ought to work on the direction on the valuation of monetary instruments in latent business sectors.

2. Giving the report of the G20 Culmination on Monetary Business sectors and the Worldwide Economy on 11/15/2008 under the title "Fortifying Straightforwardness and Responsibility." The Highest point likewise noticed that global bookkeeping standard-setting bodies ought to reinforce

their direction on assessing complex protections in business sectors that don't have Liquidity, growing resource exposure necessities.

3. The gathering of the Gathering of Twenty - G-20 on 4/2/2009, which suggested that bookkeeping standard-setters should focus on creating principles for assessing monetary instruments dependent on the liquidity of these instruments. The gathering likewise showed that the accompanying advances ought to be taken by bookkeeping standard-setters before the finish of 2009 :

- Decreasing the intricacies of bookkeeping norms for monetary instruments.
- Further developing the bookkeeping acknowledgment of advance misfortunes by expanding the degree of data unveiled.
- Further developed bookkeeping principles to give data on off-financial plan exercises, and the vulnerability related with assessments and assessments.
- Increment clearness and consistency in the use of assessment guidelines globally. Expanded revenue in fostering a solitary arrangement of excellent worldwide bookkeeping guidelines. Include partners, controllers, and markets in creating autonomous bookkeeping principles and investigating the IASB's implicit rules.

4. The "Money Road Change and Purchaser Assurance" Act was passed in the US of America in .

The Dodd-Candid Demonstration is one of the most grounded bookkeeping repercussions of the new monetary emergency. , by further developing responsibility and straightforwardness in the monetary framework.

In the space of strengthening corporate administration, Passage 971 of Law "area 971" manages the advancement of divulgence about the design of the Top managerial staff, the Administrator of the Directorate and the leader the board of the organization, as specified in passage 972 "segment 972" that inside a period not surpassing 180 days from the date of issuance of this law, the Protections Exchanging Commission (SEC) will give rules requiring organizations recorded in The US market Exposure of the explanations behind the administrator of the governing body impersonation of the situation of the CEO or its identical in chief situations in the organization.

Considering the past show, the accompanying ends can be reached:

1. This emergency uncovered a reasonable imperfection in the guidelines of exposure, straightforwardness and corporate administration, particularly as

to unveiling the executives rewards, and the disappointment of sheets of chiefs to satisfy their obligations.

2. This necessary the inadequacies in the elements of the directorate and the absence of revelation and straightforwardness, and the tremendous worldwide monetary misfortunes that followed. Global bodies and associations mediate to make authoritative and administrative revisions in light of a legitimate concern for reinforcing revelation, straightforwardness and corporate administration, fully intent on reestablishing trust in the capital business sectors and keeping away from the repeat of such events. Such an emergency later on.

Conclusion

The review inferred that monetary emergencies impacted the bookkeeping calling by expanding worldwide consideration ,by giving enactment and controls that fortify exposure and straightforwardness, and initiate corporate administration frameworks determined to build the believability of monetary reports, reestablishing trust in monetary business sectors, and keeping away from the event of monetary emergencies once more.

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Essentially Semismall Quasi-Dedekind modules and nonsingular modules

Zahraa jawad kadhim
Computer Engineering, Al-mansur University College

Mukdad Qaess Hussain
College of Education for pure science, Diyala University

Heyam Khazaal Alkhayyat
College of Computer science and Mathematics, Kufa University

Abstract

Let R be a ring with 1 and L be a unitary left Module over R. In this paper we study the relationship between Essentially Semismall Quasi-Dedekind Modules and nonsingular Modules. Also, we give some examples which illustrate these relations.

Keywords: Essentially semismall Quasi-Dedekind Module, nonsingular Module.

Introduction

A Submodule U of an R-Module L is small in L ($U \ll L$) if $L = U + V$ for every Submodule V of L then $V = L$[1]. A proper Submodule U of an R-Module L is semismall of L ($U \ll_S L$) if $U = 0$ or $U/V \ll L/V$ $\forall$ nonzero Submodule V of U[2]. A Submodule U of R-Module L is essentially semismall ($U \ll_{es} L$), if for each nonzero semismall Submodule V of L, $U \cap V \neq 0$[3]. An R-Module L is essentially semismall quasi-Dedekind (ESSQD) if $Hom(L/V, L) = 0$ $\forall$ $V \ll_{es} L$[3]. A ring R is ESSQD if R is an ESSQD R-Module [3]. Let L be an R-Module, put $Z(L) = \{l \in L : ann_R(l) \leq_e R\}$. Z(L) is the singular Submodule of L. L is singular if $Z(L) = L$ and L is nonsingular if $Z(L) = 0$[4]. In this paper we give the relationship between ESSQD Modules and nonsingular Modules.

An R-Module L is semismall quasi-Dedekind (SSQD), if each Submodule $0 \neq V$ of L is semismall quasi-invertible; that is $Hom(L/V, L) = 0$, $\forall$ $0 \neq V \ll_s L$[5].

Proposition1 Let L be nonsingular Module, thus each essential semismall Submodule of L is semismall quasi-invertible Submodule of L.

Proof: Let U be essential semismall Submodule of L and a homomorphism $f : L/U \to L$, $f \neq 0$. Then $\exists\, l \in L$ s.t $f(l + U) = l \neq 0, l \in L$. Let $r \in R$ and $r \notin ann(l)$. Thus $rl \neq 0$; $rl \notin U$. But U is essential semismall in L, $\exists\, s \neq 0, s \in R$ s.t $0 \neq srl \in U$. Then $0 = f(srl + I) = srf(l + U) = srl$ implies $sr \in ann(l)$. Thus $ann(l)$ is essential semismall ideal of R. Then $l = 0$, hence $f = 0$. Therefore $Hom(L/U, L) = 0$.

From prop.1, we get the following proposition:

Proposition2 Every nonsingular Module is an ESSQD Module.

The converse of prop. 2 is not true, as the following example shows:

Example3 Z_p as Z-Module, where p is prime number is an ESSQD which is not nonsingular since $Z(Z_P)=\{l\in Z_P : ann_Z(l)\leq_e Z\}= Z_P \neq 0$.

Remarks4

1) Every Rickart ring is nonsingular ring, by [4,prop 1.27, p.35], so it is an ESSQD ring.

2) Every regular ring is nonsingular ring, by [4,p.36], so it is an ESSQD ring.

3) If D is prime R-Module, then $End_R(\overline{D})$ is an ESSQD.

Proof: By [7, prop 3.7, p.36] and (Rem. 4(2)).

4) Any direct product of integral domains is nonsingular ring, by [4, p.36], so it is an ESSQD ring.

5) For any ring R. R/Z(R) is nonsingular ring; that is Z(R/Z (R)) = 0, by [4, Ex.5, p.36], so R/Z(R) is an ESSQD ring.

6) Let $V\leq L$. If V and L/V are both nonsingular, then L is nonsingular, by [6,Ex.5,p.269], so L is ESSQD.

7) Let W be an R-Module and $V\leq W$. If W is nonsingular, so is V. Thus V is an ESSQD R-Module, and the converse holds if $V \ll_{es} W$ by [6,Ex.7.6, p.247], hence W is an ESSQD R-Module.

8) An R-Module L over integral domain R is nonsingular R-Module iff L is torsion-free R-Module [6,p.247]. Hence a torsion free over integral domain is ESSQD.

9) A nonsingular Module need not be SSQD Module as the following example shows:

Example5

1) Let $L=Z\oplus Z$ as Z-Module is nonsingular, since for $(,v)\in L,(d,f)\neq 0$, $ann_Z(d,f)=0\not\leq_e Z$; that is Z (L) = 0 which is not SSQD [7, Ex1.5,p.7].

2) Each of the Z-Modules $Q \oplus Z$ and $Q \oplus Q$ are nonsingular Z- Modules which
are not SSQD, by [7, Ex 1.10,p.27],[7, Ex 3.21,p.40].

Theorem6 Let R is an nonsingular ring then every faithful multiplication R-Module is an ESSQD R-Module.

Proof: Let V is faithful multiplication R-Module, thus by [8,Coro. 2 .14], Z (V) = Z (R).V. Since R is nonsingular ring, that is Z (R) = 0, hence Z (V) = 0. Then V is nonsingular R-Module. Thus by prop.2, V is an ESSQD R-Module.

Proposition7 Let L be an essentially semismall prime faithful R-Module. Thus R is an ESSQD ring.

Proof: Let Y be an ideal of R s.t $Y^2 = (0)$. Assume $Y \neq (0)$. Claim $YL \neq (0)$, if YL = (0) then $Y \subseteq ann_R(L) = (0)$; that is Y = (0), a contradiction. But YL $\not\ll_{es}$ L, since if YL $\ll_{es}$ L, But L is an essentially semismall prime faithful R-Module thus $ann_R(YL) = ann_R(L) = (0)$. However, it is clear that $Y \subseteq ann_R(YL) = (0)$, thus Y = (0), a contradiction, therefore YL $\not\ll_{es}$ L. Let E be a relative complement for YL, thus $YL \oplus E \ll_{es} L$. So $ann_R(YL \oplus E) = ann_R(L) = (0)$, since $YN \subseteq YL$ and $YE \subseteq E$, then $YE \subseteq YL \cap E = (0)$ and hence $Y(YL \oplus E) = Y^2L + YE = (0)$. Therefore $Y \subseteq ann_R(YL \oplus E) = (0)$ and Y = (0), a contradiction. Then our assumption is false. Then Y = (0), thus R is semiprime ring. Therefore by [3,Proposition9], R is an ESSQD ring.

Proposition8 Let L be faithful multiplication Module over self-injective ring R. R is nonsingular (ESSQD) ring iff L is nonsingular R-Module (ESSQD ring).

Proof: Assume R is nonsingular ring. But L is faithful multiplication R-Module, thus by [8,Coro 2.14] , Z (L) = Z (R). L, but Z (R) = 0 then Z (M) = 0, hence L is nonsingular R-Module. Assume L is nonsingular ring. So Z (L) = 0. Now, for all $a \in Z(R)$, $aL \subseteq Z(R).L = Z(L) = 0$, so $a \in ann_R(L) = 0$, then a = 0. Thus R is nonsingular ring.

Proposition9 If E is semismall quasi-invertible R-Submodule of D, then ann(D) = ann(E).

Proof: Clearly ann(D) ⊆ ann(E). let r ∈ ann(E). Define f: $^{D}/_{E} \to D$ by f(d+E) = rd, ∀ d ∈ D. Clearly f is well-defined homomorphism. Thus f = 0. Therefore r ∈ ann(D).

Proposition10 If L is SSQD R-Module, then L is semismall prime R-Module.

Proof: Since L is SSQD Module, thus each semismall Submodule 0 ≠ Y of L is semismall quasi-invertible Submodule of L. Thus by prop.9, ann(L) = ann(Y), hence L is semismall prime Module.

Proposition11 If L is prime faithful R-Module, thus L is nonsingular R-Module, and hence L is an ESSQD R-Module.

Proof: Since L is prime R-Module, $ann_R(L)$ is prime ideal of R. But L is prime R-Module, thus by [9, Prop 1.3, ch.1], L is torsion-free $\overline{R} = R/ann_R(L) \cong R$. Hence L is torsion-free over integral domain R . Thus by (Rem 4(8)), L is nonsingular R- Module. Therefore L is ESSQD R-Module.

Corollary12 If L is faithful SSQD R-Module, then L is nonsingular R-Module, and hence L is an ESSQD R-Module.

Proof: By Prop.10 and Prop.11.
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Proposition13 Let L be faithful Module over an integral domain R, If L is nonsingular R-Module, thus L is an ESSQD R-Module.

Proof: By prop.2

The converse of Proposition13 is not true as the following example shows:

Example14 The Z-Module $L = Q \oplus Z_2$ is faithful Module over an integral domain Z and hence ESSQD, It is easy to see that L is not nonsingular.

Proposition15 Let L , N be Modules over ring R. Let $f : L \longrightarrow N$ be R-monomorphism. If N is nonsingular R-Module, thus L is nonsingular R-Module and hence L is ESSQD R-Module.

Proof: Since $f : L \longrightarrow N$ is an R-homomorphism, thus by [6,Lemma 7.2, p.246], $f(Z(M)) \subseteq Z(N)$. But Z(N) = 0. Since N is nonsingular, then $f(Z(L)) = 0 = f(0)$, and since f is monomorphism, then Z(L) = 0. Thus L is nonsingular R-Module. Therefore L is an ESSQD R-Module.

Proposition16 Let L be an R-Module. If $z^k(L) = 0$ then L is ESSQD.

Proof: Suppose that $z^k(L)$. Let $f \in \mathrm{Hom}_R(L)$ and $\mathrm{Kerf} \ll_{es} L$, $\mathrm{Im} f \subseteq Z^K(L) = 0$, so $\mathrm{Im} f = 0$, hence f = 0. Then L is an ESSQD R-Module.

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Detection and identification of bacterial species isolated from mobile phone

among Al-Mustaqbal University College Community /Babil/Iraq
Rawaa M. Mohammed 1 , Mohammed F. Jubaz 2 , Sara J.Ahmed 3
1 Ph.D in Microbiology , Dep. of Medical Physics , Al-Mustaqbal University College, /Iraq.
2 Mc.s in Oral Physiology, Dep.of Dentistry\Iraq, Al-Mustaqbal University College/Iraq.
3 Mc.s in Nuclear physics , Dep. of Medical physics /Iraq. Al-Mustaqbal University college. /Iraq.

1 mohammed.faries@mustaqbal-college.edu.iq
2 rawaamagid@mustaqbal-college.edu.iq
3 sara.jaleel@mustaqbal-college.edu.iqAbstract

Background: Mobile devices are considered one of the important, common and widespread means of transmitting dangerous diseases at the present time, especially bacterial and viral diseases among people in closed and open societies.
Objectives: Present study was conducted to investigate the bacterial species transmitted in the mobile phones of students and staff of the Al-Mustaqbal university college located in the province of Babylon in central Iraq.
Methods: 250 Samples from mobile devices were collected n a one-month period, collect samples done by using sterile swabs were moistened with sterile normal saline solution All of the exposed surfaces of the mobile phones were rolled with the moist swab.
Results: The following bacteria were found in the 250 isolates: *Staphylococcus aureus, Staphylococcus epidermidis, Pseudomonas aeruginosa, Escherichia coli, Proteus spp., Neisseria sicca, Acinetobacter baumannii, Enterobacter aerogenes, and Candida spp*. The percentages of isolated genera differed among the different groups in the current study depending on.
Conclusion: The current study's findings provide strong proof for the prevalence of various bacterial diseases as a result of the sharing of mobile phones and sensitive portions of our bodies that come into contact with them, such as our faces, hands, and ears. Decontamination of mobile phones requires personal hygienic sanitation, such as cleansing and washing hands when using them.
Key Words: Al-Mustaqbal University College , Babylon , Mobile phone.

Introduction:

For communication, A mobile phone, often known as a cellular phone, has become an essential part of daily life. When it comes to worldwide cellular phone subscriber growth, Asia presently has the fastest rate (1). As a result of the constant contact and handling, mobile phones are now considered a possible source of infectious infections (2). Mobile phone users have increased significantly in recent days, both among academic and non-academic workers at educational institutions. Because of the multitasking capabilities of mobile phones, life is easier and communication is improved (3). As a result, mobile phones become a possible source of germ transmission and a health hazard (4). The ecological data pointed to people who are frequent users of community facilities as being at risk of infection mobile phone (5). It is now well proven that a variety of vehicles can contaminate a cell phone, resulting in moderate to chronic diseases. Microorganisms recovered from mobile phones so far are not only a source of contamination, but also infection reservoirs, allowing them to spread across the environment (6). It's hardly surprising that thousands of microorganisms can live on each square inch of a mobile phone, posing health risks. Staphylococci, notably S. epidermidis, are common bacteria found in the human body (7). According to studies, 5-21 percent of healthcare professionals who use mobile phones create a breeding ground for bacteria that cause

nosocomial infections (8). In other research, healthcare institutions, residential settings, and other businesses such as food processing have been identified as a source of microbial transmission via human contact handling (9). Because of the benefits of mobile phones, their health risks are frequently neglected. However, because it serves as a carrier of microorganisms, The constant handling of cellular devices looks to be harmful to human health. Recently, cell phones have been identified as a possible mode of bacterial illness transmission(10). Bacterial cells have been found adhering to mobile phone surfaces and forming structured colonies (11), allowing macro-organisms to be transmitted between users (12). Microorganisms have also been found to be stored in mobile phones. Even after washing their hands and People are still in direct contact with their mobile phones while waiting at restaurants after ordering meals (texting, chatting, getting calls). Microorganisms are transmitted unintentionally from the phone to the hands (13). Mobile phones have been shown to be more sensitive to bacterial transmission than lavatories, shoes, or doorknobs (14). Furthermore, sharing a mobile phone increases the risk of pathogenic organisms spreading and serves as a vector for nosocomial and opportunistic infections amongst users (15). Human skin is constantly in contact with microbes and certain microbial species colonize it rapidly. Nearly every area of adult human skin is covered in microflora, which is periodically exposed to harmful microorganisms. During a phone call, the phone is passed from hand to hand and comes into close contact with diseased human body areas such as the mouth, nose, and ears. 1,2 Germs found on human skin could be transferred to mobile phones as a result of this relationship. It was suggested that phone contact could cause infection, and that the gadget itself could be the source of infection. The phone is becoming increasingly vital in a globalized environment. 3 Mobile phones have also become an external source of infection, posing health risks to hospital patients as well as workers and family members(16).

Materials and Methods

A total of 250 mobile phone samples were gathered from Al-Mustaqbal University College personnel, students, and cleaners using sterile swabs. During the months of January and February of 2022, Using sterile swabs moistened with sterile normal saline solution, the samples were collected aseptically. The wet swab was rolled over the exposed surfaces of the phones. Because the keyboard, screen, mouth, earpiece, side, and back of mobile phones are the most often touched surfaces when touching fingers and flesh, extra care was taken to ensure that they were all properly swabbed. Prior to collecting the samples, all participants signed a consent form and were photographed. During working hours, samples were taken from participants' mobile phones. The visible surfaces of the phone were rolled over with a sterile cotton swab. Samples from the keypad and buttons were taken with special care, as the tip of the fingers frequently exposes

these areas. The total viable plate count was determined by sampling swabs from mobile phones that had been decontaminated with 70% isopropyl alcohol. After dilutions of samples in physiological saline, 0.05 ml of aliquot was spread out on plate count agar (PCA). Before bacteriological counts, At 37°C, the plates were incubated for 24 hours. The number of colonies on each plate with 30–300 colonies was counted using a computerized colony counter. Plates with more than 300 colonies are branded TNTC because they can't be counted (17) Following that, depending on colony form, representative colonies were selected and sub-cultured on a variety of selective and differential media, including MacConkey agar, mannitol salt agar, eosin methylene blue agar (EMB), Salmonella Shigella (SS) agar, blood agar, and Cetrimide agar. At 37°C, plates were incubated aerobically for 24 hours (18).

Table 1. Bacterial growth among groups in present study .

Groups	Sample No.	%	Growth	%	No-groowth	%
Staph	50	20%	45	90%	5	10%
Student	100	40%	87	87%	13	13%
Cleanser	100	40%	98	98%	2	2%
Total	250	100%	230		20	

Results

250 mobile phone samples using in present study among Al-Mustaqbal university college community in period from Jan to Fab. 2022 , results of biochemical tests showed in Table 2 , results of media which used in current study showed in Table 3 as well as, results of bacterial species in staph of college showed in Table 4 according groups among The current study results of bacterial species in college students are shown in Table 5 in accordance with the existing study groups. the outcomes of several bacterial species in cleanser of college showed in Table 6 according groups among current study .

Table 2. Biochemical test results for the isolated bacterium.

Bacteria Species	MR	VP	Citrate	Catalase	Indole
S. aureus	-	-	+	+	-
S. epidermidis	-	-	+	+	-
P. aeruginosa	-	-	+	+	-
E. coli	+	-	-	+	+
Proteus spp.	+	-	+	+	-
N. sicca	-	-	-	+	-
A.baumannii	-	-	+	+	-
E. aerogenes	-	+	+	+	-

Table 3. Characteristics of Bacteria Species on Media Used in Current Study

.

Biochemical Tests	*Staphylococcus aureus*	*Pseudomonas aeruginosa*	*Proteus spp.*	*Neisseria sicca*	*Escherichia coli*
Blood Agar	+	+	+	+	+
Nutrient Agar	+	+	+	+	+
MacConkey	-	-	+	-	+
Manitol	+	-	-	-	
EMB	-	-	+	-	+
SS agar	-	-	-	-	-
Cetrimid agar	-	+	-	-	-

Table4. Bacterial species and numbers among staph samples .

Bacteria Species	No. of samples	Percentage
Staphylococcus aureus	19	38%
Staphylococcus epidermidis	11	22%
Pseudomonas aeruginosa	9	18%
Escherichia coli	9	18%
Proteus spp.	6	12%
Neisseria sicca	5	10%
Acinetobacter baumannii	5	10%
Enterobacter aerogenes	4	8%
Candida spp.	2	4%
Total	50	100%

Table 5. Bacterial species and numbers among students samples .

Bacteria Species	No. of samples	Percentage
Staphylococcus aureus	27	27%
Staphylococcus epidermidis	20	20%
Pseudomonas aeruginosa	15	15%
Escherichia coli	11	11%
Proteus spp.	10	10%
Neisseria sicca	7	7%
Acinetobacter baumannii	5	5%
Enterobacter aerogenes	4	4%
Candida spp.	1	1%
Total	100	100%

Table 6. Bacterial species and numbers among Cleanser samples .

Bacteria Species	No. of samples	Percentage
Staphylococcus aureus	24	24%
Staphylococcus epidermidis	32	32%
Pseudomonas aeruginosa	11	11%
Escherichia coli	10	10%
Proteus spp.	10	10%
Neisseria sicca	5	5%
Acinetobacter baumannii	4	4%
Enterobacter aerogenes	2	2%
Candida spp.	2	2%
Total	100	100%

Discussion :

To live a healthy life, it is more important to adapt microbiological standards and appropriate hygiene practices than it is to create a microorganism-free environment. The study's purpose was to isolate and identify microorganisms, as well as raise awareness about how mobile phones can be used to spread bacteria from one person to another. According to the findings, there are a range of germs on mobile phones that belong to nine different bacterium species. (*S. aureus ,S. epidermidis, P. aeruginosa, E. coli, Proteus spp. N. sicca, A. baumannii ,E. aerogenes and Candida spp*.) If pathogens are exposed to a suitable environment, they will definitely remain infectious on infected surfaces for several days. Infections, for example, can colonize surfaces in a humid climate and change a passive reservoir into an active one. Because they come into direct contact with sensitive body parts such users' faces, ears, lips, and hands, mobile phones have become a potential reservoir of germs and have resulted in illnesses. In a recent investigation, the results of a collegiate staph infection were found :19(38%) *Staphylococcus aureus* ,11 (22%) *Staphylococcus epidermidis*, 9 (18%)

Pseudomonas aeruginosa, 9 (18%) *Escherichia coli*, 6 (12%) *Proteus spp*.5 (10%) *Neisseria sicca*, 5 (10%) *Acinetobacter baumannii* ,4 (8%)*Enterobacter aerogenes* and 2 (4%) *Candida spp* .As well as in students of college results were : *27(27%) Staphylococcus aureus ,20 (20%) Staphylococcus epidermidis, 15 (15%) Pseudomonas aeruginosa, 11 (11%) Escherichia coli, 10 (10%) Proteus spp.5 (5%) Neisseria sicca, 5 (5%) Acinetobacter baumannii ,4 (4%) Enterobacter aerogenes and 1 (1%) Candida spp* . As well as in cleanser of college results were : *24(24%) Staphylococcus aureus ,32 (32%) Staphylococcus epidermidis, 11 (11%) Pseudomonas aeruginosa, 10 (10%) Escherichia coli, 10 (10%) Proteus spp.5 (5%) Neisseria sicca, 4 (4%) Acinetobacter baumannii ,2 (2%)Enterobacter aerogenes and 2 (2%) Candida spp* ., mobile phones have become a potential reservoir of germs and have resulted in illnesses. In a recent investigation, the results of a collegiate staph infection were found (24,25,26).

Conclusion:

Present study's findings show that sharing of mobile phones and sensitive parts of our bodies that come into contact with them, such as our faces, hands, and ears, leads to the spread of various bacterial infections. Mobile phone decontamination necessitates personal hygienic hygiene, such as hand washing and cleansing when using them. Cleaning mobile phones on a regular basis with an appropriate cleaning solution, as well as frequent hand washing, should be advised as a method for reducing disease transmission through mobile phones.

Acknowledgment

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Recent Advances of crow search theory: Applications and Challenges

Israa Mishkhal[1], Hassan Hadi saleh[2], MuntadherKhamees[3], Ammar Alqayyar[4]

[2]Faculty of Scinces, University of diyala, Diyala,Iraq Country (Israaadnan@uodiyala.edu.iq)
[2]University of diyala, Diyala,Iraq Country (hassan@sport.uodiyala.edu.iq)
[3]Faculty of Scinces, University of diyala, Diyala,Iraq Country (alkarawis@gmail.com)
[4]University of diyala, Diyala,Iraq Country (Ammar_tee20@yahoo.com)

Abstract:

Crow search algorithm (CSA) is one of the efficient metaheuristic optimization algorithms, which mimics behaviors' of crow flock and their process of hiding food. It has been efficiently applied in various optimization problems, such as sciences and engineering. This paper presents a comprehensive review of the inspirations and mathematical equations of the CSA algorithm. It also investigates CSA efficiency in various applications, keening to present some weakness points.

Keywords: Crow Search Algorithm, Optimization problems, Swarm intelligence-based algorithms, Metaheuristic, Nature-inspired algorithm.

1. Introduction

Recently, optimization algorithms have been applied in many aspects of various optimal problems. For example engineering, a considerable number of constraints, numerous decision variables, and complicated objective functions problems. The optimization algorithms have two main categories namely: stochastic and deterministic, and the stochastic algorithms have two types heuristic and meta-heuristic. The count of the heuristic algorithm wears down experimentation, and meta-heuristic estimation works at a progressively special level. On the other hand, the meta-heuristic type of algorithms has four sorts that dependent on nature (see figure 1). These are material science-based methodologies, swarm-based methodologies, advancement based systems and human-based strategies [1] [2].

Optimization problems are classified into four categories namely: constrained or unconstrained, continuous or discrete, single or multi-objective and static or dynamic problems. Recently, many nature-inspired optimization algorithms have been proposed because of the difficult challenges of these issues. The performance of these methodologies in solving the optimization problems is more effective because they have been proving their search ability more powerful and robust by solving the high dimensional problems comparing to other algorithms.

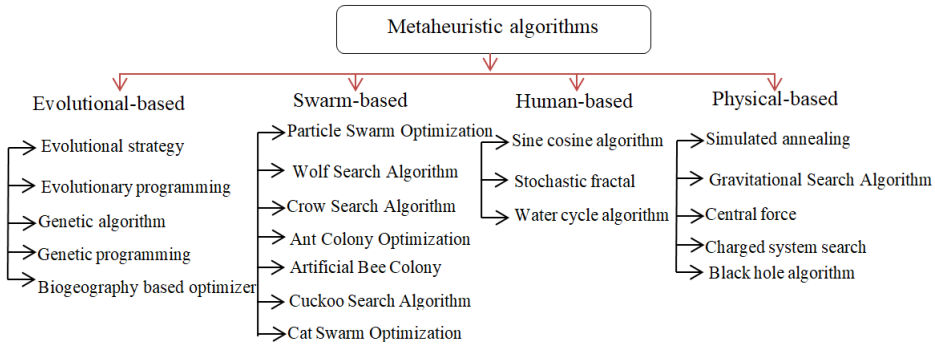

Figure 1: Meta-heuristic algorithms categories

The Crow search algorithm is one of these nature-inspired algorithms presented by Askarzadeh (2016) [3]. CSA mimics the intelligence behaviors' of crow flock and their process of hiding food. The studies show that CSA is more efficient in both the accuracy and convergence time over many other optimization algorithms such as genetic algorithm (GA), harmony search (HS), particle swarm optimization (PSO), etc. [4] [5]. Moreover, the CSA is more suitable in solving complex optimization problems [6].

2. Crow search and analysis

2.1. Crow Search Algorithm

As shown in the (see figure 2), optimization algorithms have three classifying categories namely: deterministic algorithms, stochastic algorithms and hybrid algorithms which is a mixture of both algorithms [8]. The deterministic algorithms have functions, certain data, and repeatable design variables. Their results always are the same outputs for the same inputs comparing to stochastic algorithms [9].

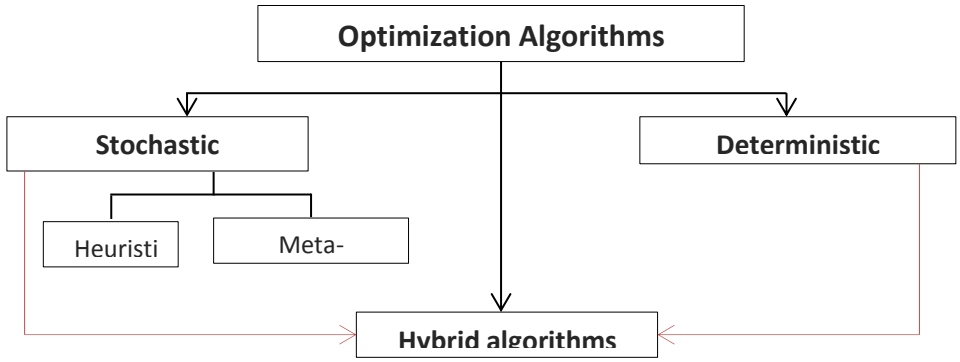

Figure2: The general classification of the optimization algorithms

The second category is stochastic algorithms. These algorithms always use some random numbers, such these algorithms: the genetic algorithm is stochastic because of the random numbers used by the mutation operator. Each time the code is run, the paths will differently change even if the final solutions may not have a big change. A stochastic algorithm is categorized into heuristic and meta-heuristic.

Askarzadeh in 2016 presented one of meta-heuristic optimization algorithms called CSA [3]. The idea of CSA comes from crow behavior in terms of hiding or stealing foods. The crows consider the most intelligent birds. They are different from others by living in the flock, having a good memory, having the ability to steal other crows' food, recognizing faces, warn the flock of potentially unfriendly ones, sophisticated communication ways and self-awareness [17] [18].

As a methodology, CSA based on D-dimensional environment, the size of the crow flock represented by *n* and the position X_d^t of crow *i* at iteration *t* which is described in equation (1):

$$X^{i,t} = X_1^{i,t}, X_2^{i,t}, \dots\dots\dots\dots, X_d^{i,t^{max}} \qquad (1)$$

Where: $i=1,2,3,\dots\dots,n$, $t=1,2,3,\dots\dots,t_{max}$ and t_{max} is the maximum number of iterations. Each crow has a good memory represented by $m_{i,t}$ to store the best-visited location of its storing food source until stopping iteration [17]. The X contains the random positions of other crows in a group. As shown in the equation (2), these positions update at each iteration until the last finding iteration that met the current criterion [18].

$$m^{i,t} = m_1^{i,t}, m_2^{i,t}, \dots\dots\dots\dots, m_n^{i,t} \qquad (2)$$

There are two cases to update these positions [18] [19]. The first case is crow *j* does not realize that crow *i* is following it; thus the crow *j* will not updating its position. Therefore, the crow *i* will know the hiding location of crow *j* (see figure 3). In the case of $ra_i \geq AP$, the crow *i* will update its position as the equation (3):

$$X^{i,t+1} = \begin{cases} X^{i,t} + ra_i \times fl^{i,t} \times \left(m^{i,t} - X^{i,t}\right) & ra_i \geq AP \\ a\ random\ \ position & ra_i < AP \end{cases} \quad (3)$$

ra_i: A random number with uniform distribution and its value between 0 and 1.
AP: is the awareness probability of crow j at iteration t.

$fl^{i,t}$: The flight length of crow *i* at iteration t. $fl^{i,t}$ affects the capability of the search CSA [3]. Moreover, $fl^{i,t}$ helps in the convergence of this methodology [20].

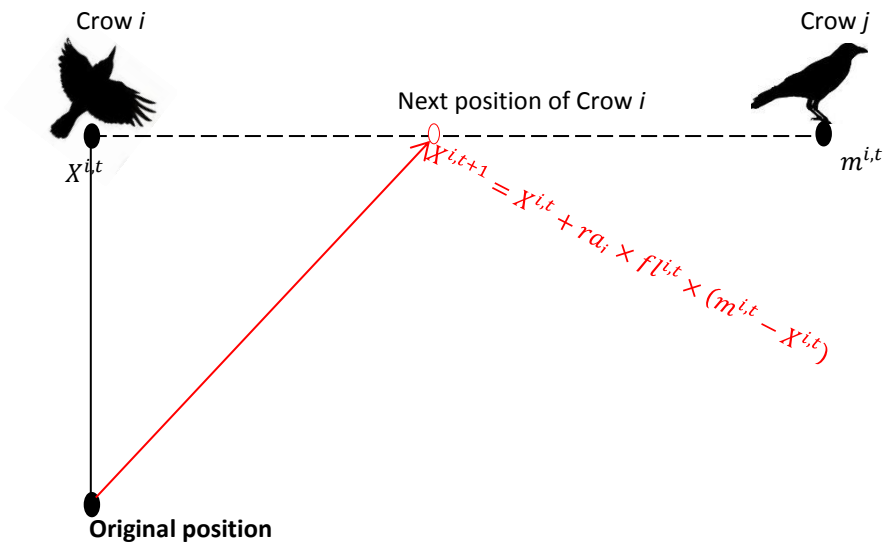

Figure 3: Updating crow *i* position if $fl < 1$

As shown in figure 4, the second case is the crow j recognizes that crow i is following it. Thus, crow j will move to a random position to protect its hiding food position. Therefore, when $ra_i < AP$, the crow i will be updated at iteration t+1 as shown in the equation (3).

2.2. implementing CSA for solving Optimization Problems

CSA makes use of a population of crows to find an optimal solution of optimization issues in a D-dimensional search area. CSA optimization has the main merits namely simple coding, fast convergence rate, and high efficiency. As shown in figure (4), there are steps to implement CSA as following [3]:

The first step is to define the optimization problem and adjustable parameters: there are four main parameters in CSA namely, the size of the crow flock is defined by *n*, termination criterion is determined by the maximum number of iteration t_{max}, global and local searches are defined by flight length *fl* and the balance between diversification is determined by awareness probability AP (see the figure 5).

The second step is to initialize the position of crow and its memory randomly: there are two vectors should be randomly initialized due to the crows have no experiences namely; a position of crow *i* is given by $X^{i,t}$ see equation (1), and memory of crow *i* is specified by $m^{i,t}$ (as shown in the equation (2)).

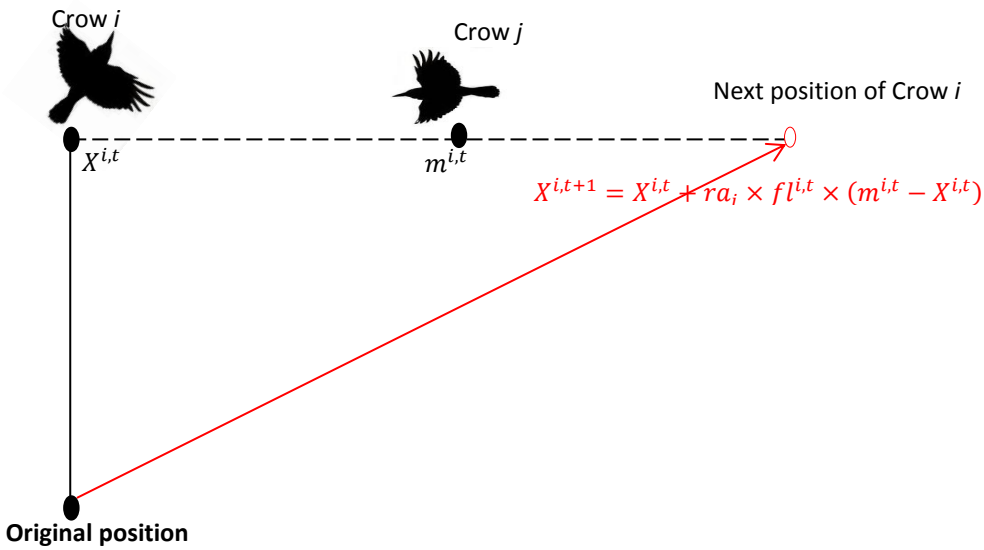

Figure 4: Updating crow *i* position if $fl > 1$

The third step is to calculate the objective function for each crow. The inserting decision variable values into the objective function determine the quality of crows' positions. The fourth step is to generate a new position depending on a crow's inherent behavior for example:

> The crow *i* follows a selected bird let be (crow *j*) to discover its hidden food location. The crow *i* is updated its position by equation (3). This process is repeated for each crow in the flock.

The fifth step is to check the feasibility of the new position. Each crow in flock checks its new feasible position. If the new location is acceptable, the crow updates its location. Otherwise, the crow does not move to the new position. The sixth step is to evaluate the fitness function of new positions. They are computed for each crow. The seventh is to update crows' memory as the equation (4). Each crow has updated its memory if the new position has a better objective function value for the new crow's position.

$$m^{i,t+1} = \begin{cases} X^{i,t+1} & f(X^{i,t+1}) \text{ is batter than } f(m^{i,t}) \\ f(m^{i,t}) & \text{otherwise} \end{cases} \quad (4)$$

$f(\,)$: is the objective function value for the new selected position.

The last step is to check the termination criterion. In this step, from fourth to seventh steps are repeated until t_{max} is reached. Then, the best position of objective function value is taken as the final solution to the optimization problem

2.3. The Essence and Efficiency of an Algorithm

The essence is a search implemented correctly to execute the required search (though not necessarily efficiently) [8]. An optimization algorithm produces a new solution for a given problem at iteration or time. As shown in equation (5):

$$X^{t+1} = A(X^t, p(t)) \quad (5)$$

Where X^{t+1} is a new optimization solution at *t* iteration and *A* is a nonlinear algorithm from a given problem (X^t) to X^{t+1}. *A* has *k* parameters *p(t)= (p1,p2,.....,pk)* which can be dependent on *(t)* time or iteration [21].

To find the new optimal solution for a given problem with an infinite number of cases is by testing some desired cases from all according to predefined criterion (see equation (6)).

$$S(\psi) \xrightarrow{A(t)} S(\theta(X^{t+1})) \quad (6)$$

Where S is a number of cases, ψ are all cases and θ desired cases [21].

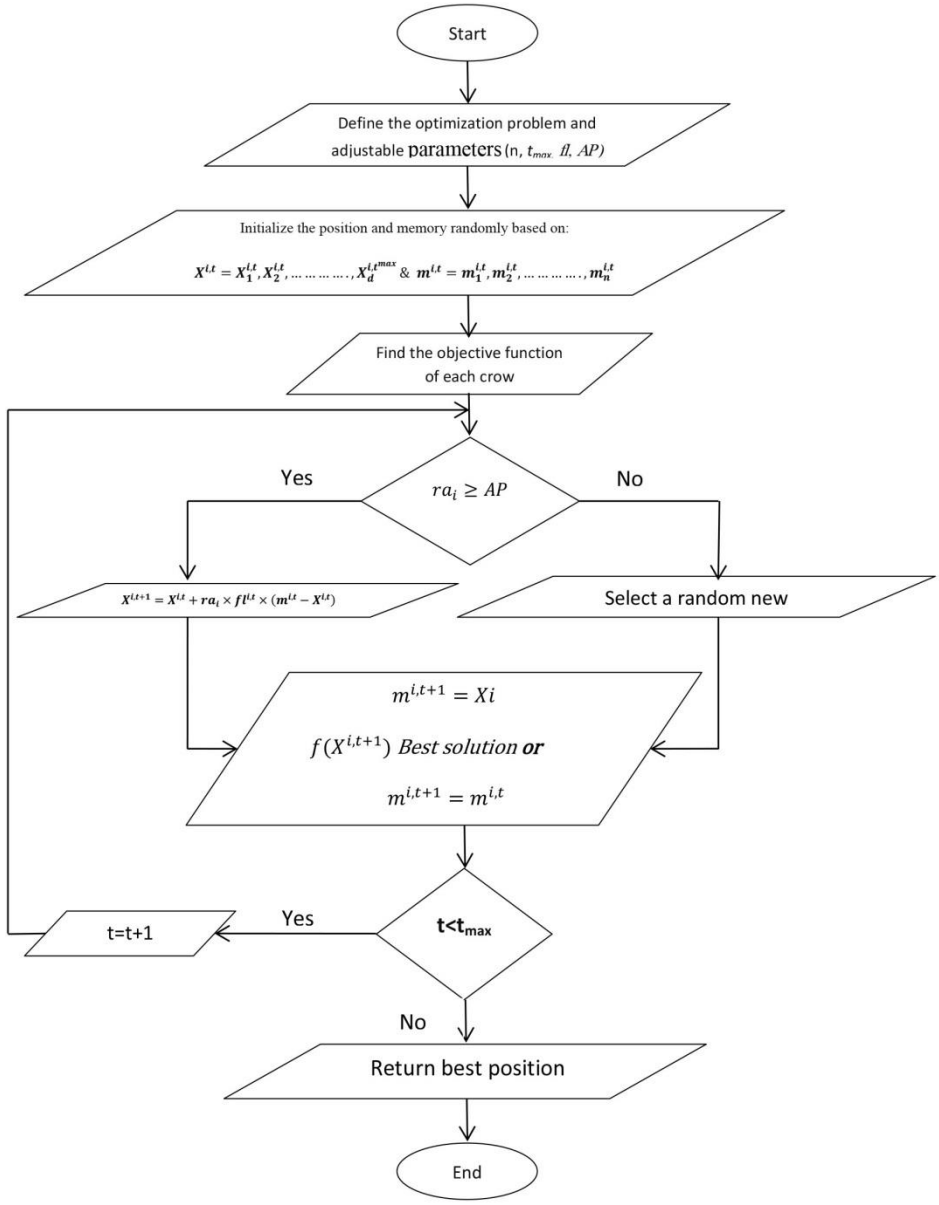

Figure 5: Flowchart CSA Optimization Algorithm

An algorithm can be a tool to tune a complex system. According to equation (6), the performance of an optimization algorithm may depend on the type of optimal problem. Moreover, to achieve an optimization solution or not (within a given number of iterations) depends on the chosen algorithm.

The efficiency of optimization algorithms is very important to ensure finding the optimal solution [22]. In mathematical programming, there are three measures of efficiency namely, the implementing time, the number of fundamental evaluations and the memory usage [22]. Implementing time is one of the important measures to check the efficiency of any optimization methodology. It measures by either CPU time or waiting time, the time that the programmer was waiting to implement the code on the computer. The CPU time is more stable than the waiting time because it is independent of other operations of the computer and consistent for the same version of an operating system running on the using computer. The second important measure is the number of fundamental evaluations. It refers to any subroutine calling by an optimization algorithm to gain fundamental information about the problem. The less common measure using for the efficiency of the optimization algorithm is memory usage.

Moreover, the efficiency of any algorithm can measure by employing any type of randomness. In this case, the result will reach a different point whenever running the algorithm even if it is starting with the same initial point. Randomness optimization algorithms are very diverse, such as genetic algorithms, differential evolution, simulated annealing, ant algorithm, bat algorithm, crow search algorithm, bee algorithms, particle swarm optimization, firefly algorithm, harmony search, cuckoo search, and others [3] [7] [23] [24] [25] [26] [27].

2.4. Why Crow search is so efficient?

Crow Search Algorithm has two search capabilities namely tradeoff of randomization and local search to solve a real-world optimization problem [28]. CSA uses the random search technic to get the best solution for a given problem. This allows that the search space is more efficiently on the tradeoff of randomization, and consequently finding a higher probability. This feature helps to discover new good solutions for a problem [29].

CSA is the enhancing version of particle swarm optimization (PSO) [30] [31]. In PSO algorithm has 4 the adjustable parameters namely: individual learning factor, the maximum value of velocity, inertia weight, and social learning factor. In Genetic algorithm (GA) has 6 necessary parameters [31]. These are crossover probability, crossover method, selection method, mutation probability, mutation method, and replacement method. On the contrary, CSA requires adjusting two parameters namely: flight length (*fl*) and awareness possibility (*AP*) [32]. As an important point of the optimization success of any algorithm depends on the appropriate tuning of these specific parameters [33]. Thus, CSA is a more efficient method when compared with other optimization algorithms.

The flight length (*fl*) parameter has a significant impact on CSA performance. The less *fl* obtains the local optimum solution while the large *fl* helps to gain the global optimum solution. On the other hand, the awareness possibility (*AP*) plays an important role in controlling the intensification and variegation phases of the CSA. The smaller values of *AP* lead to the utilization regions of the search space during the iterations, however higher *AP* leads to exploring undiscovered regions of the search space in a random manner [33]. These advantages make the CSA algorithm is easy to code and high efficiency to adjust and converges to the optimal solution [34]. Indeed, various studies and applications have demonstrated that CSA is very efficient (the next section will explain them in great detail).

3. Applications

CSA has been applied in many fields of optimization and computational intelligence applications with high efficiency. As shown in table 1, it has been used in engineering design applications. For example, by modifying the CSA algorithm used to optimize the operation of the hybrid energy system that composes of photovoltaic (PV), pumped hydro storage (PHS) and diesel generator, and it achieved higher accuracy comparing than other methodologies [34]. CSA also utilized to solve the optimal reactive power dispatch problem [35]. The problem of optimal design of third-order resonance-free passive filters in distribution networks solved with efficient results [19].

Engineering design apps.	Methods	Min	Mean	Max	Std
the operation of the hybrid energy system that composes of photovoltaic (PV), pumped hydro storage (PHS) and diesel generator [34]	GA	72.2433	82.4223	87.6319	4.7368
	PSO	74.3452	89.3816	94.7352	4.1307
	CSAAC-AP (α=2)	**67.0566**	**78.8633**	**84.7844**	**3.4788**
three-bar truss design, pressure vessel design, tension/compression spring design, welded beam design, gear train design and gear train design [3]	GA3	6308.4970	6293.8432	6288.7445	7.4133
	GA4	6469.3220	6177.2533	6059.9463	130.9297
	CPSO	6363.8041	6147.1332	6061.0777	86.45
	HPSO	6288.6770	6099.9323	6059.7143	86.20
	G-QPSO	7544.4925	6440.3786	6059.7208	448.4711
	QPSO	8017.2816	6440.3786	6059.7209	479.2671
	PSO	14076.3240	8756.6803	6693.7212	1492.5670
	CDE	6371.0455	6085.2303	6059.7340	43.0130
	UPSO	9387.77	8016.37	6154.70	745.869
	PSO-DE	N.A	6059.714	6059.714	N.A
	ABC	N.A	6245.308144	6059.714736	205
	(l + k)-ES	N.A	6379.938037	6059.701610	210
	TLBO	N.A	6059.71434	6059.714335	N.A.
	CSA	**7332.84162110**	**6342.49910551**	**6059.714363 43**	**384.9454 1634**
the optimal power flow (OPF) problem related to the RDGs [18]	DE	1.9687×10^{-15}	1.5408×10^{-4}	0.0043	7.3369×10^{-4}
	ABC	2.5701×10^{-15}	0.0030	0.0126	0.0024
	GSA	3.4768×10^{-22}	5.4439×10^{-21}	1.6715×10^{-20}	4.1473×10^{-21}
	ICSA	**1.4024×10^{-32}**	**1.9404×10^{-30}**	**6.3192×10^{-29}**	**1.0674×10^{-29}**
the multi-parameter evaluation problem of groundwater quality [36]	PPSOGSA	618.77	619.21	619.98	0.5488
	TLBO	618.66	619.06	619.36	0.4576
	PSO	633.32	634.02	635.44	0.9498
	CSA-PSO	**617.09**	**617.32**	**617.98**	**0.3812**
electromagnetic benchmark problem [37]	NIM	-	-	1.2864	-
	BP	-	-	1.0280	-
	ELM Model	-	-	1.0648	-
	CSA-ELM	**-**	**-**	**1.0654**	**-**
electromagnetic	CSA	3.1308	5.4788	8.5990	1.5972

Table 1: Comparison of results for engineering applications

benchmark problem [38]	**MCSA**	**2.0619**	**3.8435**	**4.7021**
enhancing electrical distribution networks [39]	ACO	646.383	-	-
	Proposed CSA	**705.673**	-	-
energy problems, the combined economic and emission dispatch (CEED) problem [40]	NR	3.2706	-	-
	GA	3.2846	-	-
	HGA	3.1045	-	-
	CSA	**2.96**	-	-
the optimal reactive power dispatch problem [35]	**CSA - IEEE 30**	**2.8507**	-	-
	CSA - IEEE57	**15.1934**	-	-
	CSA - IEEE118	**76.7783**	-	-
	CLPSO - IEEE30	4.5615	-	-
	CLPSO - IEEE57	24.5152	-	-
	CLPSO - IEEE118	131.99	-	-
	GSA - IEEE30	4.5143	-	-
	GSA - IEEE57	23.4611	-	-
	GSA – IEEE118	127.7603	-	-
	SOA- IEEE57	24.2654	-	-
	SOA- IEEE118	114.9501	-	-

CSA leads to finding promising results for the six engineering optimization problems namely: three-bar truss design, pressure vessel design, tension/compression spring design, welded beam design, gear train design and gear train design [3]. Moreover, in the engineering applications, crow search algorithm has superior performance over other optimization algorithms for a range of optimization problems such as the optimal power flow (OPF) problem related to the RDGs, the multi-parameter evaluation problem of groundwater quality, electromagnetic benchmark problem, enhancing electrical distribution networks, energy problems, the combined economic and emission dispatch (CEED) problem [18] [36] [37] [38] [39] [40].

Besides, CSA has been used in the healthcare aspect (see Table 2). [29] combined CSA with the overlay layout consensus (OLC) approach in order to accelerate the search process and improve the quality of the results to the DNA fragment assembly problem. Anter et al. [41] designed a hybrid crow search optimization algorithm (CFCSA) for diagnosing medical problems. The paper [42] proposed the optimized version of the crow search algorithm (OCSA) to predict Parkinson's disease. This proposed system recorded the highest accuracy over other used algorithms for this optimization problem. CSA also has been

proved the higher efficiency with assisting the diagnosis in different brain diseases compared to other used methodologies [43].

Healthcare apps.	Methods	Accuracy	Average
DNA fragment assembly problem [29]	**CSA-P2M ∗Fit**	-	**1.6 /0.4**
(based on Statistical Ranking Color Scheme (SRCS))	P2M ∗Fit	-	−2/ −1.6
	GA-P2M ∗Fit	-	0.4/ 1.2
diagnosing medical problems [41]	**CFCSA**	**0.986**	-
(for the data sets DS4)	BCSA	0.907	-
	BALO	0.791	-
	CALO	0.930	-
	bat	0.748	-
predict Parkinson's disease [42]	**OCSA**	**0.882**	-
	CCSA	0.842	-
the diagnosis in different brain diseases [43]	**CSA**	**0.9060**	-
	DE	0.8966	-
for the data set Z144 based on the feature	HS	0.9015	-
similarity index (FSIM)			

Table 2: Comparison of results for medical applications

On the other hand, using CSA to minimize the total weighted tardiness to the single machine total weighted tardiness (SMTWT) scheduling problems that dependent on setup times [44]. Lakshmi et al. [45] combined the CSA with K-means algorithm to cluster the data efficiently and obtain the global optimal solution. Furthermore, a hybrid GWO with CSA (GWOCSA) proposed to solve the feature selection problem [46]. This methodology has a high capability in solving real-world complex problems compared to other proposed algorithms. A modified crow search algorithm (MCSA) by Gupta et al. [47] has used to extract usability features from the hierarchical model with the optimal solution. The paper [48] presented a new novel metaheuristic optimizer namely a chaotic crow search algorithm (CCSA). CCSA applied in superior efficiency to optimize feature selection by maximizing the classification performance and minimizing the number of selected features. Recent other studies have demonstrated that the crow search algorithm can perform significantly better than other optimization algorithms in different applications [49] [50] [51].

4. Discussion and concluding remarks

The CSA is one of the swarm intelligence-based algorithms that are very efficient in finding an optimal solution to nonlinear optimization problems. Therefore, CSA applies in various fields such as sciences, engineering, clustering features, etc. CSA has very good global convergence; however, it has some challenging issues that still need to be resolved in the future works, such as randomly updating its position, selecting inefficient global optimization solutions sometimes, and suffering a slow convergence rate in multi-modal optimization issues [52] [53].

Most optimization algorithms have good applications in practice, but they have the issue with the theoretical analysis. Therefore, the one key challenging issue is these algorithms have a significant gap between theory and practice. In this case, researchers can work well at a practical level, but they hardly understand why the selected algorithm works and how to improve it with a good understanding of its working mechanisms. The second issue that has a huge impact on the efficiency of all meta-heuristic algorithms is they depend on some parameters. These parameters will largely influence the performance of an algorithm such as the crow search algorithm [26]. Therefore, the ways to choose the proper parameters tuning to these algorithms become an optimization problem [54]. Moreover, these parameters become an important area of research [55]. Therefore, these challenging issues may motivate to use a crow search algorithm with other applications shortly rather than other optimization algorithms.

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Practical Study of Some Antibiotics and Their Effect on Some Pathogenic Bacteria

*Fatima Rammadan Abdul[1], Maysoon K. Abbas[2], Ihsan A. Raheem[3] and Hanan T.subhi[4]

[1,2]*Department of Biology; College of Science; Mustansiriyah University; Baghdad –Iraq,*

[4] Department of Biology, Faculty of science and health, Koya University, Kurdistan Region

*Corresponding author: qetasyshah@gmail.com

Abstract

Despite the discovery of many new antibiotics, bacteria over time develop the ability to resist these antibiotics ,A total of one hundred and seventy-three samples of different bacterial isolates of bacteria (158 isolates, and 15 isolates are not cultured) were taken from different patients in Iraqi Kurdistan hospitals. Bacteria

were isolated from a vaginal swab (n = 93) that is 8 tests negative, 85 tests positive, a urine sample from 70 patients with urinary tract infections and ear swab samples from two patients with otitis media, as well as semen samples (n = 2). patient) and sputum (n = one patient), stool (n = 2). Where it was found that out of the complete of 168 patients, the number of affected females was 76 (43.93%) and 97 were males (56.07%). 173 bacterial isolates were isolated and characterized, and the percentage of infection caused by Gram- positive bacteria was about (65.19%) compared to infection caused by Gram-negative bacteria (34.81%). Bacterial susceptibility to biofilm formation was examined. An antibiotic susceptibility test was examined for all bacterial isolates for 31 antibiotics. Most of the isolated bacteria are resistant to antibiotics

Keywords: Antibiotics, Bacteria , Biofilm. Pathogenic.

1- Introduction

Mortality and morbidity are caused by multiple resistance to antibacterials in addition to increased costs and treatment failures. Antibiotic resistance has been reported when a drug loses its capacity to successfully prevent bacterial growing [1].Bacterias, when duplicates so in the existence of the antibiotics, are termed resistant bacterias. Antibiotics are commonly active against them, however once the bacteria quieten down susceptibility, it needs a better than the conventional levels of an equivalent medication to possess a bearing. The emergence of antimicrobial resistance was ascertained shortly when the introduction of recent Anti-bacterial compounds [2]. There square measure several details behind the event of antibiotic resistance , starting from microorganism reasons to human aspects like overuse and over-prescription of antimicrobials, agricultural and industrial request of antimicrobials within the animal sector, and human behavioral factors[3]. Our ability to treat common pathogens becomes difficult owing to antibiotic, leading to magnified period of ill health, costs, range of difficulties, and deceases. Antibiotics contest to Elimination of microorganisms. Therefore, microorganisms possess immune activity. The method of resistance occurs through sequence level mutations [4]. Antibiotics caused selective pressure and genes also act in the context of selective pressure [5]. Bacteria have a criterion for transferring genetic material directly between each other by transferring plasmids, showing that the natural process is not the only mechanism that develops through that resistance. A wide range of antibiotics are prescribed in hospitals as an answer to infections in healthcare facilities; But it will increase the resistance [6]. Antibiotics usually remove the bulk of the bacteria

in an overgrowth. Though, a unique colony of genetically mutated bacteria may occur that may cause resistance [7,8]. The extent of antibiotic-resistant infections began to correlate closely with the degree of antibiotic depletion [9, 10].

2- Materials and Methods

Antimicrobial susceptibility testing for some bacterial strains include (*Staphylococcus* spp, *Escherichia coli* , *Streptococcus* spp , *Gardnerella vaginals, klebsiella pneumonea, Enterococcus faecalis*)that collected from patients in Iraqi Kurdistan hospitals, were cultured on bacterial culture media represented by Nutrient agar, MacConkey agar, Blood agar, Mannitol agar, Chocolate agar at 37°C for (18-48) hours, and diagnosed using Gram stain and microscopic examination, biochemical tests were also used to isolate and diagnose bacterial isolates [11]. The following sample have been taken (Vaginal swab, urine, ear swap, synovial swap, seminal fluid,blood and stool specimen). Antimicrobial test include antibiotics (Nalidixic acid ,Ofloxacin, Ciprofloxacin , Gentamycin, Streptomycin , Refampin, Clindamycin , Trimethoprim, Nitrofurantion, CLarithromycin, Amikacin , Norofloxacin , lincomycin , Tobramycin, Cephalothine, cefem , Amoxiclave , Vancomycin , Meropenem, Cefadroxil, Azithromycine, Nitofumation , Cefriaxone , Cefexim , T_S(septrin), Suprax, Cepadroxil, Tobromycin , Metronidazole , Tetracycline , Imipenem , Amoxicillin , CLavulanic acid and Ampicillin). The activity of biofilm formation was measured using microtiter plate (M.T.P) [12].

3- Result

The study involved the investigation of 173 patients suffering from different infections, vaginal swab from 91 patients, and urine sample 70 patients suffering from UTI and ear swab samples from two patients at otitis media, and , including seminal fluid and stool (n=two patients) and sputum (n=one patient) , seminal fluid (n=2), synovial fluid(1) and throat swab (1) . The study also included identifying the pathogen most causing infection, and among the patients (Figure 1).

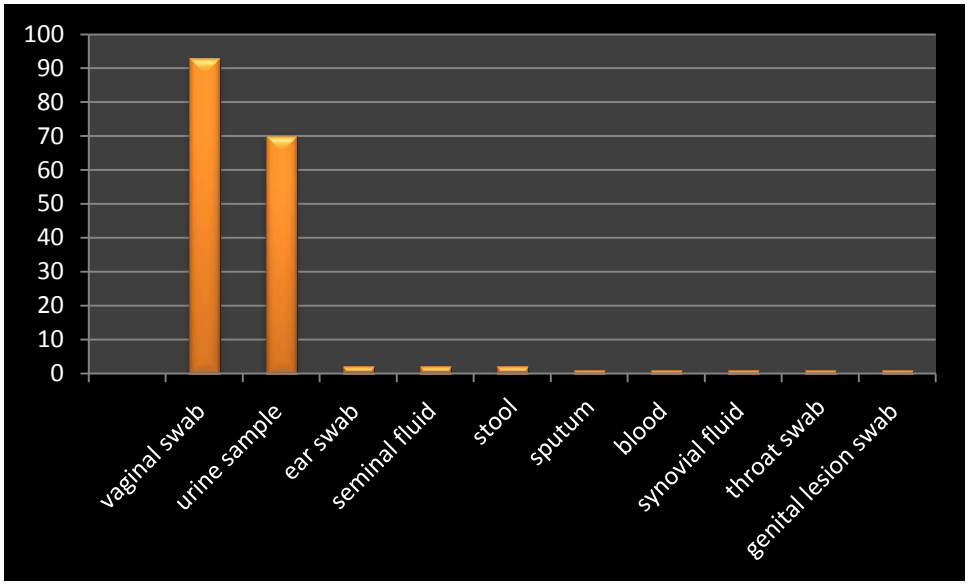

Figure (1): showing the number of specimen taken from patients

The results exhibited that the gram positive bacteria that cause infections are more dominant than the gram negative bacteria that isolated from different specimen, as 103 bacterial (G +ve) isolates were isolated compared to 55 bacterial (G-ve) isolates, as shown in Table (1). The presence and spread of bacteria may be play a role in infection, particularly in suitcases of a pathetic immune system. Furthermore, the study focused on the year in which bacterial infections increase, which is due to its capacity to attack the efficiency of antibacterial substances current in saliva in addition to their capability to abandon to the epithelial tissues [13].

Table 1: Distribution of bacterial infections in patients with different specimens

The type of sample	Isolates		
	G +V	G --V	total
vaginal swab	56	29	85
urine	42	24	66
blood	-	-	-
ear swab	2	-	2
seminal fluid	-	1	1
synovial fluid	-	-	-
throat swab	1	-	1
genital lesion swab	1	-	1
sputum	1	-	1
stool	-	2	2
total	103	55	158
%	65.19	34.81	

studied the incidence of between males and females in the patients below study, and it was renowned that the incidence of altered infections was higher in males than females, it is found that further than the overall 173 patients, the number of the diseased women is 76 (43.93%) and 97 men (56.07%), as presented in Figure (2). This may be because of the incidence or spread of certain bad behaviors in one sex over the other, including the prevalence of smoking and alcohol habits among males in excess of it is in females, which growths the rate of diseases [13] specified that this might flow from to the physiological and immunologic variations between the sexes, which can change or increase the speed of infection or it should flow from to the immune status and also the secretion and purposeful variations between the sexes [14]

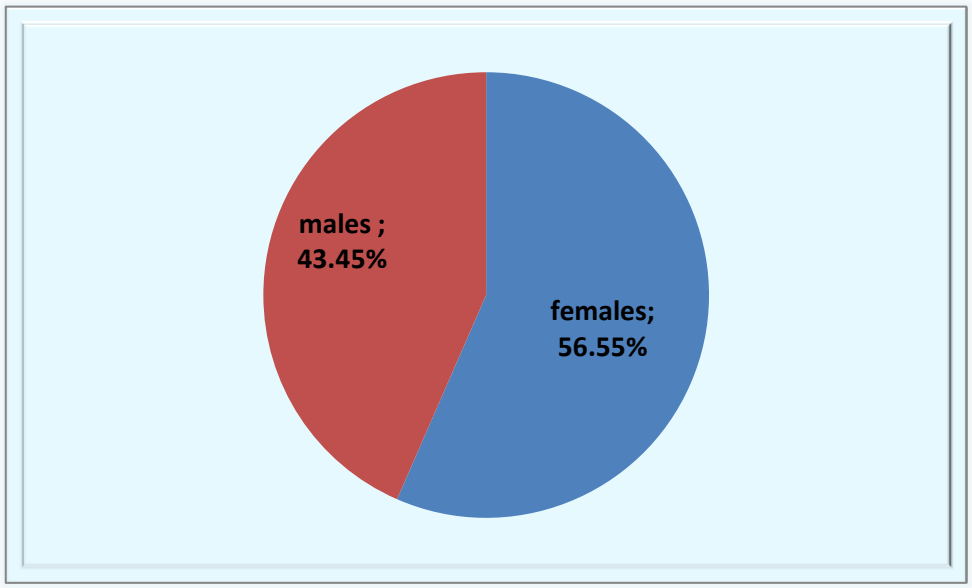

Figure 2: Distribution of infections according to the sex of the patient

A total173 tests of culturing different strains of bacteria from different specimen of Kurdish population , 158 results was positive and 15 was negative result . isolated vaginal swab (n=93) which is 8 test negative , 85 tests positive , (42 / %49.41 of strains are *staphylococcus spp)* , (29 / %34.11was *Escherichia coli*) , (11 / %12.94) was *Streptococcus spp)* , (3 / %3.52 was *Gardnerella vaginals*) as shown in Table (2) , urine (n=71) which is 5 test negative , 66 test positive (34 / %51.51 was *Staphylococcus spp*) , (20 / %30.30 was *Escherichia coli)* , (5 / %7.57was *Streptococcus spp*), (3 / %4.54 was *Klebsiella pneumonia)* , (2 / %3.03 was *Enterococcus faecalis*) , (1 / % 1.51 was *Pseudomonas aeruginosa*) , (1 / %1.51 was *Lactobacillus* spp, *)* , blood (n=1 was negative test) , ear swab (n=2 was *Staphylococcus spp*) , Seminal fluid (n=2 1 was negative , 1 was *Escherichia coli)* ,synovial fluid (n=1 was negative result) , throat swab(n=1 was *Streptococcus spp*) , genital lesion swab (n=1 was *Staphylococcus spp*) , Sputum (n=1 was *streptococcus spp*), stool (n=2 was *Escherichia coli)*

Table 2: Types of bacteria isolated from patients according to the type of specimens.

Type of bacteria	Total of number		Vaginal swab		Urine		Ear swab		Other specimens	
	Number Of isolate	%	Number Of isolate	%	Number Of isolate	%	Number Of isolate	%	Number Of isolate	%
G +V										
Staphylococcus spp.	79		42		34		2		1	
Streptococcus spp	18		11		5		-		2	
Enterococcus fascial	2		-		2		-		-	
Lactobacillus spp.	1		-		1		-		-	
Gardnerella vaginals	3		3		-		-		-	
Total	103		56		42		2		3	
G –V										
Escherichia coli	51		29		20		-		2	
Pseudomonas aeruginosa	1		-		1		-		-	
Klebsiella pneumonia	3		-		3		-		-	
Total	55		29		24		-		2	
Total Summation	158		85		28		-		4	

The study showed that there is quite one microorganism cause concerned in infections, as quite one microorganism sort was isolated at constant website of infection, and this relies on the sort of infection and therefore the immune standing of the host yet because the impact that some pathogens wear the organs, yet because It was observed that the quantity of infections triggered by Gram-positive microorganisms was higher compared to infections produced by Gram-negative organisms. microorganism , as shown in Table (1,3). this might result to their ability to secrete some toxins and enzymes, and this plays a job in resisting bodily process additionally to its presence naturally within the organ. justify the

explanation for this as a result of these gram-positive microorganism area unit naturally found within the bodily cavity region and their presence facilitates the method of their invasion [15].

Table 3: ***Number & percent of bacteria isolates***

Bacterial isolated	***Number & Percent of bacteria isolates***	
	Number	***%***
Staphylococcus spp	79	50
Escherichia coli	51	32.28
Streptococcus spp	18	11.39
Klebsiella pneumonia	3	1.89
Gardnerella vaginals	3	1.89
Enterococcus fascial	2	1.27
Lactobacillus spp.	1	0.64
Pseudomonas aeruginosa	1	0.64
culture isolated	158	
Non-culture isolated	15	
Total	173	

Results in table 3 showed samples cultures revealed 158 had bacterial isolates from 173 pateints (while 15 non- culture isolate). The most predominant pathogen was *Staphylococcus spp* (*n* = 79 ,50%), the second most important microorganism which was isolated *Escherichia coli* (*n* = 51 , 32.28%) followed by both *Klebsiella pneumonia* and *Gardnerella vaginals* (*n* = three , 1.89%), followed by *Enterococcus fascial* . (*n* = 2, 1.27%), *Lactobacillus spp.*. (*n* = one , 0.64%) and *Pseudomonas aeruginosa* (*n = one , 0.64%)* isolated from study groups (vaginal swab, urine, blood samples, ear swab, seminal fluid, synovial fluid, throat swab, genital lesion swab and sputum.

High rate resistance of antibiotics of *E.coli* to cephalexin (15/15), amoxicillin (12/12)metronidazole (6/6) , clarithromycin (11/11)clindamycin (32/37) , metronidazole (6/6) , Rifampin (37/46) naldixic acid (28/35) , spiramycin (6/6)) , clavulanic acid (6/6) , and high rate of susceptibility to levoflaxin (23/25) , followed gentamycin (22/45) .high rate resistance of *Staphylococcus spp* to ceftriaxone (33/33), cefatoxime (36/45), nalidixic acid (23/28) , Erythromycin (23/29) , metronidazole (31/31), trimethoprim (20/26) Ofloxine (23/33) , lincomycin (45/59) other in table .1. And susceptible in high rate to imipenem (31/31) , vancomycin (25/33) , meropenim (27/35) , Amikacin (24/32)

The high resistance rate of *streptococcus spp* to Naldixic acid (11/13) , ceproflaxin (16/19) , ceftriaxone (11/12), lincomycin (11/14), norofloxacin (14/18), trimethoprim (12/16) .and the high rate susceptibility to nitrofurantoin (12/18) , followed by Rifampin (10/19). *Lactobacillus spp* is resistance to nalidixic acid , levoflaxin , lincomycin , streptomycin in high rate , and susceptible to nitrofurantoin , tetracycline , streptomycin in high rate .*Pseudomonas aeruginosa* susceptible to Amikacin , Azithromycin , Ceproflaxin, Gentamycin , imipenem , levoflaxin , meropenim and resistance to amoxicillin , tetracycline , metronidazole , trimethoprim *klebsiella pneumonea* resistance to amoxicillin , tetracycline , Erythromycin, metronidazole in high rate , and susceptible to meropenim , levoflaxin , nitrofurantoin, in high rate .*Gardnerella vaginals* resistance to cephalexin , metronidazole, tetracycline in high rate , and susceptible to ceproflaxin , Azithromycin , levoflaxin, imipenem , vancomycin .*Enterococcus faecalis* has high resistance to amoxicillin , ampicillin , metronidazole, streptomycin , and susceptible to imipenem , levoflaxin, Rifampin , nitrofurantoin in high rate Table.4 .

Table.4. Antimicrobial susceptibility of some bacterial isolates

Antibiotic	*Staphylococcus spp*			*Escherichia coli*			*Streptococcus spp*			*Lactobacillus spp*		
	S(%)	I(%)	R(%)	S(%)	I(%)	R(%)	S(%)	I(%)	R(%)	S(%)	I(%)	R(%)
Imipenem	31/31	---	---	3/7	4/7	----	4/5	---	1/5	---	---	---
clavulanic acid	8/31	11/31	12/31	-----	---	6/6	---	---	1/1	---	---	---
Levofloxac	31/56	10/56	15/56	23/2	2	10/2	7/13	2/	4/13		1/	1/2

in				5	/25	5		13			2	
Rifampin	30/70	7/70	33/70	8/46	1/46	37/46	10/19	1/19	8/19	1/2	1/2	
Amoxicillin	7/52	12/52	35/52	----	-----	12/12	---	3/5	2/5	---	---	---
Cefotaxime	3/45	6/45	36/45	-----	-----	6/6	---	1/3	2/3	---	---	---
Naldixic acid	3/28	2/28	23/28	3/35	4/35	28/35	1/13	1/13	11/13			2/2
Ciprofloxacin	24/83	14/83	45/83	15/52	17/52	20/52	2/19	1/19	16/19			2/2
Azithromycin	2/29	11/29	16/29	----	2/6	4/6	3/5	2/5	1/5	---	---	---
Clarithromycin	16/73	3/73	44/73	----	----	11/11	2/5	1/5	3/5	---	---	---
Clindamycin	13/67	10/67	44/67	4/37	1/37	32/37	5/12	2/12	5/12			1/1
Erythromycin	2/29	4/29	23/29	---	---	6/6	2/5	1/5	2/5	---	---	---
Ofloxine	10/33	----	23/33	7/23	2/23	14/23	1/7	---	6/7	1/2		1/2
Gentamycin	28/70	16/70	26/70	22/45	9/45	14/45	3/17	4/17	10/17	---	---	---
Doxycline	11/20	1/20	8/20	------	2/2	__	2/2	---	---	---	---	---
Lincomycin	11/59	3/59	45/59	2/18	----	16/18	2/14	1/14	11/14	---	---	2/2
Vancomycin	25/33	5/33	3/33	-----	----		5/6	1/6	---	---	---	---
Meropenem	27/35	7/35	1/35	14/15	-----	1/15	4/5	1/5	---	---	---	---
Metronidazole	---	---	31/31	----	----	6/6	---	---	5/5	---	---	---
Nitrofurantoin	41/70	4/70	2570	15/45	15/45	1545	12/18	5/18	1/18	2/2	---	---
Norfloxacin	23/70	7/70	40/70	20/43	----	2343	2/18	2/18	14/18	---	1/2	1/2
Ampicillin	6/31	5/31	20/31	----	----	6/6	2/4	2/4	---	---	---	---
Spiramycin	1/29	10/29	18/29	----	----	6/6	1/5	1/5	3/5	---	---	---
Streptomycin	22/55	6/55	27/55	10/25	1/25	14/25	5/11	1/11	5/11	---	---	2/2
Tetracycline	5/12	1/12	6/12	2/5	1/5	3/5	---	---	2/2	---	---	---
Trimethoprim	18/50	3/50	39/50	19/45	3/45	23/45	2/16	2/16	12/16	2/2		
Trimethoprim / sulphamethoxazole	4/26	2/26	20/26	----	1/6	5/6	---	---	4/4	---	---	---
Amikacin	24/32	----	8/32	16/33	----	19/33	8/13	3/13	2/13	---	---	1/1
Ceftriaxone	---	----	33/33	---	---	8/8	--	1/12	11/12	---	---	---
Cephalexin	---	----	26/33	---	---	15/15	2/8	1/8	5/8	-	---	2/2

At current, Antibiotic resistance thought-about a worldwide health alternative, Multiple treatment resistance bacterium area unit on growth and more at the time changing into a vital downside of all inhabitants, so area unit being concerned in Increased morbidity among patients. infection with resistant species that work for a long stay in hospitals; Immunocompromised individuals, combined with exposure to multiple antibiotics, are the most common risk factors for infection and multi-antibiotic resistance. Antibiotic resistance appears in varied bacterium from completely divers samples is related to significant Negative results [16]. *staphylococcus spp* is the most prevalent bacteria isolated from vaginal swab (%49.41) which is released and in urine (%51.51). The increase in resistance has a abundant impact on the cheap of both developed and emerging countries as it is most likely to affect the lab our force through mortality and morbidity.

Capacity of *Staphylococcus* spp and *Escherichia coli* to form biofilm can be indirect by phenotypic characteristic. In table 5, presented the 18 isolates of *Staphylococcus* spp were strong biofilm producers, while 6 isolates were moderately productive and one isolate was weak or non-productive. *Escherichia coli* Fourteen isolates were of strong productivity, 9 of medium production, and two isolates of non- or low-production.

Table 5: Number and percentage of biofilm form by *Staphylococcus spp and Escherichia coli* detection by M.T.P.

Isolated Bacterial Number (25)	**biofilm formation**	***Staphylococcus* spp.** **NO. (%)**	***E. coli*** **NO. (%)**	**Total** **NO.**
	High	18(72)	14(56)	32(64)
	Moderate	6(24)	9(36)	15(30)
	Weak / none	1 (4)	2(8)	3(6)
	Total	25(100)	25(100)	50(100)

Biofilm development may be a key consider the institution and resolve of coccus infections in humans, animals, and on medical devices, the flexibility to make biofilms on plastic devices is a crucial virulence issue for microorganism.

4- Conclusions

It was concluded from this study that Bacteria isolated from different pathogens were Gram-positive bacteria more frequent than Gram-negative

bacteria. And that men are more susceptible to infection than women, in addition to that the bacteria that form the biofilm are more resistant to antibiotics.

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Investigation of Deep Fake Video Detection

1 st Sarah Riyadh Adnan
dept. of computer
college of science, Mustansiriyah
University
Baghdad, Iraq
sarahriyadh93@uomustansiriyah.edu.iq
2 nd Huda Abdulaali Abdulbaqi
dept. of computer
college of science, Mustansiriyah
University
Baghdad, Iraq
huda.it@ uomustansiriyah.edu.iq

Abstract—The rapid developments of deep learning techniques are the process that can easily create and use a fake media known as Deepfakes. Deep learning techniques can generate facial motion transferring, gender changing and face swapping with others. Currently, it is possible to create hyper-realistic digital media like images and videos by deep learning techniques that was easily accessible. However, that become a threat for everyone, if that used for harmful purposes. In this work presents how the deep learning is used for Deepfake generation and detection. There are two methods which are most popular to Deepfake generation: Generative Adversarial Networks (GANs) and autoencoder techniques that is presented in this work. It also, introduces a survey of some researcher's works and methods that used for Deepfake detection during the few recent years. This paper previews several deep learning techniques used for fake media detection such as Convolutional Neural Network (CNN), Recurrent Neural Network (RNN), and Long Short-Term Memory (LSTM). The presented method in this work for deepfake detection is based on Gray Level Co-occurrence Matrix (GLCM) as a feature extraction method applying on 4 bands to obtain 13 feature form each one to achieve good accuracy of classifier.

Keywords—component Vision, multimedia, Cyber, Fake Video, Security

Introduction (*Heading 1*)

Manipulated multimedia is present on the Internet and social media platforms increasingly, such as images of videos for the person that is replaced with another one like a swipe face processing to obtain Deepfake information. These useful uses of deep fake can hurt society and introduce misleading information on social media. The most popular form of deep-fake video is a face-swap of a person's face with another one. This deep-fake is created using a generative adversarial network (GAN) [1], this model is used to apply on a data set and then create fake videos and images as fake news that seriously impact society. In another hand, the detection of Deepfake videos and images become so important.

Recently Deepfake news has become rapidly shared on social channels, which makes the Deepfake detection of videos and images so important, so there are many studies about deep learning approaches in the last few years.

The most important step is the feature extraction method, the GLCM is a popular method that used as a texture feature extraction that increasing the accuracy of classification method [2].

This study focuses on Deepfake detection using the most popular deep-learning techniques as classification method such as Convolution Neural Network (CNN) [3] [4], Recurrent Neural Network (RNN) [5], and Long Short-Term Memory (LSTM) [6] [7].

This survey contribution is summarized as:

- This survey covers the current using of deep-learning methods and algorithms to detect Deepfake news.
- This work also previews the challenges achieved by researchers in this field.
- The review summarizes and displays the available dataset that was used.
- The strategy of the proposed work for deepfake video detection method.

The rest of this work is introduced as follows: In section 2 presents Deep learning techniques, Section 3 introduce Deepfake generation and detection methods. While section 4 includes the available dataset the researchers work on it. The section 5 is the proposed work for deepfake video detection method. Finally, section 6 discusses the conclusion of this paper.

Deep learning techniques

Deep learning has been used in several applications such as computer vision, natural language processing, audio processing, automatic translation, and fake media detection [8]. The deep learning method has the same concept of neural networks that use multiple sub-layers in the network. Deep learning algorithms are used to create fake data that is very hard to distinguish from real ones. Also, deep learning methods are used to detect Deepfake images and videos [9]. In recent studies, several techniques are using deep learning such as Convolutional Neural Network (CNN), Recurrent Neural Network (RNN), and Long Short-Term Memory (LSTM) that describe as follow:

Covolutional Neural Network (CNN)

The proposed methods of Deepfake detection filed for the recent years using CNN. These techniques have subscribed to improvements in the performance of computer vision problems. CNN has several state-of-the-art models like AlexNet, VGG-Face, GoogLeNet, and SqueezeNet for image recognition purposes that are based on factors such as noise, blur, brightness, contrast, and missing data that affect their performance [10].

The core of CNN is the convolutional filter process, it creates a feature map of the image by moving around it and determines small image features [11].

Recurrent Neural Network (RNN)

A recurrent Neural Network (RNN) is a class of artificial neural networks that are applied in handling sequential information as a videos application [12]. The main

functionality of RNN can detect if video fake or not, also it's can check any temporal variations between video frames produced by Deepfake tools [12]. Recurrent neural networks contain an internal state to represent context information and keep it of past inputs that depend on its weights by using prior knowledge. RNN is a good decision for long-term dependencies problems [13].

Long Short-Term Memory (LSTM)

LSTM is an extension of RNN that use to extract the spatial and temporal information of Deepfake video [LSTM]. LSTM has feedback connected to identify all data sequences. LSTM architecture includes three gates: (input, forget and output gate). LSTM has a cell state as long-term memory that returns values from the previous interval and is put in this cell. While the input gate function is selected a proper value to put into cell state. The forget gate is used to determine the information that should be forgotten by implementing the sigmoid function, but the output gate responsible of find the information should be in the next step [8].

Deepfake generation and detection methods

Generation Methods

Deepfake multimedia is generally created by the most used technology Generative Adversarial Networks (GANs), which are implemented by swapping a face in image and video to produce fake contents that cannot be recognized by the human eye [15]. GAN implements the Deepfake process as shown in Figure 1 below, its content is a generator and a discriminator. The source and target images receive as input data to the generator to be synthesized as shown in Fig. 1 (a). These input data using by the generator to create a new image. While the discriminator learns to recognize if the image real or fake, as shown in Fig. 1 (b). Then the output from discriminator feedback to the generator repeats this process unit the discriminator can't recognize between the real and fake images, show Fig. 1 (c) [11].

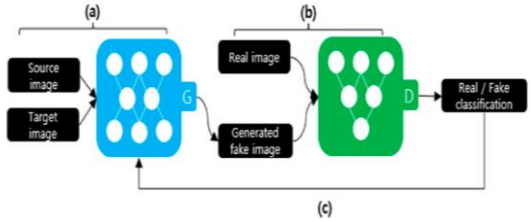

Fig. 1. Deepfake generation by GAN. (a) The generator training, (b) the discriminator training. (c) Feedback repeating

Also, the autoencoder is one of the primary technology that is used to Deepfake generation. Its works with encoder and decoder, the encoder is extract features from the image, and the decoder is used to restore the original image. There are two autoencoders used in this technology, while the decoder work as learned to generate a fake image as shown in Fig. 2 below [11].

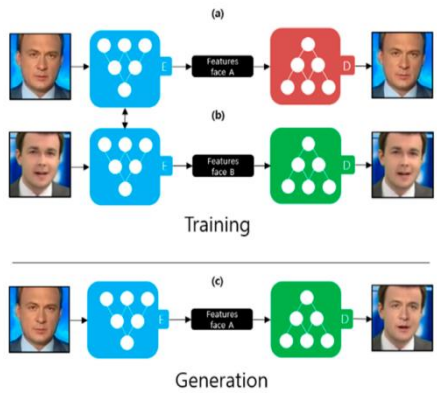

Fig. 2. Deepfake generation by autoencoder. (a) Face A trained by autoencoder, (b) Face B trained with

Detection Methods

Deep learning is a new branch of Artificial Intelligence. Deep learning has a useful task, such as text, speech, and image recognition, so it's led to the development of Deepfake detection that use to detect fake media content.

In this paper, introduce as a survey some works and methods that used in the few recent years. Atharva et al. [12] introduced using CNN and RNN, this work started with dividing the video into frames and then using CNN to extract the face feature from each video frame and ignored all frames that didn't have faces. The model was used in this work includes resnext50 32x4d and LSTM, it can be detected if the video is real or fake. The results of these models are 94.21% correct.

Bhavik et al. [16] presented a system that helps to distinguish the authentic data by suggesting two models for video and image. At first, using pre-processing to extract the faces from image and video frames by using the MTCNN process for face detection. The images were cropped pass through the Facet model to create 512 embedded dimensions for each face, this dimension was passed into dropout and dense layers for decreasing the dimension to 64 vectors. Then used triple loss function to generate unique clusters of fake and real images. The results from the triple function are sent to the SGD function that is used to classify the images are fake or real. While the video model also takes the cropped face and passed it into the Facenet function and then to a series of dropout and denes layers to reduce the image dimension into 64 and then passed through the triple loss function to generate unique clusters of fake and real video. At least the results are sent to the LSTM layer to detect the video state. There are two accuracies is achieved by the video model: training accuracy 81% and testing accuracy 78%.

Video a Synthetic Aperture Radar (SAR) is a deep learning approach that developed and used in detection and tracking techniques. Liwu et al. [16] presented a video SAR detection approach by using a dual faster region based on CNN (Faster the R-CNN), the author has introduced three main

contributions in this work: 1) they proposed the detection approach that based on (Faster- R-CNN), which gathering the shadow detection of SAR and Range-Doppler (RD). 2) Using SAR with high resolution and RD with low resolution as input to Faster R-CNN, also using Region Proposal Networks (RPNs). 3) Authors proposed a method (a rule-based azimuth coordinate shift). This new approach was proposed can effectively detect false alarms.

Deressa et al. [18] authors in this work suggested the approach of their Deepfake video detection model that includes two components: CNN and Vision Transformer (ViT). This model was applied to the facial frames of videos with different datasets, while the maximum accuracy was achieved to 91.5 at DeepFakes Detection Challenge (DFDC) dataset.

AVAILABLE DATASET

In this section, the reviewing dataset that was recently used in researcher studies.

- **Celeb-DF dataset:** The Celeb-DF dataset of Deepfake videos has different visual artifacts that can easily recognize from the real videos [19]. Atharva *et al.* [12] authors in this work used the Celeb-DF dataset, they are mixed datasets when it includes the same proportions of real and fake videos. They are used 70-80 percent of data for training and 20-30 percent for testing. Each video in these data has 30 frames per second with a time of 10 seconds, which means the video has 300 frames. Also, Bhavik *et al.* [16] used the Celeb-DF dataset in the work by taking a screenshot from a video.

- **Faceforensics ++ dataset:** The Faceforensices ++ is a forensics dataset consisting 4000 fake and 1000 real videos, these videos have been manipulated with four methods of face manipulation like: FcaeSwap, Face2Face, Deepfake and NuralTextures. This data has a trackable frontal faces which enables to generate fake video [20]. Bhavik *et al.* [16] suggested to used 996 fake and 993 real videos in their work, that were used for train and testing their detection model.

- **DFDC dataset:** The dataset is use for a deepfake detection contains more than 100000 videos, it's include two version: algorithms of featuring two facial modification with 5k videos and eight with 124k videos [21].Bhavet *at el.* [16] used 1566 fake and 1727 real DFDC videos in their work. While Deressa *at el.* [18] tested their model with 400 DFDC videos and obtain 91.5 % accuracy.

PROPOSED DEEPFAKE VIDEO DETECTION METHOD

The proposed method of fake video detection as shown in Fig. 3, which is used DFDC data set, where each video have a 300 frame with 30 f/s of frame rate. This dataset have real and fake video for testing and training. In this work, the first step begin with preprocessing stage that convert each video into frames by using OpenCV method that applying with python language. OpenCV that use for image scanning and face recognition, the function "Video Capture Function" that used to capture 100 frames from each video in the DFDC dataset. The proposed method to use for feature extraction is GLCM that applied on single band, it's supposed to be the gray image. For this we need as a third step

in preprocessing stage to convert each frame from RGB level to gray level. As optimized this work, we proposed to use these three band RGB each one separately beside the gray, by this step looking forward to increase the accuracy of classification method. The next step of preprocessing stage is the frame enhancement, the purpose of this step to be increased the frame contrast by using a linear fitting model, which applied on each pixel to make its value between 0-255.

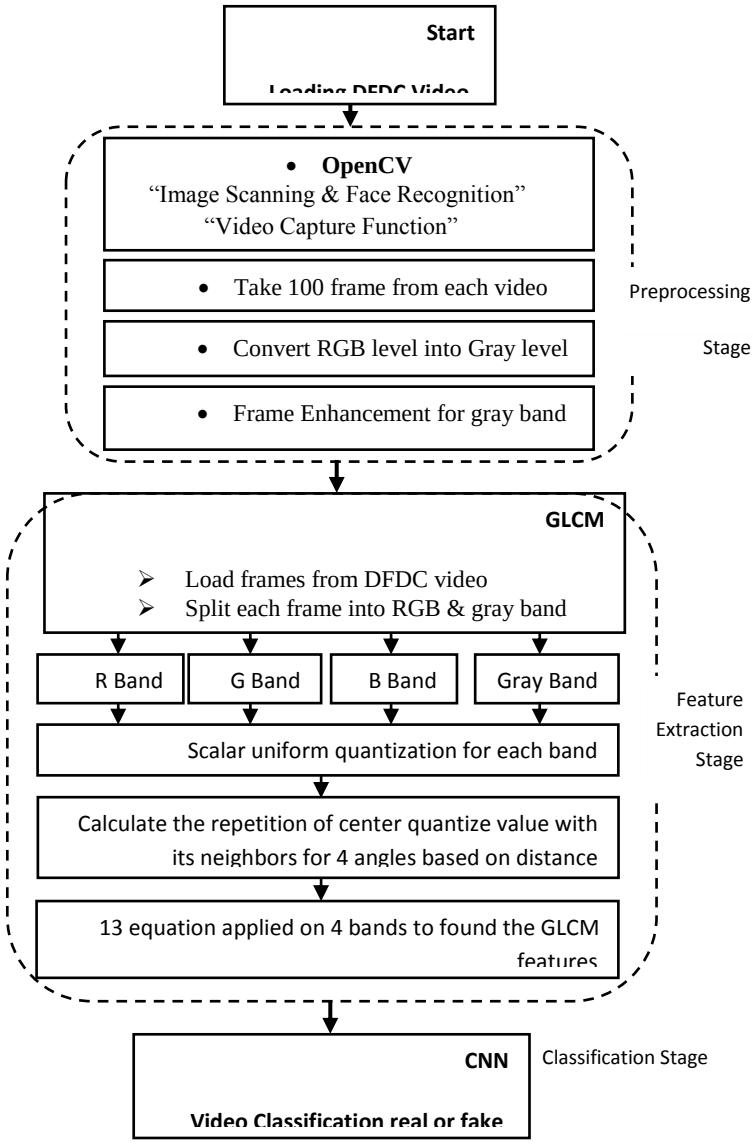

Fig 3. Deepfake video detection method.

The second stage of the proposed work is the feature extraction. GLCM is a texture feature method that applying on different types of frame from DFDC dataset videos to obtain the most important information, which is help to achieve higher classification accuracy. The GLCM applying on 4 bands. In this stage, set the quantization level by using the scalar uniform quantizing to remove the noisy pixels in each frame. The next step, calculate the repetition of center quantize value with its neighbors for 4 angles based on distance. Therefore, there are 13 equation that applying on 4 bands to obtain 13 GLCM features from each one. The final step is the classification stage, the CNN is the proposed classifier to be used for classifying the video is real or fake.

CONCLUSION

The Deepfake image and video in social media platform had so popular recently. Also, the tools that are used to create Deepfake contents become easy to work with it and share content on the social media platform. Recently, the focus on deep learning methods is increasingly for addressing this issue and detecting fake content. This paper firstly displays the current tools and applications used for fake video and image creation. Then, introduce and discuss the deep learning techniques that are currently used: CNN, RNN, and LSTM. Also, provide details of methods that are currently used for Deepfake generation and detection. As well, preview the accessible dataset are used by researchers within studies mentioned in this paper. Finally, presented the proposed method of deepfake video detection that suggest to use as shown previously that look forward to achieve a good classification accuracy with GLCM texture feature extraction method that applying on 4 bands to get 13 features that optimized the work results .

The performance of deep learning with Deepfake creation is in constant evolution. Hence, that make the Deepfake quality has been increasing and it's become closer to real content. That's why needing to improve the Deepfake detection methods effectiveness and reduce the impact of Deepfake over social media content.

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Synthesis and Applications of (UPE/SiC) anti-Corrosion Nanocomposite Coating for Oil steel pipes

Mohammed O. Kadhim[1] Fadhil K. Farhan[2] Faez Salim Abed[3]

AL-Karkh University of Science, College of Energy and Environment Science [1,3]

AL-Karkh University of Science, College of Science [2]

*Corresponding author, Email: m.obaid_k@yahoo.com

Abstract

In this study the coating of the oil and gas pipelines has been achieved with new coatings materials via nanocomposite for protection these pipelines from the corrosion. Nanocomposite coating as a resistant to corrosion component of unsaturated polyester (UPE) reinforced by nanoparticles silicon carbide (SiC). It was prepared from unsaturated polyester (UPE) reinforced by nanoparticles silicon carbide (SiC) with average particle size of 50 nm and with different weight fraction wt.% 0, 1 ,2, 3, 4 and 5 . The coatings were applied on carbon steel sheets by dip-coating method. The crystal structures of used steel samples before and after coating with UPE/SiC have been measured. Nano composite were investigated by X-ray diffraction (XRD). Corrosion behavior of the coated carbon steel has been done by Tafel electrochemical polarization method and immersion method in different corrosive media. Experimental results show different amount of corrosion ratios, with higher ratio for uncoated sample and coated with normal paint while the samples coated with the UPE/SiC Nano-Composite pint enhance the wear- reinforced of metal in comparison with net UPE paint.

Keywords: Nano-SiC, UPE, Nano- composite coatings, oil pipes corrosion, immersion test.

Introduction

Maintenance costs worldwide resulting from corrosion problems have reached around 2.5 x $10^{12}$$ according to the World Corrosion Organization (WCO), conversely, evolution and the rapid development in the field of nanotechnology and its strong entry into the fields of corrosion as a problem that may lead to multiple serious accidents resulting from deterioration and failure of many industrial facilities and home systems [1,2]. Corrosion may occur due to the deterioration of metals as a result of their interaction with a corrosive element in their surroundings, such as oxygen, chlorine, fluorine, carbon dioxide, etc. As a result of this deterioration, economic damage results, which include reduced efficiency and reduced useful life, in addition to loss of materials, and may lead to the suspension of some production processes, in addition to environmental damage, which includes (injuries, fires, explosions, pollution and the spread of toxic substances), and depletion of resources, etc. [3]..

Nanotechnology has a very high-impact for finding radical solutions for the many complex industrial problems such as industrial corrosion which is considered as one of the most complex problem that troubling the world's developed and developing countries alike as it appears in many important industrial sectors such as the corrosion of the structures and steel pipelines in oil installations and

transportation systems [1- 5]. It also causes failure in reinforced concrete structures, aircraft and cars structures, and oil and gas pipelines; in other cases it can cause harmful effects on humans and their surroundings [6].Carbon steel pipelines play an important role in the transportation of oil and gas for long distances [5]. Thus, they need an efficient protection from corrosion for its limited resistance. The corrosion is a result of the chemical or electrochemical interaction of steel with its surroundings causes a wearing of the metal surface leading to a reduction in its thickness as well as changing some of its physical and mechanical properties such as hardness, scratching and wear especially the pipes that are buried in soil [7-9]. The corrosion process of metals in soil are affected by the humidity, Oxygen, concentration of Chloride and Sulphate salts and the soil electrical conductivity which have profound effects on the electrochemical reaction [10].there are four common methods used to control corrosion on pipelines; materials selection, cathode protection, protective coatings and linings, and inhibitors. The corrosion resistance coatings has attracted the attention, for several years, for their simplicity, efficiency and relatively low cost, the research on the subject focused on the development of coatings to meet different requirements such as ease of application and high performance, low cost and long term endurance and environment-friendly [11]. Organic coatings played the main role for metal corrosion protection and have been used in many industries and showed good resistance to corrosion on the other hand they showed low adhesion strength with steel pipes and having relatively poor mechanical properties such as hardness, scratching and wear ,etc [12]. The best way to improve the characteristics of these coatings is done through the addition of certain desirable properties filling materials [13].The temperature affects the corrosion rate because the adsorbed molecules of oxygen on the surface of the metal are affected by temperature During its gaining of kinetic energy, which leads to a chemical reaction [14].The importance of the corrosion protection is shown through the world's interest in this phenomenon which is reflected in the huge numbers of researches that tries to improve the steel corrosion protection by using different methods such as Nano- composite coating Ni-Al_2O_3 [8]. Recently, the high cost of corrosion effect make researchers try to found an alternative materials instead of traditional materials (steel and wood) that are used in many applications with low manufacturing costs and availability such as unsaturated polyester resins (UPE) in the form of matrix of fiber-reinforced composites or thermoplastic matrix in natural fiber composites due to their [15].Since 1930 UPE have been used in wide range of applications of thermosetting system [16,17,18,19].These resins are compounded with varied fillers, reinfor-cements and cured by using free radical initiators to yield thermoset articles having a wide range of "chemical and mechanical properties" depending upon the choice of decades, dials, cross- linking agents, initiators and other additives [16].

SiC have chemical inertness, high thermal conductivity, high HV and YM [20], even at very high temperatures due to the" storing- chemical –bond" SCB between Si & C atoms [20, 21] The "strength yield" of SiC is about 22 GPa at RT and is expected to be 0.33 GPa at 999 ∘C, [22, 23].Several researchers have prepared and studied the role of polymer Nano -composite coatings in minimizing the corrosion process. Most studies have focused on using polymer Epoxy and polyaniline as they have good corrosion resistance. X. Shi et al showed improving the corrosion resistance of the steel after coating by epoxy modified with Zn and SiO_2 nanoparticles at differenced concentrations. Enhancement of the corrosion resistance of steel by coating with epoxy—organ clay Nano- composites demonstrated by Merachtsaki D. et al [24-30]. The current study aims to prepare a polymer based Nano composite coating from unsaturated polyester (UPE) reinforced by different percentages of nanoparticles SiC and examine the capability of such additives to improve the corrosion protection of carbon steel in different corrosive media.

Materials and methods

For the current work, a mixture of unsaturated polyester (UPE) with a different weight fraction (wt. %) of 0, 1, 2, 3, 4 and 5 of nano-SiC with average particle size of 50 nm has been prepared. Liquid mixing and ultrasound technique for 20min was used to prepare well mixture nancomposites with medium of viscosity emulsion as an anti-oxidant paint. The samples of the carbon steel pipelines have been taken from Al Dora refinery store of damaged pipelines, and then they have been cut with the dimensions (2x2x0.3) cm^3. Also, a sample of the soil has been prepared where matches the specifications of the soil in which the pipelines usually were buried in. The pipe samples were intermittently immersed for coating with thickness almost 1mm and have been fully dried in a confined place to prevent an early oxidation and contamination of the samples. Table (1) shows weight fraction of composite UPE/SiC and code of samples.

Table (1): wt.% of composite UPE/SiC and code of samples

components	Steel	Steel+UPE	Steel+ UPE/SiC	Steel+ UPE/SiC	Steel+ UPE/SiC	Steel+ UPE/SiC	Steel+ UPE/SiC
code of sample	A	B	C	D	E	F	H
UPE wt.%	0	100	99	98	97	96	95
SiC wt.%	0	0	1	2	3	4	5

Results and discussion

The X-ray diffraction have been investigated for sample before and after coating with UPE/SiC nanocomposite to identify of samples structure at weight fraction 4% of nano SiC as illustrated in fig. (1) and fig (2) respectively. It is noted in crystal structure due to the existence of additional components such as SiC which formed a protective layer against the corrosion.

Fig (1) shows the X-ray patterns results of corrosion products that taken from the surface of the oil pipe. These results confirmed the formation of a significant amount of oxide-hydroxide (FeOOH), iron oxide, and iron sulfide**.** Fig. (1) indicted the strong peaks at angles 42.1° **,** 64.6° and 82.05°, corresponding to the iron in hematite type of mild steel substrate without coatings while fig(2) .show the strong peaks at angles 28.55°,29.4°,33.1°,35.55°, 53.95°and 62.4° …etc. belong to UPE/SiC nanocompsite coating.

in general, the mass loss and the corrosion rate of a sample of steel decreases as a result of the coating process, noting the decrease in its values when adding nano SiC, specifically at wt.% of 4 to the sample F as shown in table (2). The effect of the nano SiC wt.% in UPE/SiC nano composite as a coating material on the chemical corrosion rate of samples is illustrated in Fig.(3).The presence of the nano SiC works clearly to reduces the corrosion rate specifically at wt.% of 4 to sample F ,and this ratio is sufficient for the purpose as a result of stabilizing the value of the corrosion rate , where increasing the addition of the nanomaterial may negatively affect the formation of clusters.

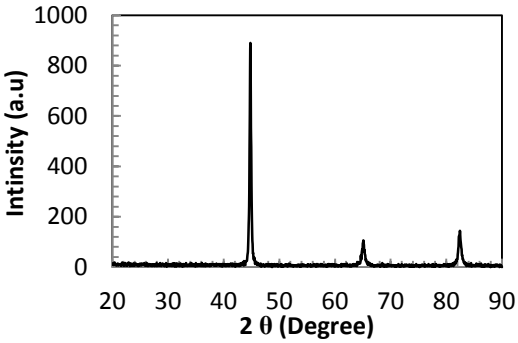


Figure 1- XRD pattern of uncoated Steel sample A.

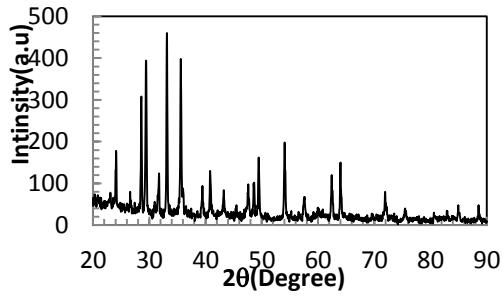


Figure 2- XRD pattern of coated steel sample F.

The effect of the coating by (UPE/SiC) nanocomposite on the corrosion of steel pipes was examined through the immersion test and Tafel electrochemical polarization method. Tafel method depends on electrochemical kinetics relating the rate of an electrochemical reaction to the over potential. Conversely, in the immersion test, the samples were immersed in soil for 30 days according to

procedures of the ASTM G31-72 standard, in which the corrosion rate (C_r) is given by the following formula [31]:

$$C_r(\text{mm/year}) = \frac{W\,K}{\rho\,A\,t} \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where, W: the Mass loss (g), due to corrosion process which determined by subtracting the mass of the corrosive specimen from the initial mass of the specimen. $K = 8.76 * 10^4$, ρ=mass density of steel (g/cm^3). A= total surface area of the specimen (cm^2). t= Time of immersion (hr.)

Table (2): Experimental Results of the chemical corrosion of Immersed samples in soil for 30 days.

sample code	A	B	C	D	E	F	H
mass loss (g)	0.737	0.205	0.307	0.036	0.051	0.001	0.001
C_r (mm/year)	2.852	0.793	1.188	0.139	0.197	0.0038	0.0038

The results of the electrochemical corrosion Tafel test of the used samples are shown in Fig.(4), where the vertical axis is electrical potential while the horizontal axis is the logarithm of absolute current. The straight lines are the theoretical current for the anodic and cathodic reactions. The curved line is the total current: the sum of the anodic and cathodic currents. The sharp point in the curve is actually the point where the current reverses polarity as the reaction changes from anodic to cathodic, or vice versa, corrosion rate have been calculated by using this method as explain in the table(3).

Table (3) shows the electrochemical corrosion rate for all samples which is the result of electric current of samples. It was observed that all UPE-SiC coated samples and for all percentages showed high corrosion current resistance, where it was found a shape decreasing of the corrosion current for coated samples as compared with uncoated sample, and the best samples were at wt.% of 2,3 and 4 for the corrosion currents 6.53,6.7 and 7.53 respectively, then the corrosion current increase at the wt.% of 5 for sample H.

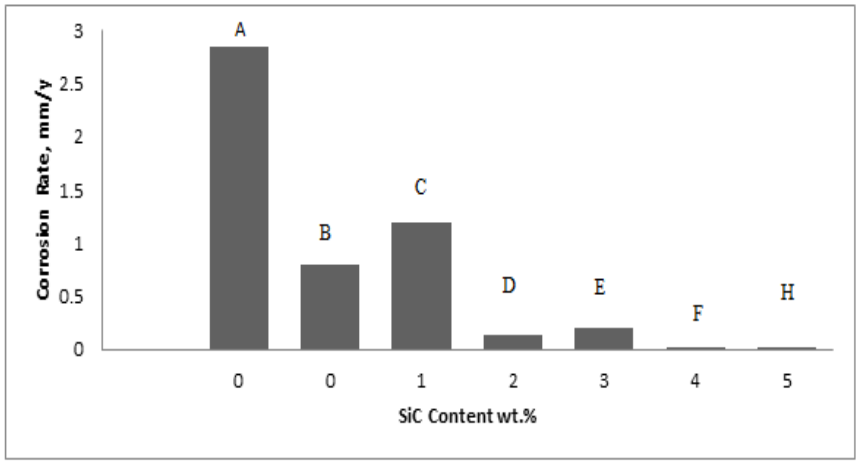


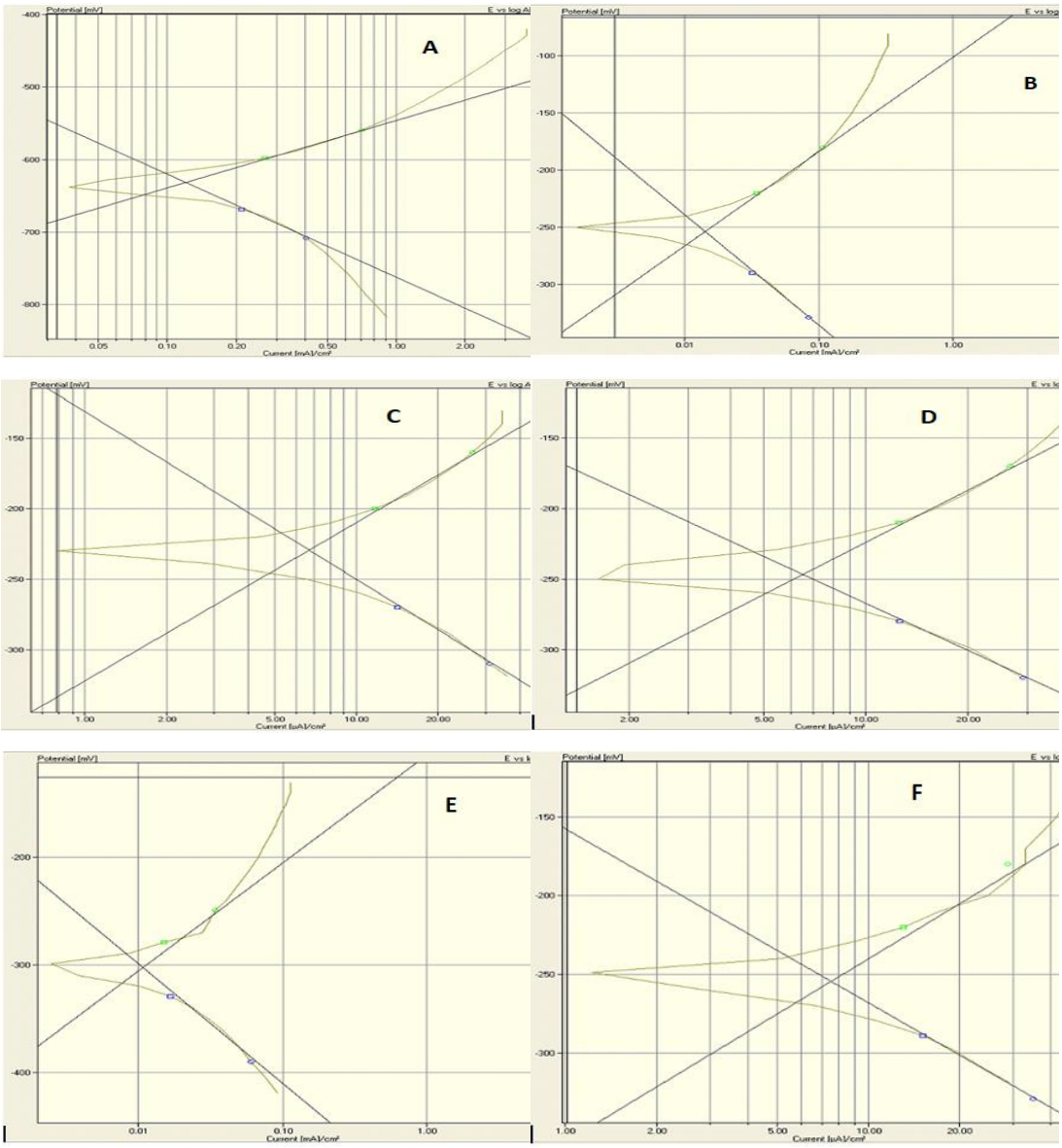
Figure 3-The effect of nano SiC wt.% additive on the chemical corrosion rate of samples.

Table (3): Corrosion current and corrosion rate of uncoated and coated steel samples

Sample Code	A	B	C	D	E	F	H
I -corr. (μA)	120	14.19	10.73	6.53	6.7	7.53	25.38
C_r (mm/year)	38.75	4.84	3.86	2.06	2.16	2.36	8.40

fig 4 show the results of electrochemical corrosion Tafel test of the used samples. where The vertical axis is electrical potential and the horizontal axis is the logarithm of absolute current. The straight lines is the theoretical current for both anodic and cathodic. The curved line is the sum of the anodic and cathodic currents . The sharp point in the curve is actually the point where the current reverses polarity as the reaction changes from anodic to cathodic, or vice versa. The sharp point is caused by plotting along a logarithmic axis. Logarithmic axis was used due to its necessary for the wide range of current values that must be recorded during a corrosion experiment where the E sample show lower value of current, C sample shows the maximum current while A show the maximum

potential as compare with others. this behavior of UPE-SiC nanocomposite coated acts on both anodic and cathodic sites.



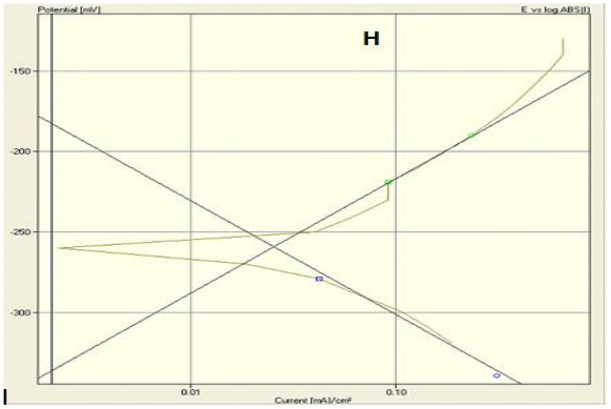


Figure 4- Results of electrochemical corrosion Tafel test of the used samples.

Figure (5) shows the relation between electrochemical corrosion rate and the SiC content wt.% in UPE-SiC coated samples. It is seen that a large reduction in the corrosion rate at wt.% of 2 to sample D due to the systematic distribution of Nano-SiC powder in the coating and the absent of agglomeration. Moreover, this distribution is formed an insulation layer protecting the sample surface from oxidation or gaps formation in the coating.

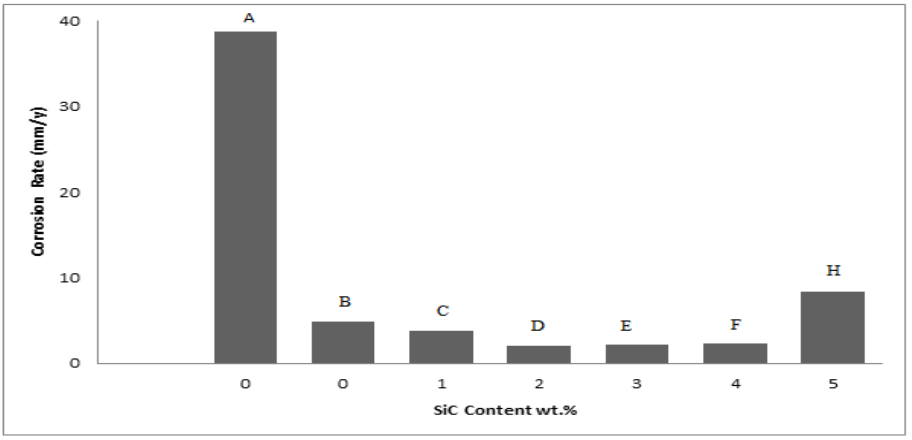


Figure 5- Electrochemical Corrosion rate by Tafel method vs SiC content.

Conclusion

The coating layer functions as nanoparticle SiC reinforced polymer composites as metal protecting layer from corrosion due to giving the metal a layer of strength and durability against the chemical and electrochemical corrosion. All samples show different amount of corrosion, the largest was in the uncoated sample and then the sample that coated with normal paint which was not reinforced with composite polymeric material. the addition of nanoparticle to the normal paint, particularly the high percentage of reinforcement, made the corrosion process diminished or none as it is clear above. So, the role of nanoparticles in significantly improving the corrosion resistance of the coated steel, through the measurements indicate that the incorporation of nanoparticles increased the polymer coating resistance and the charge transfer resistance due to enhancing the coating barrier performance It was noted during the X-ray examination the existence of additional components such as carbon and silicon which formed a protective layer against the wear and corrosion. The immersion test of the samples in soil for 30 days is more accurate and realistic than the electrochemical. The rates of corrosion have been calculated by using Tafel method, since the first method uses the same actual medium, unlike the second method, which uses similar medium conditions. It can be concluded that, (UPE + SiC) nanocmposite coating can provide practically prevent for corrosion behavior of cast iron pipes , Further studies should be conducted to investigate this behavior of this pipes under dynamic flow conditions and temperature variation to test how these effect on the petroleum industry.

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Spectrophotometric Determination of Lisinopril dihydrate using dye bleaching method in pure and pharmaceutical drugs

Aws Maseer Nejres
كيمياء تحليلية / تحليلات دوائية
جامعة الموصل كلية العلوم

Abstract

An accurate, simple, and precise spectrofluorimetric method is presented for the determination of Lisinopril (LIS) based on the bleach of 5,5′-indigo di sulfonic acid sodium salt (IG) dye in acidic medium through oxidation of Lisinopril (LIS) with known excess bromosuccinimide (NBS) as oxidizing agent. The residue from the oxidizing agent work as a bleach of 5,5′-indigodisulfonic acid sodium salt (IG) dye. The intensity of the dye was measured at 610 nm after optimization of the experimental parameters. Beer's law was applied to the proposed method and it was valid within a concentration range of 2.5–50 µg/mL and the linear regression was R2 = 0.9968. The limit of quantitation was 2.5 µg/mL, and the molar absorptivity coefficient 1.8985×103 L.mol-1cm-1. Sandal's sensitivity was 0.2325 µg.cm-2 There is no interference from excipients found in the tablet. The mean recoveries ranged from 98.24 to 102.1 %, the current approach was effectively used to the determination of Lisinopril (LIS) in tablet formulation. The data were statistically compared with those of a standard reference using Student's t-and F-test.

Keyword : Lisinopril (LIS),N- bromosuccinimide (NBS) , 5,5'-indigodisulfonic acid sodium salt (IG),redox reaction

1. Introduction

Lisinopril dehydrate(LIS) {(S)-1-[N2-(1-carboxy-3-phenylpropyl)-Lproline] dihydrate}, is an angiotensin-converting enzyme inhibitor used to treat excessive blood pressure, heart failure, and heart attacks, as well as of problems renal and retinal complications of diabetic injured[1][2][3] Several methods for determination Lisinopril in pharmaceutical formulations have been published in the literature. High-performance liquid chromatography(HPLC) is one of them. [4], Gas liquid chromatographic(GC) [5], liquid chromatography technique(LC) [6], spectrophotometry[7], capillary electrophoresis[8], Single-crystal X-ray structure[9], radioimmunoassay[10], Many methods have been used for simultaneous determination of (LIS). considered UV-Visible spectrophotometric method for the determination of Lisinopril dehydrate in raw and pharmaceutical is an obvious economical, rapid, and selective method, particularly for routine quality control analysis of pharmaceutical products[11][12] .

Here has been used a method which is based on the color bleaching of 5,5′-indigodisulfonic acid sodium salt (IG) is one of the most commonly used worldwide as dye , it have other name is indigo carmine, it enter in reduction–oxidation (redox) processes are required dyeing [13] . The development of quantitative spectrophotometric methods was the primary objective methods for the determination Lisinopril dehydrate (figure1)[14], 5,5′-indigodisulfonic acid sodium salt is used for medical diagnostic purposes [15], and used N-bromosuccinimide (NBS) acts as oxidizing agent especially in acid medium[16][17] .

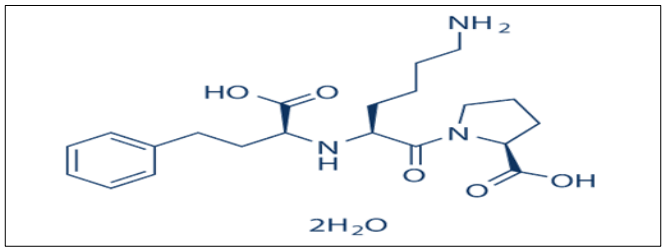


Figure 1: structure of lisinopril dehydrate (LIS)

This paper describes a simple, precise and sensitive spectrophotometric method for the determination of Lisinopril in tablets, the method is validated as British Pharmacopoeia Commission.

2. Experimental

A. Apparatus

All spectrophotometric measurements were recorded in JASCOV-360 digital spectrophotometer equipped with 1-cm glass cells. Gilson micropipette with disposable tips was used to add samples.

B. Chemicals and Reagents

Lisinopril dehydrate (LIS) was supplied by Meryer (Shanghai) Chemical Technology, China. Lisinopril tablets were 5,10 mg (Accord,UK) and 5,10mg (Bristol,UK),and N-bromosuccinimide (NBS) and Hydrochloric acid HCl, nitric acid HNO_3, acetic acid CH_3COOH and sulfuric acid H_2SO_4 (Fluka,UK), 5,5′-indigodisulfonic acid sodium salt ((IG) (FLINN scientific, Canada),

C. Preparation of Standard and Sample Solution

A stock solution of pure (LIS) (1000 µg/mL) was prepared by dissolving 0.1 g of pure Lisinopril dehydrate powder in appropriateness amount of distilled water then transfer to 100 mL volumetric flask ,at same solvent prepared daily of standard solutions (500 µg/mL) .

For all pharmaceutical drugs of (LIS) accurately weighed for 7 tablets and average weight of one tablet is calculated and prepared same concentration for pure Lisinopril by dissolved in appropriateness amount of distilled water and stirred for 15 min, filtration for removed Insoluble excipient Whatman filter paper. Transfer solution to 100 mL volumetric flask with the same solvent.

D. Preparation of reagent

In 100 mL volumetric flask prepared (1×10^{-3}M) of N-bromosuccinimide (NBS) by dissolved 0.0177 gm , and prepared (100 µg/mL) from IG dye by dissolved 0.01gm in appropriateness amount of distilled water , then transfer to100 mL volumetric flask , in same volume for flask transfer 8.4 mL HCl for prepared (1M) . the absorbance was measured for Lisinopril dehydrate at 610 nm.

3. Results and Discussion

Due to the presence of an amine group(NH_2), Lisinopril dehydrate acts as a reducing agent, The suggested mechanism of reaction that's showed in (Fig.2).

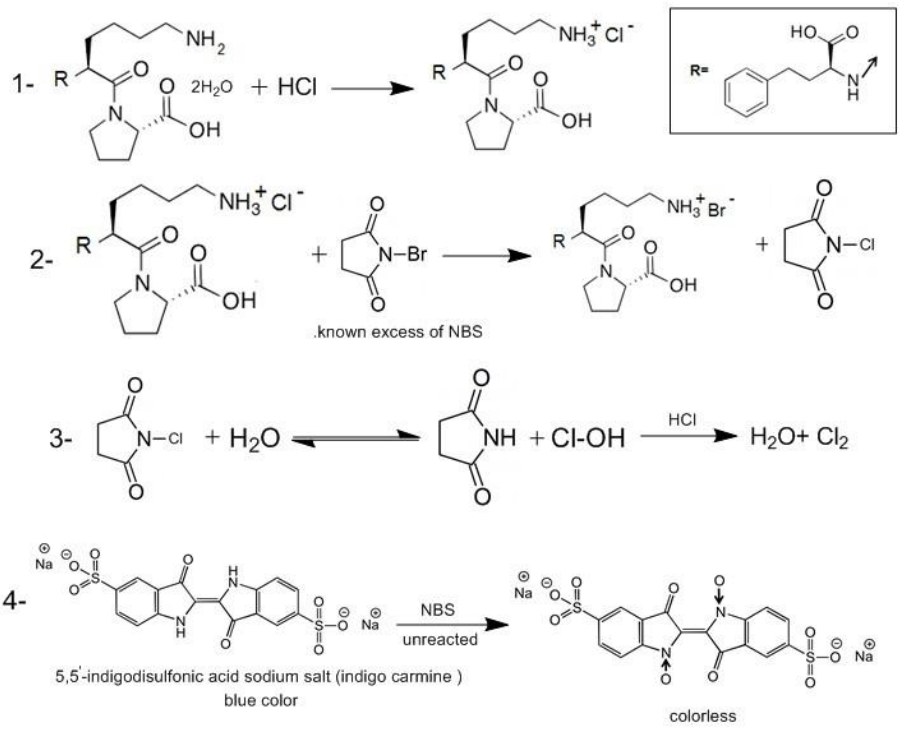


Fig.2: The suggested mechanism of reaction of LIS with reagents

A. Preliminary study and absorption spectrum

For the determination of LIS in pure and tablet drugs, the reaction conditions as well as the various parameters of experimental influencing dye stability and color development.

Selection of IG dye concentrations

In 10mL volumetric flasks, a series of different volumes of IG dye was taken in an acidic medium in the range (1-14 µg/mL) then complete by distal water . absorption was measured at wavelength 610 against blank contain only distal water (fig. 3).

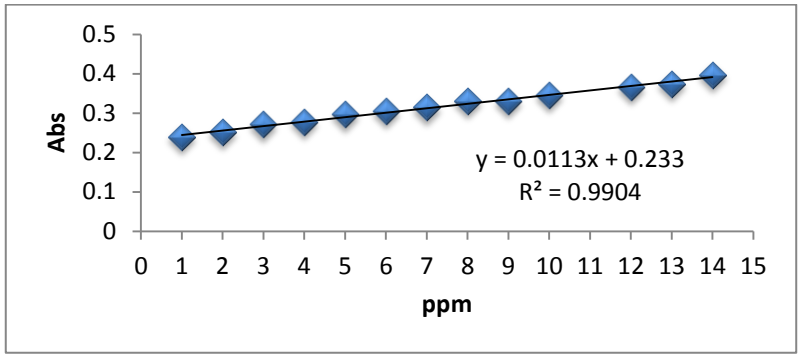


Figure 3: Absorbance vs. solutions that contain different volumes IG dye

1 mL was chosen due to Within the linear range at (R^2=0.9983), Adopted in subsequent experiments.

Selection of type and acid volume

Taken 1mL from 1M HCl, nitric acid, acetic acid and sulfuric acid individually and added to four volumetric flasks 10mL contain 1mL (LIS) , dye, NBS, and completed to 10mL by distal water , give Hydrochloric acid highly absorbance (fig. 4), and the highest absorbance was observed with 0.5 mL of 1M HCl (fig. 5), Adopted this volume and concentration in subsequent experiments.

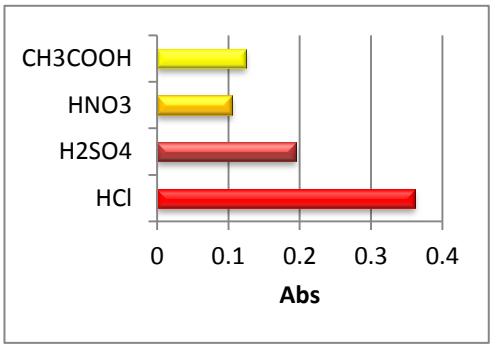


Fig.4 : Absorbance vs. different acids of HCl

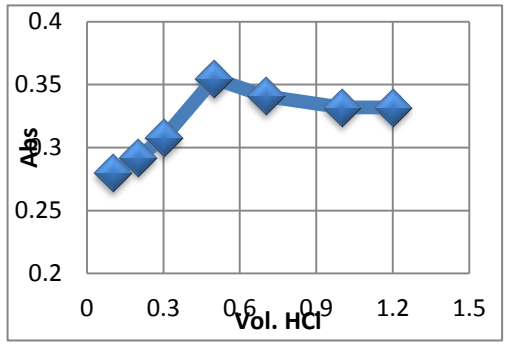
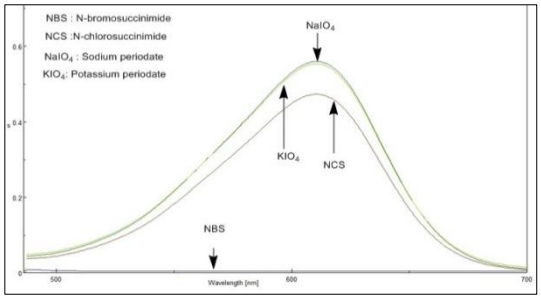


Fig.5: Abs. vs. different volumes

Selection of type and oxidizing agent volume

Taken 0.5mL from N-bromosuccinimide (NBS), N-chlorosuccinimide (NCS), sodium periodate ($NaIO_4$), potassium periodate (KIO_4) given (NBS) highly absorbance (fig. 6) , after that prepared different volumes (0.1-1.3mL) in 10mL volumetric flasks completed the volume by distal water and 0.5mL IM HCl,1mL IG dye, the results obtained in (fig.7), The appropriate volume of the oxidizing agent is 0.6mL . subsequent experiments were performed with this volume of NBS.



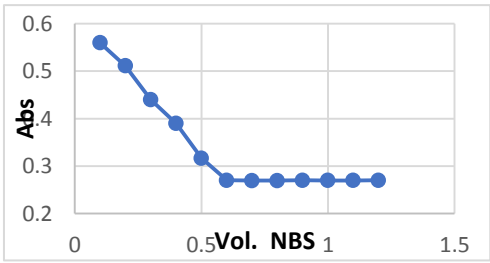


Fig.6 : Absorption spectra of oxidation agents : N-bromosuccinimide, N-chlorosuccinimide, sodium periodate, potassium periodate. Fig7 : Calibration curve of spectrophotometric indirect volume of the NBS

Time of reaction and stability dye color

Time is a factor in the completion of the oxidation-reduction reaction. 1mL (500 µg/mL) lisinopril (LIS) (with 0.6 mL (1×10^{-3}M) NBS solution in 1 mL (1M) of HCl acidic medium and bleaching of 1 mL (100 µg/mL) IG dye in 10 mL volumetric flasks and completed the volume by DW. The absorbance was attained with deferent time at room temperature 25 ± 2°C (table. 1). IG dye add after deferent time from mixture reagents with LIS then selected the appropriate times to mix the reaction mixture.

After selection time of reaction, studied the stability of IG dye and the appropriate temperature for reaction which give maximum absorbance , The maximum absorbance was at room temperature 25 ± 2°C(Table 2).

Interferences and surfactants studies

Under optimum conditions, the effects of common excipients added to pharmaceutical drugs of Lisinopril tablets as possible interferences were studied[17]. Arabian gum, fructose, starch, sucrose, and glucose individually were mixed with 50µg/mL Lisinopril pure in the final volume of 10 mL .the error E% is less than ±5%, the level of interference is considered acceptable[18] as well as, surfactants were studied (CTAB,CBC,SDS). no significant levels of common excipients and surfactants were observed in the determination of Lisinopril (Table3a,b).

Order of Addition

Series of 10mL volumetric flasks contain of 1mL (500)Lisinopril pure, 0.5mL (1M) HCl, 0.5mL (1× 10-3M) NBS addition in different sequence. studied the effected through investigated by bleaching the color of IG dye and measuring its absorbance at 610 nm. Best absorbance was achieved in the order drug, HCl, NBS and dye (figure 8).

Table 1: time of oxidation-reduction reaction for IG dye

Time oxidant (min)	Time add of dye (min)				
	5	10	15	20	25
5	0.102	0.088	0.096	0.103	0.096
10	0.196	0.185	0.169	0.221	0.199
15	0.289	0.291	0.295	0.296	0.301
20	0.35	0.331	0.364	0.364	0.364
25	0.362	0.362	0.361	0.362	0.362

Table 2: stability dye color reaction for IG dye

Temp .(Ċ)	Time stay the sample in temperatures (min)									
	5	10	15	20	25	30	35	40	50	60
10	0.337	0.337	0.334	0.332	0.332	0.325	0.325	0.325	0.320	0.320
RT	0.361	0.362	0.364	0.364	0.362	0.362	0.362	0.360	0.350	0.360
30	0.353	0.353	0.354	0.353	0.352	0.352	0.352	0.351	0.350	0.349
40	0.342	0.342	0.342	0.341	0.341	0.341	0.341	0.340	0.339	0.339

Table 3a: effect of Interference common excipients on Lisinopril drug

co-exist materials	concentrations (µg/mL)	E%
Arabian gum	100	-1.9
fructose	100	1.2
Starch	100	-1.7
Glucose	100	0.9
Sucrose	100	2

Table 3b: effect of surfactants on Lisinopril drug

surfactants	concentrations (µg/mL)	E%
CTAB	100	-0.6
CBC	100	-1.02
SDS	100	-0.17

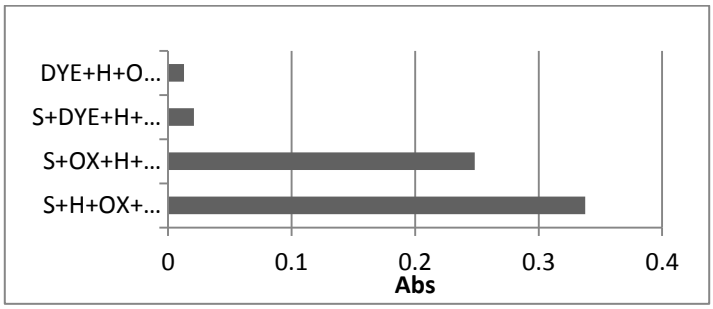


Figure 8 : Absorbance of different addition of mixed reaction

B. Calibration curve and Statistical Data

Under experimental conditions optimum that which it has been confirmed, were added series of concentration (2.5-60 µg/mL) respectively for Lisinopril pure into 10mL volumetric flasks, added 0.5mL (1M) HCl, 0.5mL (1× 10-3M) NBS, 1mL (100 µg/mL) IG dye individually, At 610 nm the absorbance was measured

against blank , The regression equation obtained using Beer's law was used to compute the calibration curve[18].

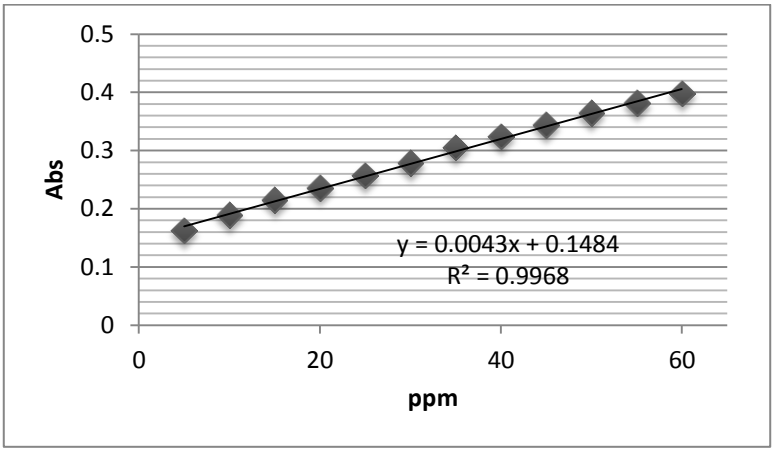


Fig.9 : Calibration curve of Lisinopril pure with NBS and dye

accuracy and precision

after taken four different concentrations of Lisinopril pure from linear of the calibration curve (10, 30,50,60 µg/mL) individually in three replicate measurements Table 4.

C. Application and Comparison

The applicability of the proposed approach for analyzing of Lisinopril in drugs, through by investigating two pharmaceutical belongs companies and the results are shown in (Table 5) which were compared to the standard Lisinopril assay and with British Pharmacopoeia standard methods[19].

after suggested approach was successfully used to determine Lisinopril in pharmaceutical drugs, the results were compared with previous studies(Table 6).

Table 4. Accuracy and precision of the proposed method

The concentration	Found from the proposed method	SD	RSD%	E%	REC%
10	10.25	0.00325	1.01900	1.7600	101.7

30	30.16	0.00676	2.07851	0.4216	100.4
50	50.45	0.00359	0.97770	0.90609	100.9
60	59.41	0.005068	1.28577	-0.97965	99.02

Table 5. Application of the proposed approach to the determination of the studied compounds in drugs

drugs tablets	Observed values (mg)	Values from suggested approach	RSD%*	E%*	REC%*	t and F test value**
Accord Uk	5 10	4.95±0.05 9.8±0.17	2.188 2.063	2.95 -0.43	97.05 100.43	t= -1.47, F= 0.15 t= 0.35, F= 0.16
Bristol Uk	5 10	4.88±0.12 10.27±0.27	2.364 1.318	0.57 0.56	99.43 99.44	t= -0.18, F= 0.14 t= -0.17, F= 0.26

*Average of three determinations, ** 95% Confidence Interval of the Difference

Table6. Comparison of determination of Lisinopril between technique and the proposed method and different redox reactions through spectrophotometric method

Reagent	λ max nm	Linear Range μg mL^{-1}	Molar absorptivity $L.mol^{-1}.cm^{-1}$	LOD	medium	References
5,5′-indigodisulfoni	610	2.5–50	1.899×10^{3}	0.005	H_2O	This work

c acid sodium salt (IG)						
Alizarine	432	4.415-300.23	1.619×10^3	N	$1:2H_2O:C_2H_5OH$	[20]
1-fluoro-2,4-dinitrobenzene	405.5	8.0–120	0.323×10^{-4}	0. 023	acetonitrile	[21]
N-bromosuccinimide	520	25-600	7.28×10^2	0.94	acetone	[22]
p-chloranilic acid	525	25–300	1.192×10^3	0.277	methanol	[23]

N: Not Available.

A simple sensitive and routine spectrophotometric method has been developed for the estimation of Lisinopril. It included an oxidation of Lisinopril (LIS) with excessed known amount of NBS in acidic medium. The excessed of oxidizing agent was determined by quenching color of IG dye. the absorbance magnitude of residue IG was measured at 610 nm. notarized, the absorbance increases linearly with increasing of drug concentration. The method is applicable and does not require extraction, and give the limit of detection (LOD) 0.0027 µg/mL, give molar absorptivity coefficient 1.8985×10^3 L.mol−.1cm−1and Sandal's sensitivity 0.2325 µg.cm-2 using the proposed method, different pharmaceutical formulations of studied drugs were determination with excellent agreement.

ACKNOWLEDGEMENT

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Isolation and study of MRSA-resistant Staphylococcus aureus from clinical samples in Al-Diwaniyah Hospitals

احمد شريف ياسين

جامعة القادسية كلية العلوم -طالب ماجستير علوم حياة - التخصص الدقيق احياء مجهرية

Summary:

This study included the collection of 554 samples from different clinical sources and cases for patients of different ages, visit the different Diwaniyah hospitals for the period from November 2021 to March 2022. Staphylococcus aureus was investigated. The results showed the yield of 100 isolates of S aureus bacteria, which included 11 isolates from burns, 11 from wounds, 24 from sputum, and 55 from urine.

MRSA was investigated using the method of spreading on the agar, and it was 80%, 50% urine, 25% sputum, 13% burns, and 11%wound. An antibiotic assay was done towards MRSA isolates, and the percentages were as follows: Penicillin 100%, Cefoxitin 100%, Moxifloxacin (MFX) 76.2%, Erythromycin 70%, azithromycin 63.7%, levofloxacin 51.5, CLARITHROMYCIN Amikacin 41, 38% 12, Clindamycin 287%, Ofloxacin 41.2%, Tetracycline 36.2%, Doxycycline 31.2%, Rifampin 23.7%, Norfloxacin 18.7%,Trimethoprim 18.7%, Gentamicin 13,3% Trimethoprim-Sulfamethoxazole 12 and Ciprofloxacin and 12% and Nitrofurantoin 10% and Chloramphenicol 6.1%, while the values of the MAR index ranged from 0.75 to 0.05

1 - Introduction

Staphylococci includes many types of pathogenic bacteria For both humans and animals, the aureus is. S is one of the most important types of bacteria that are pathogenic to humans

The most common at present(Shear 2012) which is responsible for a wide range of diseases is Methicillin-resistant Staphylococcus aureus.

MRSA (MRSA (aureus Staphylococcus) is a major health problem with a high and increasing risk all over the world because it causes many infections associated with hospitals and more in intensive care units and maternity wards, as well as in burn units (Hudson 2012). This is due to its possession of many factors of lethal virulence. Virulance factors that enable them to penetrate most of the body's natural barriers and the immune defence forces in the body and spread to the various tissues of the body easily. These factors include enzymes, toxins, surface proteins and components of the cell wall(Okba et al. 2022); thus, it is the largest

Cause of hospital-acquired infection Nosocomial infection, which has become constantly increasing due to resistance of MRSA bacteria to most of the known classes of antibiotics (Yang et al. 2021). Infection with pathogens with multiple antibiotic resistance contributed to the higher mortality rate compared to sensitive strains, as it increased Those rates are in different countries The world and in large and varying proportions(Abadi et al. 2019) . MRSA is one of the most common bacteria in the world. opportunistic pathogens that have a great ability to cause They range from relatively simple skin infections to life-threatening systemic infections (infections due to conditions that are available when)(Bromley et al. 2021). Life - threatining systemic illness In view of the importance of MRSA bacteria in causing various infections in the body, and its increasing spread, the current study aimed to isolate MRSA bacteria. And studying its sensitivity to many different antibiotics

2. Materials and methods

2.1. Study design and area

Al-Diwaniyah Governorate is located in southern Iraq. In this study, five hospitals, in different districts and districts, were included in the study. The study was conducted in the Public Health Laboratory, which serves as the national reference laboratory in Diwaniyah. Samples from inpatients with infected wounds, burns, urine and sputum (within 2 hours) were collected to the Microbiology Department of the Public Health Laboratory for treatment. Additional information was also collected on participants including age, gender, onset of lesion, previous antibiotic use, gender, and associated medical conditions. The study was conducted between the end of the year 2021 and the beginning of the year 2022.

2.2. Selection and exclusion criteria

The reviewers were examined by the attending physician for admission or expulsion from the study. The criteria for them to be included in the study included all inpatients suffering from burn infection, wound abscess, urine and sputum. The criteria included non-admission is to ensure that there was no informed consent.

2.3 Sample collection and processing

554 samples were collected from burns, surgical wounds, sputum and urine by sterile swabs. Sample collection sites were prepared using the Levine technique [23]. Double wound swabs were then taken from each location and purulent discharge of the surgical wound, etc. were first taken in nutrient agar (NA) and blood agar for a whole day and then cultured in mannitol salt agar (MSA) (Oxoid Limited, UK) and incubated Aerobic for a full day for 24 hours in the incubator at 37 °C. Blood samples were inoculated with chocolate agar (California) (Oxoid Limited, UK) and then cultured in MSA.

After that, we microscopically investigated the bacterial colonies that showed typical characteristics of Staphylococcus aureus including golden yellow colonies on MSA for Gram staining, catalase test, DNase test and in the same conditions above. Mannitol-fermented bacteria, Gram-positive as they were shaped like grape-like clusters and exhibiting catalase positivity, were cultured in DNase agar (Oxoid Limited, UK) and incubated for 24 h at the 37 °C incubator. DNase agar plates were subsequently immersed in HCl (1N) (Oxoid Limited, UK). Isolates showing the ability to hydrolyze DNA were identified as S. aureus.

2.4.Antimicrobial sensitivity test

A standard method for Kirby Power disc diffusion was performed using Muller-Hinton Agar (MHA) plate technology (Oxoid, Basingstoke, Hampshire, England) according to CLSI guidelines A bacterial suspension equivalent to 0.5 McFarland turbidity standard was prepared for inoculation. Standard antimicrobial tablets representing multiple drug classes mentioned above were used. The plates were incubated at 37 °C for a full day 24 h in Muller-Hinton agar (MHA) with 2% NaCl. The diameter of the inhibition zone was then measured by the digital ruler for each antimicrobial and interpreted as resistive (R), medium (I), and sensitive (S) by doing a comparison with mecA negative (S. aureus ATCC 29213) and mecA positive (ATCC). 33591)

2.5.Ethical Consent

Ethical approval was obtained by the ethical committee of the Iraqi Ministry of Health (MoH) and Al-Qadisiyah College of Science. The purpose of the study was explained to each of the volunteers, and written consent was obtained from each person later. We kept the results confidential throughout the study period.

3. result

3.1.Isolate rate of Staphylococcus aureus

In this study, 554 of the above-mentioned clinical sources were collected, it was found that 366 (66%) showed bacterial growth and 188 (34%) did not show growth. Additionally, 100 (18%) samples were also positive for S. aureus. All discharge samples showed, . It should be noted here that the cure rate of S. aureus bacteria from all four types of samples (wounds, burns, urine and sputum) was significantly associated with a value of 0.005 Table1.

Table (1) the number and percentage of positive and negative samples taken from different clinical cases.

Culture results	number of samples	percentage
Positive cases	366	66%
negative cases	188	34%
Total	554	100%

3.2. spread of MRSA

The prevalence of MRSA was obtained to be 80 (80%). The recurrence rate of MRSA in male patients was 55% versus 45% in female patients. in addition to , . Moreover, the frequency of MRSA in patients with burns, wounds, urine and sputum was 40, 20, 11 and 9 percent Table2.

Table (2): Distribution of MRSA isolates by source of isolate

sample source	Number of MSSA	The number of	Value

isolates		MRSA	
urine	15	40(40%)	0,05
sputum	4	20(20%)	0,05
wounds	1	9(9%)	0,05
burns	0	11(11%)	0,05
Total	20	80(80%)	0,05

Table No. 3 shows the sex ratio

GENEDR	MSSA	MRSA
Male	12(60%)	44(55%)
Female	8(40%)	34(45%)

3.3. organism resistance file

Antimicrobial susceptibility test results indicated 13 (15.9%) Penicillin 100%, Cefoxitin 100%, Moxifloxacin (MFX) 76.2%, Erythromycin 70%, azithromycin 63.7%, levofloxacin 51.5, CLARITHROMYCIN Amikacin 41, 38% 12, Clindamycin 287% 41.2%, Tetracycline 36.2%, Doxycycline 31.2%, Rifampin 23.7%, Norfloxacin 18.7%, Trimethoprim 18.7%, Gentamicin 133% Trimethoprim-Sulfamethoxazole 12 and Ciprofloxacin and 12% and Nitrofurantoin 10% and Chloramphenicol 6.1%, respectively, as in Table No. (4).

Table (4) comparing the rates of resistance shown by MRSA and MSSA isolates .

name of antibiotic	Resistant MRSA(%) N=80	Resistant MSSA(%) N=20	The number resistant isc
Penicillin(P)	80(100)	16(80)	96%
Cefoxitin(FOX)	80(100)	0(0)	80%
Moxifloxacin(MFX) \	61(76,2)	0(0)	61%
Erythromycin(E),	56(70)	3(15)	59%
azithromycin(azm)	51(63,7)	6(30)	57%
levofloxacin(LEV)	41(51,2)	1(5)	42%
CLARITHROMYCIN	33(41,2)	7(35)	40%
Amikacin(AK)	31(38,7)	4(20)	35%
Clindamycin(CD),	23(28,7)	12(60)	35%
Ofloxacin (OFX)	33(41,2)	1(5)	34%
Tetracycline(TE),	29(36,2)	2(10)	31%
Doxycycline(DOX)	25(31,2)	0(0)	22%
Rifampin(RE)	19(23,7)	0(0)	19%
Norfloxacin(NOR)	15(18,7)	0(0)	15%

name of antibiotic	Resistant MRSA(%) N=80	Resistant MSSA(%) N=20	The number resistant isc
Trimethoprim(TMP)	15(18,7)	0(0)	15%
Gentamicin(GM)	11(13,3)	2(10)	13%
Trimethoprim-Sulfamethoxazole (SXT	12(15)	0(0)	12%
Ciprofloxacin(CIP)	12(15)	0(0)	12%
Nitrofurantoin(F),	8(10)	1(5)	9%
Chloramphenicol(C)	5(6,1)	0(0)	5 %

3.4. Multidrug resistance

Among the isolates of Staphylococcus aureus bacteria, where there is the highest resistance obtained from 2 isolates that resisted 15 antibiotics, while it was less resistant than one isolate where it resisted only an antibiotic as in Table No. (Table 7)

We can describe the isolates as MDR/XDR/PDR. Multidrug resistance (MDR) is described as resistance to a single antibiotic in 3 or more classes of antimicrobials. XDR is defined as the absence of sensitivity to at least one antibiotic in all but two or fewer classes of antimicrobials used. Pandrug resistance (PDR) was defined as hyposensitivity to all antibiotics in all classes of antimicrobials. As mentioned in (Eatemadi et al. 2021). The results in this study showed that (n = 22/100, 22%) was XDR and (n = 39/100, 78%) was MDR. And no PDR was observed in our current study, and the value of MAR, which is described as the process of dividing resistant antibiotics, divided by the number of total antibiotics, is often

less or equal to one, and its value ranged in our study between 0, 75 and 0.05 as table (5).

Table No. 6 shows the numbers of resistant antigens for each isolate

name of antibiotic	Resistant MRSA(%) N=80	The total number of resistant isolates
Penicillin(P)	80(100)	96%
Cefoxitin(FOX)	80(100)	80%
Moxifloxacin(MFX) \	61(76,2)	61%
Erythromycin(E),	56(70)	59%
azithromycin(azm)	51(63,7)	57%
levofloxacin(LEV)	41(51,2)	42%
CLARITHROMYCIN	33(41,2)	40%
Amikacin(AK)	31(38,7)	35%
Clindamycin(CD),	23(28,7)	35%
Ofloxacin (OFX)	33(41,2)	34%
Tetracycline(TE),	29(36,2)	31%
Doxycycline(DOX)	25(31,2)	22%

name of antibiotic	Resistant MRSA(%) N=80	The total number of resistant isolates
Rifampin(RE)	19(23,7)	19%
Norfloxacin(NOR)	15(18,7)	15%
Trimethoprim(TMP)	15(18,7)	15%
Gentamicin(GM)	11(13,3)	13%
Trimethoprim-Sulfamethoxazole (SXT)	12(15)	12%
Ciprofloxacin(CIP)	12(15)	12%
Nitrofurantoin(F),	8(10)	9%
Chloramphenicol(C)	5(6,1)	5 %

TABLE (6) MAR index values for MSSA and MSRA isolates

No. of strain MRSA	MAR index value	No.of resist antibiotic
2	0,75	15
2	0,70	14

1	0,65	13
4	0,60	12
3	0,55	11
6	0,50	10
12	0,40	8
9	0,35	7
8	0,30	6
17	0,25	5
11	0,20	4
4	0,10	2
1	0,05	1

4.Discuss

, Gentamicin 13,3%(M and Ali 2018; Wichelhaus et al. 2002) and Nitrofurantoin 10%(Babakir-Mina et al. 2013) and Chloramphenicol 6.1%(Ahmed et al. 2012; Blumberg et al. 1991; Fayyaz et al. 2013),

A test was conducted in order to know the antibiotic resistance of MRSA isolates, and the percentages were as follows: Penicillin is 100%, which is the same results obtained in the study(Abdolmaleki et al. 2019) and differed with the results of (Dehkordi et al. 2017), which was 90% , cefoxitin 100%, which is the same as the

results of the researcher (R and Vysakh 2013), as for Moxifloxacin 76.2%, and regarding erythromycin 70%, the results were very close to (Rahi et al. 2020) where it was 71%, and for azithromycin 63.7% the results are somewhat close Of the results of (Hoşbul et al. 2013), which recorded a resistance of 62%, and it shows us that levofloxacin 51.5% is the same as the results of (Antonov et al. 2015) who got 51%, and clarithromycin 41% and amikacin 38% are the same results as(Tiwari et al. 2009), and Clindamycin 28.7% was different from(Siberry et al. 2003) the score of 44%, ofloxacin 41.2% was different from the score of 40%(Hamdad et al. 2006), tetracycline 36.2% close to the score of 36%(Sun et al. 2015), doxycycline 31.2%(Sun et al. 2015; Simor et al. 2007), rifampin 23.7% same as results(Wichelhaus et al. 2002)which were 23%, norfloxacin 18.7% that differ from (M and Ali 2018) he record 22%,As for the resistance to the antibiotic moxifloxacin, where the results we obtained are 61%, and this is somewhat close to the percentage obtained in the study(Alseqely et al. 2021) where the rate of resistance to the antibiotic is 64%. As for the pathway folate antibiotics represented by Trimethoprim Sulfamethoxazole (SXT) and Trimethoprim , the resistance to them was 12 % and 15%, respectively, Where the results we obtained are very similar to what was found in the study (Kwoji et al. 2017), where the resistance to the antibiotics (TMP) and (SXT) is 11%.Gentamicin was 13.3%, which contrasts with a study that recorded 67%(Miró et al. 2009) And as for the percentage, it was recorded for the antibiotic 10% Nitrofurantoin, which is the same in a study(Miró et al. 2009; Arora et al. 2010) As for Chloramphenicol, it scored 6.1%, which is close to a result with the researcher (Udo et al. 2006)who scored 4.1%.

5. Restriction

Although this research is in the process of presenting data from an environment where information about antibiotic resistance is very limited, we must acknowledge some difficulties or limitations. Data generalizability may be compromised by sampling biases - the true case burden for these hospitals remains unknown. Also, the data should not be generalized to the entire Iraqi state. Moreover, the distinction between HA and MRSA and between CA and MRSA is not very clear. Therefore, the actual source of infection is not completely certain. In addition, we did not collect data on the combination of atlamour such as, but not limited to, length of stay and hospital stay, area of patient residence, history of antimicrobial use of the examined patient, and contact

with livestock, among other things. The associated PCR examination was also not performed. Despite the limitations described, the goal here remains that these studies provide important vital information about MRSA burden and associated AMR patterns. Therefore, the data we collect have an important role to play on the quality of patient care (high frequency of MRSA-positive bacteria here is a sign of poor patient care), the choice of experimental antibiotics, and the need for ongoing studies of antimicrobial resistance.

6.Conclusion

Antibiotic resistance is an intractable and growing public health problem in Iraq and most countries, and it has been suggested to conduct a study of local studies. However, the epidemiology of antibiotic resistance in bacteria in the region is poorly understood. This same situation is true of MRSA. In this study, we provided data on recurrence in MRSA in Al-Dawwaniyah hospitals. In contrast to a previous study, the current study found very alarming levels where MRSA isolates (80%) are highly resistant to other antibiotics (penicillin in particular). This indicates a significant increase after 2020. The increase observed here highlights the need for a comprehensive system in operation to monitor and contain drug resistance. The tracking system should be able to collect data on emerging antimicrobial resistance trends, report infections from various health care sectors in the governorate (acute, long-term, ambulatory) and veterinary care across Iraq, and identify patients at risk for these bacterial infections. Lethality, among other things. This information can be used to design further studies for infection control and optimal use of antimicrobial agents in Iraq. We understand the difficulty of implementing these suggestions but only in the long-term. For now, an initial reassessment of current infection control practices and implementation of more effective practices (that is, screening for MRSA carriers, isolating or pooling individual patients, health care workers in colonies, and ongoing environmental decontamination, among others) should suffice. other). Priority should also be given to investing in laboratory infrastructure and allied personnel in order to limit the spread of this germ.

spectrophotometric of phenylpherine Hcl by oxidation and bleaching Alkali blue 6B

Ali M.Hussein[1a] and Nebbel S.Othman

[1]*Department of Chemistry / College of Science University of Mosul, Mosul, Iraq*

a) *Corresponding email :*

Abstract: A simple sensitive and easy spectrophotometric method of phenylpherine Hcl determination has been suggested The developed method is best on the oxidation of phenylpherine Hcl with an excess of N-bromosuccinimied [NBS],Then the unreacted NBS used in bleaching the color of alkaine bule B6[AbB6]. All factors that affected the two reactions have ben studied,these factor included type and amount of acid used in the farst reaction [oxidation of phenylpherine Hcl]amount of AbB6 , The medium of reactions and times required for completed oxidation and time for bleaching the color of AbB6 and the optimum conditions have been recommended .The present assay was obyed Beer ,s law R2=0.9997 0ver arrange of phenylpherine Hcl concentration form 1to 17.5µg / ml.The value molar absorptivity are found to be $1.25*10^4$ L/mol.cm.the sandell,s index value 0. 0162µg /cm2 .The values of molar absorptivity and sandell,s index indicated that suggested mothed good selectve towards the compound under investigation phenylpherine Hcl no interfereance of additivec .The present mothed was applied successfully to the assay of phenylpherine Hcl in its formulation [drop].

Keywords: phenylpherine Hcl, oxidation , N-bromosuccinimied , spectrophotometry, alkaine bule B6.

INTRODUCTION

The hydrochloride of phenylephrine (Nec-synephrine) is (R)-1-(3-hydroxyphenyl)-2-methyl-aminoethanol [61-76-7]. Chemically, it is quite similar to epinephrine. It's a good long-acting vasoconstrictor that has little effect on the heart or the central nervous system. It is applied topically in the form of nose drops. Subcutaneous injection has been used widely to treat orthostatic hypotension and to prevent hypotension during spinal anaesthesia[1,2] It can also be used in conjunction with local anesthetics to extend the duration of anesthesia. 8,16 It's found in a variety of medicinal preparations, either alone or in combination with other active substances. Tablets, syrups, eye drops, and injections are examples of dosage forms[3]. Phenylephrine hydrochloride can be detected qualitatively and quantitatively using a variety of methods. Among the several analytical methods are titrimetric [4]fluorometry and chromatographic methods [5,6]HPLC method[7] liquid chromatography (LC)–mass spectrometry [8]and spectrofluorometric [9] This study describes a spectrophotometric approach for determining phenylephrinein pure and dose forms that is more accurate, sensitive, convenient, and time-consuming.

EXPERIMENTAL

Apparatus

All Spectral measurements and absorption readings were carried out using a JASCO-360 spectrophotometer. Cells of glass and quartz with a light path of 1 cm were used. The pH was measured using a TRANS BP3001 pH meter and a BEL-sensitive balance was used to carry out the required weighing operations.

Reagents

All chemicals used were of analytical reagent grade, the pure Phenylpherine hydrochloride was provided from State Company for Drug Industries and Medical Appliance-(Safa and Bioner) -Iraq.

- Phenyl pherine hydrochloride (100 µg/ml) was prepared by dissolving of 0.01g in distilled water and then made up to 100 ml in volumetric flask and kept protected from sun light in ambient bottle and Tablets in same method .
- This solution N-Bromosuccinimide ($1x10^{-3}$)M was prepared by dilution of 0.01779g in distilled water and diluted to the mark in100 ml in volumetric flask and kept protected from sun light in ambient bottle and Tablets in same method .
- Dilute hydrochloric acid solution 1 N: It is prepared by withdrawing 8.4 ml of concentrated hydrochloric acid (11.8 N) by adding it to a volumetric bottle of 100 ml containing a little water and completing the volume with distilled water to the mark.
- **Drop analysis of phenylphrine hydrochloride**

Prepare by withdrawing 1 ml of the drop and completing the volume to 100 ml in a volumetric vial 100 volumetric flask.

RESULTS AND DISCUSSION

Color Spectrum

To determine the wavelength, the spectrum of the dye that will be used in the subsequent measurements was taken by taking 1 ml of the dye and adding to it 1 ml of 1M (HCl) acid, completing the volume with distilled water to 10 ml, and taking the spectrum against the sham experiment. Figure (1) shows the spectra of Dye product formed so; the maximum absorption at 585 nm is used in all subsequent experiments.

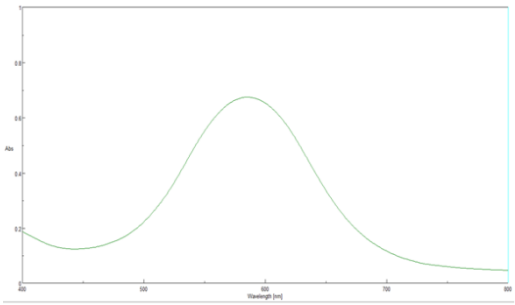


FIGURE1. Absorption spectra of Dye

Study of the Optimum Reaction Conditions

The effect of various parameters on the absorption intensity of the dye formed was studied and the reaction conditions are optimized.

Effect of dye volume

Different volumes of Alkali blue 6B were studied, ranging between 0.1-2 ml of 0.1 molarity, and the absorption at the wavelength of 585 nm was measured against the sham solution and the results are shown in the figure.

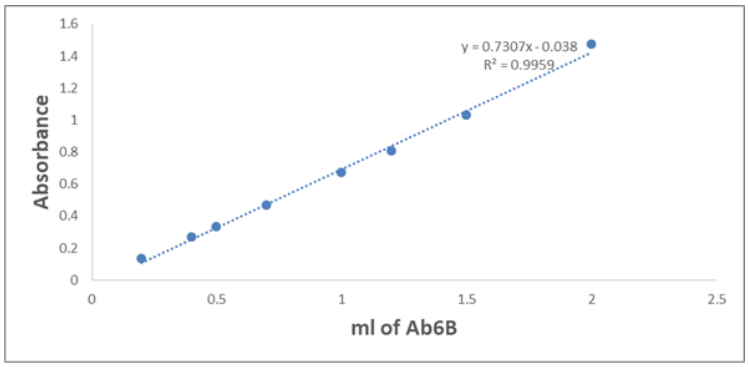


FIGURE 2 Standard curve of Ab6B.

The standard curve for different amounts of Alkali blue 6B. The results in Figure 1-2 show that the linearity continues to 2 ml with a rating factor of 0.9959. 1 ml of Alkali blue 6B was chosen to give it an acceptable absorption and that it falls within the standard curve**.**

Selection of the optimal oxidizing agent

The oxidizing agents potassium metapyrodite, -N-bromosuccicinamide and -N-chlorosuccinamide (by adding 1 ml acting on shortening Alkali blue 6B at a concentration of 0.1% of each oxidizing agent to 10 ml volumetric bottles containing 1 ml of dye and 1 ml of hydrochloric acid) were studied. Then the volume was supplemented with distilled water to the mark and the solutions were left for 10 minutes, after which the absorption was measured at the wavelength of 585 nm against the mock solution.

The figure shows that the oxidizing agent -N-bromoboxinamide gives the best results in the shortening process, so it was chosen in subsequent experiments

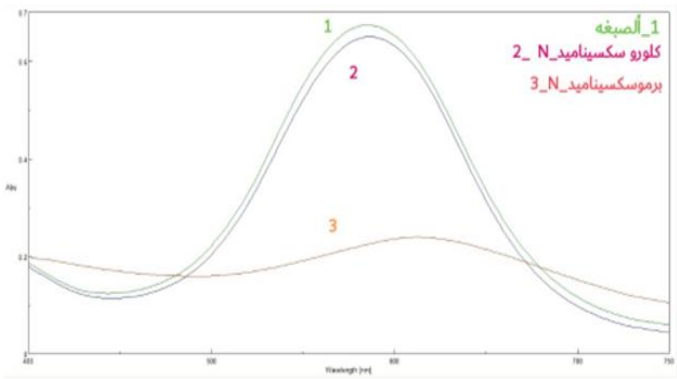


FIGURE 3 Effect of different oxidizing agents on dye shortness

Effect of the amount of oxidizing agent

The effect of the oxidizing agent n-bromoboxinamide in different quantities was studied in the oxidation of the drug compound under study with increasing amounts of it in a medium of hydrochloric acid (1.0 ml of 1 M), followed by waiting for 10 minutes with shaking, then adding the fixed amount of dye 1 ml and leaving for 5 minutes and completing with distilled water From the results listed in the table - it was inferred that the optimum volume of 1 milliliter of the oxidizing agent is the best in the oxidation process to give it the highest value of the intensity of absorption, which indicates that the largest amount of the drug compound is oxidized and the remaining amount of the oxidizing agent is less, so the dye is short, and therefore it was adopted in subsequent experiments.

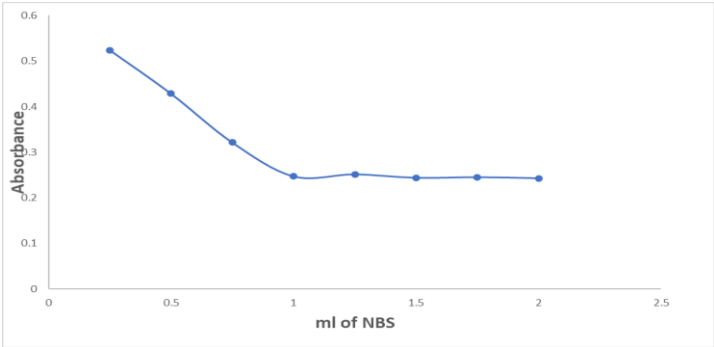


FIGURE 4 above shows the volume of the oxidizing agent

Effect of the type of acid used in oxidation

Different types of acids were studied on the oxidation of the drug phenylphrine hydrochloride, as 1 ml (100 µg) of phenylphrine hydrochloride was taken and 1 ml of different acids were added to each type. Schedule

Absorption of the remaining Ab 6B color was measured after shortening and dilution to 10 mL at wavelength 585 nm and the results are shown in the table 1.

(1M) Acid usde	Absorbance
HCl	٠,٦٢٧١
H_2SO_4	0.5321
$HN0_3$	0.5682
CH_3COOH	0.3831

From the results in the table, it was noted that hydrochloric acid gave the

highest value in the intensity of adsorption of the remaining dye, which indicates that a larger amount of vinyl ferrin hydrochloride had an oxidation, and therefore it was used in subsequent experiments

***E*ffect of the amount of hydrochloric acid**

The effect of the amount of hydrochloric acid needed to complete the oxidation process of vinylphrine hydrochloride was studied, as shown in the table2.

Table 2 Effect of the amount of hydrochloric acid on the process of oxidation and shortening**.**

١MHCl(ml)	0.25	0.5	0.75	1	1.5
Absorbance	0.1543	0.3138	0.4705	0.6244	0.5312

Effect of oxidation time

He studied the effect of the time required for the oxidation of vinylphrine hydrochloric by the calculated amount of

The oxidizing agent n-permosuccinamide in the acidic medium and then left for different periods of time - 0-25 minutes and then adding the known amount of dye Alkali blue 6B and then diluting it to the mark limit and measuring the absorption at the maximum wavelength 585 nm and the results are shown in the table 3.

TABLE 3 Effect of oxidation time on the drug compound and short pigmentation.

Standing time minute befor dilution						
Standingtime minute of oxidation	**Immediately (٠)**	**5**	**10**	**15**	**20**	**25**
Immediately (٠)	0.2690	0.3816	0.5311	0.2942	0.2940	0.2833
5	0.6332	0.6418	0.6133	0.6025	0.6012	0.5960
10	0.6228	0.6431	0.6724	0.6653	0.6592	0.6584
15	0.6136	0.6305	0.6242	0.6148	0.6069	0.6048
20	0.5419	0.5616	0.5811	0.5781	0.5718	0.5648
25	0.5242	0.5414	0.5606	0.5539	0.5511	0.5423

The above results showed that the best time for oxidation of vinylphrine hydrochloride is 10, and the best time for shortening the color of Alkali blue 6B is 10 minutes, so it was adopted in subsequent experiments.

The effect of temperature and time on the stability of the color of the remaining Alkali blue 6B dye

The effect of temperature on the intensity of the remaining Alkali blue 6B color was studied. It was noted that changing the room temperature gave the best results. Therefore, the room temperature was adopted to give it the highest absorption. The results are shown in the table 4.

Temperature	Absorbance / minute standing							
	5	10	15	20	30	40	50	60
10	0.5219	0.5220	0.5223	0.5214	0.5213	0.5210	0.5213	0.582
RT	٠,٦٢٣٨	٠,٦٢٣٤	٠,٦٢٣٥	٠,٦٢٣٠	٠,٦٢٢٢	٠,٦٢٢٠	٠,٦٢٢٢	٠,٦٢٢٣
40	0.5732	0.5718	0.5722	0.5724	0.5723	0.5730	0.5711	0.5714

results are shown in the table 4.

Sequence of adding reaction components

Several experiments were carried out with different sequences to add the oxidizing agent in order to obtain the best absorption of the remaining dye. Results Table 5.

Reaction component	Order number	Absorbance
S+ OX +H +Ab6B	I*	0.6225
S+ Ab6B +OX+H	II	0.2850
Ab6B + OX +H+ S	III	٠,٥٧٢٥

S(Phenylpherine HCl) + H (Hydrochloric acid) + OX (NBS) AB6B (Alkali blue 6B)

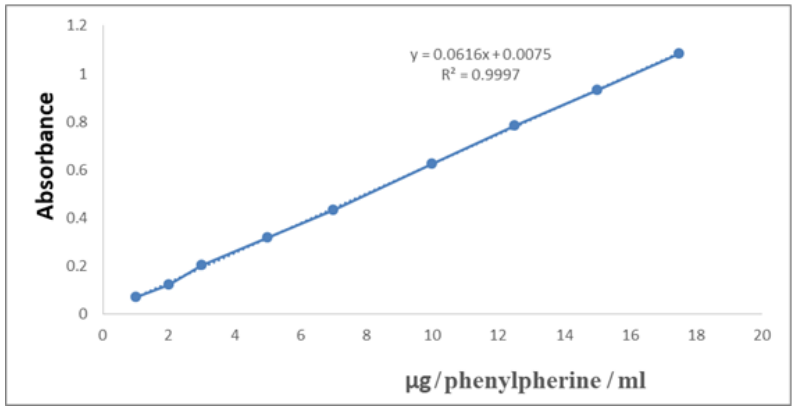
From the results in the table above, the sequence I followed in the previous and subsequent experiments was adopted

In order to give it the highest absorption intensity of the remaining dye, which indicates the largest amount of the drug compound oxidized.

Working method and standard curve.

The standard curve was prepared for the determination of valine by adding increasing volumes of valine hydrochloride solution to a set of volumetric bottles of 10 ml containing different concentrations from 1 to 17.5 µg/mL of valine hydrochloride to a set of volumetric bottles of 10 ml and 1 ml. of hydrochloric acid and add to it 1 ml of a solution of

1x 10^{-3}M-N-bromosuccinamide, then leave the solutions for 10 minutes at room temperature, then add 1 ml of AB6B (0.1%) and leave for 10 minutes and complete volumes with distilled water to the mark, then The absorption is measured against the sham solution at the wavelength of 585 nm and the figure represents the standard trend for the determination of phenylphrine hydrochloride, which follows Beer's law in the range of concentrations 1-17.5 µg ml and the molar absorptive[10] value is 1.25×10^{4}L. mol .1-cm and Sandel's significance is 0.01623gµ. cm-2 Which indicates the high sensitivity of the method.



Standard Curve Shape 5 Phenylephrine Hydrochloride

Absorption Spectrum

After creating the optimal optimum conditions listed in Table 3-21, the absorption spectrum of the dye was taken in the absence of phthalene hydrochloric and in the presence of three concentrations of phenylverrin hydrochloride. The figure 6 shows the results of the above experiment**.**

Variable	Optimality
Dye ,concenteration,V	Alkali blue 6B,0.01M,1ml
Oxidant,M,ml	N-bromosusscinimde,1*10^{-3} M ,1ml ,
Volume of HCl,M,ml	1,1M

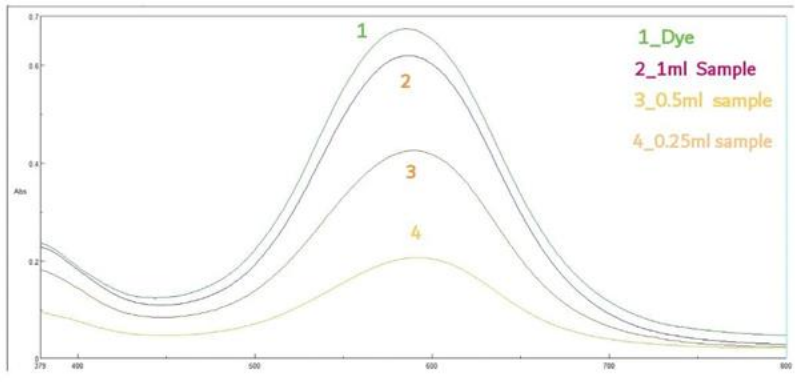


Figure 6 Absorption spectrum of the dye in the absence of valine hydrochloric and in the presence of three concentrations of valine.

method and its compatibility.

The accuracy and compatibility of the method was calculated by taking two concentrations of 5 and 10 µg/ml, and the percentage of recovery percentage was calculated, the relative error RE% and %RSD, as shown in the table 7.

Table7 of accuracy and mastery of the proposed method.

The results obtained from the table below confirm that the proposed method is accurate and perfect.

pharmaceuti cal prepreation	µg Ab6B Preseny	µg Ab6B measured	%Recovery	% **RSD***	%**RE**
Phenylpherine HCl Safa	5	5.2	104	0.15	4
	10	9.8	98	0.14	3
Phenylpherine HCl Bioner	5	4.99	99.81	0.28	-0.18
	10	9.99	99.95	0.92	-0.04

AvregFor five determinations*

Analysis of drop Phenylpherine hydrochloride

The method was applied by taking different volumes of the standard solution 100 µg/ml to get a tracer of 5-10 for the Safa Company and 5-10 for the Pioneer Company µg/ml and treated according to the working method described for the standard solutions.

The concentration of the drug compound in the syringe was found using the standard curve for the drug compound in its pure form, and the results obtained are summarized in the table

Table 8 of analysis for droplets of vinylverine hydrochloride

Pharmaceutical preparation	Certified Value) mg(	Amount present µg/ml	Recovery*%	Drug Content Found mg
safa	1%	5	99.96	0.9996
	1%	١٠	100.21	1.0021
Bioner	١%	٥	99.02	0.9902

	١%	10	98.52	0.9852

Estimation by the standard addition method

In order to prove that the proposed method is free of interferences, the standard addition method was applied to the medicinal product drops, as the obtained results shown in the table below indicate that the standard addition method agrees well within the acceptable range of error, which indicates that the results of the method are satisfactory and free from interference.

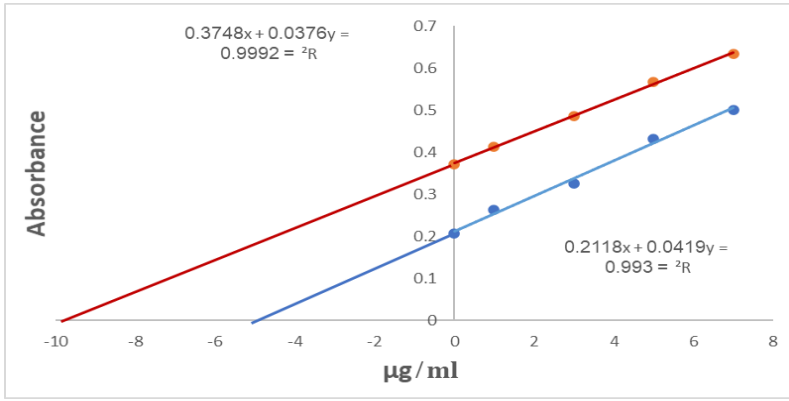


Figure 7 standard addition method of Safa.

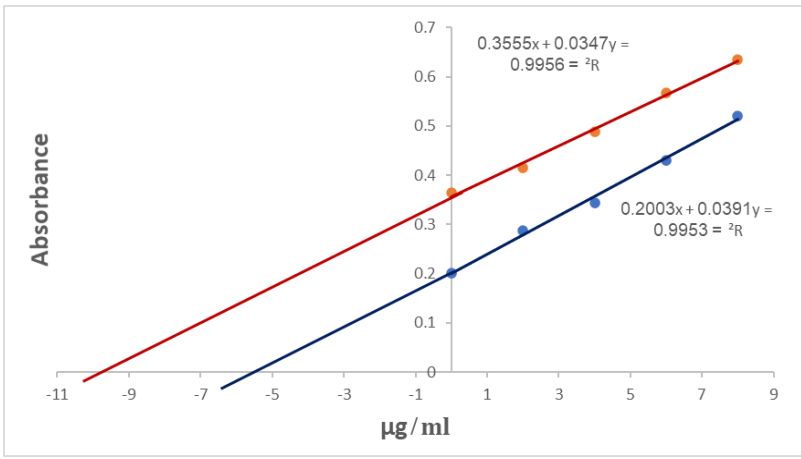


Figure 8 standard addition method of Bioner

Conclusion

Suggested a sensitive spectrophotometric method for the determination of vinylphrine hydrochloric in pharmaceutical preparations by oxidizing vinylphrine hydrochloric with the oxidizing agent N-bromosuccinamide and then estimating the unreacted oxidizing agent by shortening the color of Ab6Bampicin and the measurement is done at the wavelength of 585 nm. The method was successfully applied for the determination of phenylphrine hydrochloride in its dropwise pharmaceutical preparation**.**

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USAGE OF PROTOTYPING IN DEVELOP AN EMPLOYEE'S INFORMATION MANAGEMENT

[1]Khansaa Azeez Obayes Al-Husseini , [2]Ali Hamzah Obaid
[1,2] Al-Furat Al-Awsat Technical University, Babylon Technical Institute, 51015 Babylon, Iraq.
E-mail: [1]khansaaazeez@gmail.com , inb.khanssa@atu.edu.iq,[2]inb.ali210@atu.edu.iq,alimk.iq@gmail.com

Abstract

The software development process is witnessing an increasing trend among many educational and non-educational institutions and companies. where many enterprise managers are attracted to the benefits of software development to improve the performance of the existing programs and increase their efficiency.

The present study aims to develop an employee information management system. To obtain this objective, the initial Prototype was adopted in the development process. A new analysis and design that is commensurate with the opinions of senior managers is conducted in the present study with the participation of users to facilitate the process of software design and to analyze the current system for development purposes using prototypes in the UML environment.

On the other hand, Through this study, we reached results There are many benefits through the development of the existing programs such as reducing costs and time that systems designers spend in the stages of system creation through implementation, training, maintenance, and system testing.

Key Word : Prototype, Software Development**,** Information, Management, EIS

1. Introduction

In the field of information technologies, the today's world is going through a great transitional phase as a result of the rapid transformation in data computing and the great development taking place in computer hardware, especially storage devices. In this direction, administrations seek to move to more comprehensive systems to help them take decisions, especially those related to human resources. It is indicated that organizations that seek distinctiveness in the labor market constantly pay attention to human resources (Ramadhan, 2019).

New systems design is difficult for developers. Designers have to deal with many design issues, such as understanding the problem, cost, and time (1). Thus, many developers resort to dealing with prototypes in designing systems and then using the work environment.

Software development process is defined as dividing tasks into smaller parallel, sequential, or sub-tasks to improve the program in terms of design, tasks, or new work methods, which are all performed by the project development team (2,3). Prototypes provide a clear understanding of the program's functionality as well as potential threats and problems (4).

The process of understanding the requirements contributes to facilitating the task of the development team in meeting the desires of the organization by describing the product model and the process model in details in light of a clear conceptual model of the requirements (5).

It is known that the design of information systems is a difficult and complex task that takes a long time to implement in addition to the high costs in design. It also requires highly qualified specialists, especially projects related to the management

of large amounts of information and resources. Due to the rapid development of information systems technologies and the presence of many programs for collecting data in order to automate operations and tasks, it is difficult for many companies to choose programs that suit their work tasks. So, the best choice is to develop the program that the company owns to reduce costs, unnecessary functions, and ensuring the compatibility of the new program with the existing one. Hence, the development process has become a common and powerful tool for automating any process and task.

In many areas of development that require creativity in work and engineering skill in the final design of the product, prototypes emerge as an appropriate solution to reach the final decisions in choosing the final design of the product. Prototypes help many designers and employers to choose the best design through sharing ideas and comments from users or customers (6).

It is indicated that prototyping technology has a role in reducing the cost of the development process and the risks involved(Rudd 94). The use of prototyping tools in developing interactive systems aims to clarify ideas to help designers produce to reach the best solutions (7). It also provides customers with a clear understanding of development and production ideas, seeking clarity in understanding ideas, and reducing uncertainty. Prototypes also provide an interactive way to deal with the problems of customer or user requirements. It generally improves productivity. Its cost is considered low when ignoring some of the developmental problems that occur during the development period, which accurately identify the main requirements (8).

In the proposed work, the Unified Modeling Language (UML), which is a graphical descriptive language, was used to model objects in the field of software development, business process modeling, systems design, and presentation of organizational structures. UML allows describing the system from almost all viewpoints and different aspects of the system's behavior and describing the results of analysis and design of programming methods in modern object-oriented languages. Despite the fact that there are many ready-made programs, but it is often difficult to find an integrated program that meets the specific tasks and duties of the business of the institution.

1.1 The concept of employee's information management

Employees' information systems are a set of interconnected and coordinated elements to achieve the goals of electronic data processing of human resources using computers to obtain scraps that contribute to decision-making for stakeholders. It is one of the keys to the success of senior administration in taking appropriate decisions to achieve the goals and objectives required for the organization, which depends mainly on Data obtained from employee information stored on the system. The EIS system is an information system that allows maintaining a set of employee data in a database of their own, which provides

stakeholders with the opportunity to take the appropriate decision in managing their institutions. The system allows collecting data about employees, such as CVs, storing them in a particular storage, updating, or amending them when needed (9). Employee management systems are part of the general management system. They support all basic business operations within the organization. They also support management activities at all levels and provide performance indicators for the institution at all levels (10). EIS is often designed to automate information and decision-making (11).

1.2 The Problem statement

Employee information management systems provide information about employees in the organization. They help senior administrations in the process of decision-making in a timely manner. It is indicated that through the development of human resources systems, administrations obtain, perceive, interpret, and understand data in a timely manner.

In order to determine the problem of the present study, the researchers conducted an analysis of the existing program by collecting preliminary information about the system, through which, it became clear that the existing system is an old system that works on Microsoft Access with one user. The (X) company seeks to develop the system in light of the most modern data sharing systems and multiple users according to specific powers.

1.3 Objectives of the study

The main objective of the present study is to develop the existing system and form prototypes for the design of the new program and to analyze the flow of information. Hence, the following objectives can be stated:

1. Analyzing the existing system.
2. Building diagrams for the interaction of information with the user interface.
3. Identifying the goals of the system.
4. Building an interface for users to interact with the system.
5. Developing the program interface.
6. Developing user models and permissions.
7. Developing work on the local server.

1.4 Significance of the study

The present study is significant as it tackles one of the important topics in developing programs and benefiting from them in all organizations that seek to develop their existing system, especially human resources systems.

1.5 Aim of the study

The main aim is to develop the system to work on local servers to collect and store data in one place and to develop the users' permissions through a clear division of the jobs given to each specialist, for example, one user is selected to input data only. It is also aimed at developing work interfaces on a simplified scientific basis that facilitates work through the use of the expert system. Data

reports that facilitate the appropriate decision-making by the senior administration are extracted.

2 Development requirements

2.1 Subject area automation

When analyzing the current systems, it is necessary to take into account the peculiarities of the institution in organizing its activities and the number of users of the system to consider the process of automating the system for a group of factors, such as interface development, ease of use, cost, storage, sharing ... etc. to implement the company's policy. The prototype of the development process allows the start of work procedures.

3 Method and Procedures

3.1Description and analysis of the system and business process models

Domain analysis

Within the scientific theory, domain includes a set of objects, properties, relationships, and functions that are considered to analyze a system that includes a wide range of objects, properties, relationships, reports, users, and data tables that are of great importance in the work of institutions (Hall, 1996), which are widely used in all types of tasks such as modeling and reporting (Rittweger, 2010).

3.2 Description of business models

There are many data flow standards that are used in developing and modeling information and economic systems. In the present study, the DFD standard was used to develop process model diagrams (Hermans, 2011). External entities interact with the system through a data flow that identifies the information transmitted through a communication medium between the source and the receiver. Administrations always face a challenge in choosing between new software products in the information technology market or developing their own software in terms of work specifics, ease of use, or activities carried out by them.

3.3Architectural design

Architecture is a conceptual view of the structure of processes and functional technologies at the system level. Information systems are designed as interactive components at a high level that can be systems in themselves. The system architecture describes information, how to manage them, and how to operate the system through applications and individuals in the organization. It is known that the structure of institutional information systems is one of the main and strategic objectives of the organization to adopt information technology and automated development in its institutions.

Information system architecture development is the process of describing the system architecture in representing all aspects and joints of the system from the

file server architecture to the client server architecture. An advantage of database servers is the presence of a data directory that contains the database structure, data integrity constraints, formats, and server procedures for processing data by calling the program. The objects in such applications are relational data models and SQL statements associated with a set of model queries for the database.

When designing information systems in organizations, it must be taken into account that these systems can be developed according to the future goals and strategic plans set for the organization. Hence, developers can plan and schedule the system, facilitate its task in designing the main interfaces, functions, and technologies required, and estimate the development budget to reach a satisfactory concept in Early stages of development.

The information system architecture requires many conditions, including understanding the organization's tasks, faith in requirements, focus on development, system adaptation, and flexibility. These conditions lead to developing the organization's information system structure more efficiently (12).

3.4 Program interface development

It is indicated that the best way to build user interfaces is through iterative improvement of the model, creating an initial version of the interface, and then taking opinions from users with regard to the planning and evaluation stage (13), which is to meet with stakeholders to derive Technical requirements of the business objectives, as well as analysis of the context of use (14).

A user interface is a set of software and hardware that provides user interaction with a computer (15). When developing an information system, one of the main development tasks is to create a simple interface that the end user can understand. But, at the same time, the interface should be unpacked, that is, there should be nothing superfluous. With the help of the interface, the end user of the software product "communicates" with the information system.

Form dialogues form the basis of this interaction. In this case, dialogue is understood as an organized exchange of information between a person and a computer that is carried out in real time to jointly solve a specific problem through the exchange of information and the coordination of actions. Each dialog consists of separate I/O operations that actually provide communication between the user and the computer. Information is exchanged by sending messages and control signals.

By analogy with the procedural and programming-oriented approach, there are both procedural and object-oriented approaches to developing interfaces.

Procedural interfaces use a traditional model of user interaction based on the concepts of action and operation. Under this model, the software provides the user with the ability to perform some actions for which the user selects the appropriate data to obtain the desired results.

When implementing the developed information system, the implementation of procedural-oriented interfaces was used. This choice is justified by the simplicity of the system implementation and the choice of design methodology. GUI prototypes are developed when determining the requirements for the designed system.

After starting the application, the main form opens, which contains the main menu, which consists of five items, including Menu, System, Account, Analytics, and Log out. The menu interface allows the user to select the necessary operations from a special list displayed by the program. These interfaces assume the implementation of several business scenarios in light of the sequence of actions defined by the user.

Through the abovementioned, the operation of the user interface, which visually shows the action taken in the user interface by pressing the buttons to programmatically access the treatment corresponding to the case can be described as shown in Figure (1) which describes the operating interface. A set of tools associated with the program and the interface can be described as in Figure (2) which describes the operational interface tools.

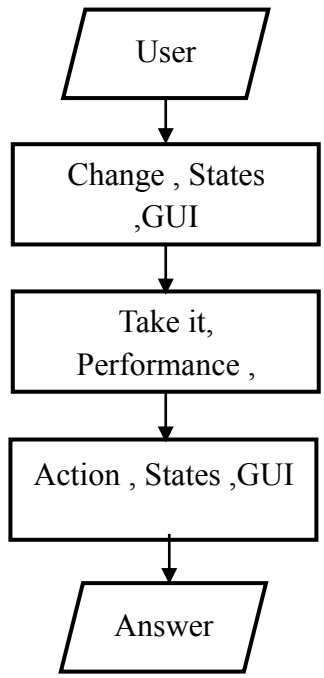
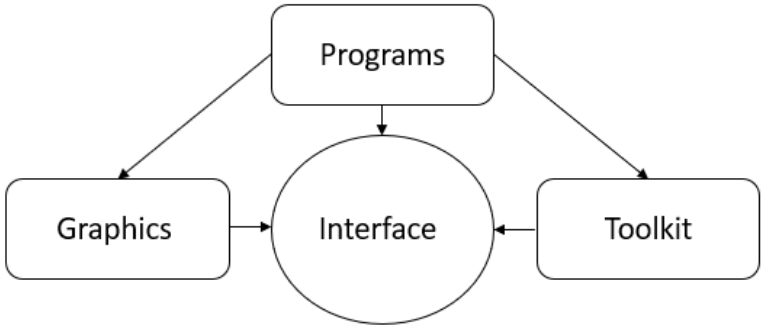


Figure (1) Procedures of users' interface



Association of tools with users' interface Figure (2)

3.5 System user architecture development

One of the main factors for the success of the secure sharing of information is controlling the roles of users to deal with resources, which consists of a set of powers to control system resources and access information securely. Here, the structure of the existing system is developed in order to access the system structure on four levels by identifying the users.

Admin: The person responsible for the program and has the authority to generate administrators, users, edit and issue reports, maintain the program and everything related to the program, and control the generation/modification of user names and passwords as shown in Figures (4 and 5).

Administrator: The person that has the powers to generate editors, data entry and normal users, and generate their own names and passwords.

Data editor :The person that has the permissions to input data and view reports as shown in figure (3).

Users: Persons that have the authority to view personal information only as shown in Figure (3).

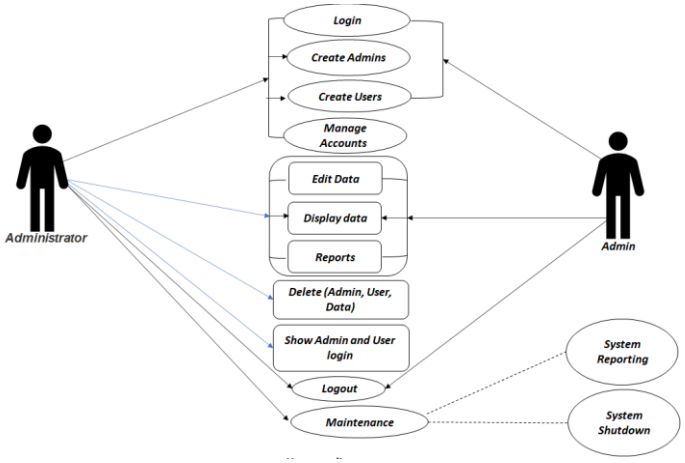


Figure (3) Case diagram system

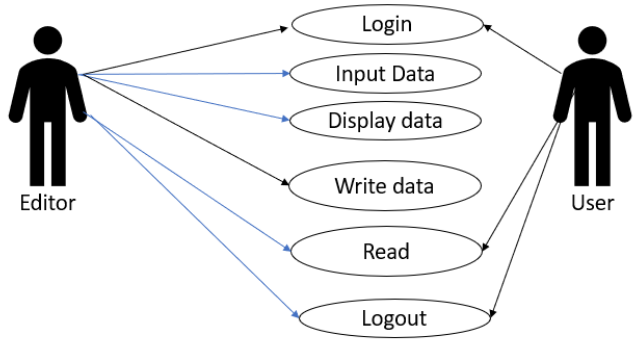
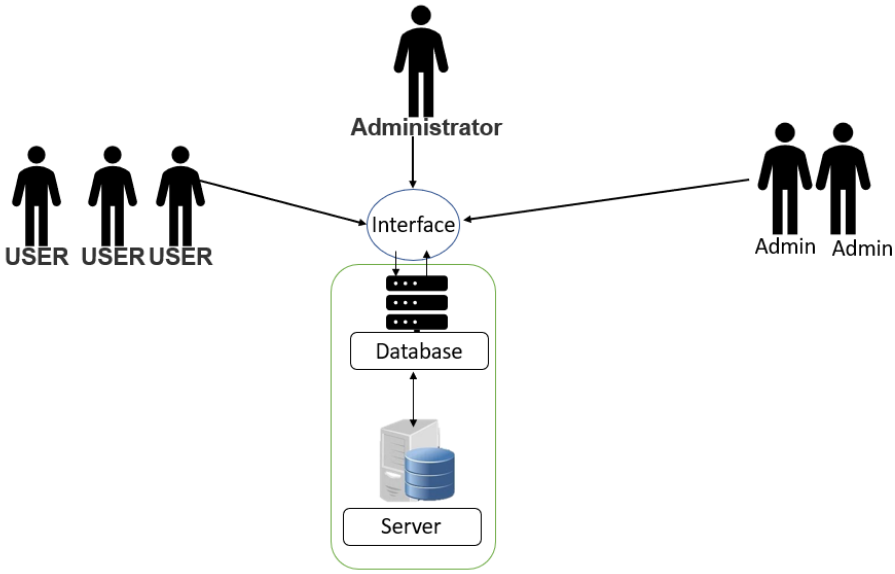


Figure (5) Case diagram system (User/Editor).

3.6 System development using local server

Due to the presence of many personal computers with different levels of development and operating cost in the organization, it is necessary to organize information systems on the basis of the use of local networks and the use of file servers for a relatively low cost to connect computers operating to the local network and to facilitate the process of storing shared files.

The local server technology is one of the technologies that allows authorized access and simultaneous work with the database for all users of the program directly in their workplace with the possibility of distinguishing the rights of access to information (group of users, rights, logins, passwords) and provides protection from access As well as providing backup copies and copying



information against its loss. Access to the local network allows working on the database, inputting data, displaying reports, and so on whenever according to the right to access information as shown in Figure (6). Most of the client server configurations It uses a two-level model to connect the client to

the services. The data management components are hosted on the server to provide a graphical interface to add the data management components and facilitate the work.

Figure (6) Connecting users to the program interface and the local server

A database is a single storage of data structures that are simultaneously used by several

users from different departments. The main source of reporting by the system being developed will be the data generated by the main program Ticket Sales.

The design of the database depends on the information that the developed software will use. The information needed to design a database is collected by examining the documents that are used to collect or provide the information. The list of required documents is determined at the stage of collecting requirements. The information collected at this stage may be poorly structured and includes some informal user data that will later need to be transferred and presented in the form of more explicit requirements.

When designing a database, an important task is to define the way the data is presented and the relationships between them, which are necessary for all the main areas of applying this application. During the design process, three levels of the model were created, including conceptual, logical, and physical levels.

The conceptual level of the model reflects the entities and relationships that reflect the basic business rules of the field. An entity relationship diagram may include many-to-many relationships and not include key descriptions. The conceptual database model is shown in Figure (6).

4. Conclusion

In light of the huge data related to human resources, the present study proves that the use of prototypes in the development of existing systems offers many benefits, such as reduction in design costs, increase in work speed, reduction in design time, giving quick solutions in the ideal design, high performance, and building an efficient model that simulates Required challenges. The development of software using prototypes provides technical and software tools and the ability to create the program at a high level of accuracy with highly reliable analysis tools with an easy-to-use interface that allows users to use.

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The side effects of shisha smoke on pregnant mice and their fetuses

Arwa Adress Alnuimy 1 , Hani MallAlla Hamodi 2

Biology Department / College of Education for Pure Sciences / University of Mosul / Mosul / Iraq

Corresponding author
Arwa Adress Alnuimy
E-mail: arwabio2020@uomosul.edu.iq

Abstract: Background: The study was conducted to assess the teratogenic, and histopathological effects of shisha smoking on some organs (liver, lung, heart, and kidneys) of pregnant white mice and their offspring. Twenty pregnant female mice were divided into two groups for the experiments. The first was exposed to fresh air as a control group, while the second was exposed to shisha smoke once daily at evening from the 7^{th} to the 18^{th} gestation day for 30 minutes for each exposed period per day. Results: It showed Fetal malformations were at a rate of (93 %), which was represented by the appearance of deformed fetuses, aborted , the Histopathological lesions in pregnant mice organs were Karyorrhexis , Hepatomegatocytes differentiate in liver and Desquamation of the bronchiolar epithelium , and an emphysema in lung , in heart shown Rarefaction of the heart muscle Waved cardiac muscle fibers damaged, The proximal renal tubules condense and degenerate in kidney , The malformations that occurred in the organs of the fetus were not less than those that were in the adult mice. Conclusions: The study showed that shisha smoking have congenital anomalies on the fetus and the pregnant mother should be careful when consuming.

Keywords: Shisha, Malformations, Evening

1. Introduction

The widespread usage of hookah, the world's second most popular form of smoking, is owing to the common misconception that it is less dangerous than cigarettes and delivers flavors dissolved in it, making it more aromatic. During a typical 30 minute smoking session, the smoker is exposed to 100-200 times the equivalent of cigarette smoke [1], The danger of hookah smoking lies in the inhalation of tobacco first, coal smoke second, and infection resulting from the use of a single pipe third [2] , According to World Health Organization reports on the prevalence of hookah smoking as a new strain in the global tobacco epidemic and a source of public health concern [3], and the relationship of shisha smoke to many diseases such as chronic obstructive pulmonary disease, asthma, vascular diseases, etc., and its causing cancerous diseases in the vital organs of the body [4], As well as the increase in the number of smokers using water pipes and addiction to them on a large scale, especially among young people and women, because they believe that it is safer than smoking cigarettes, and that the water filters toxins and produces light smoke, in addition to the absence of health and media warnings to describe its harms, so they consider the hookah more tobacco product. [5], As for its widespread adoption in Iraqi society, it may be due to the exceptional circumstances in which people find themselves, which may be due to economic, social, psychological, or educational factors, causing smokers to

increase their frequent visits to cafes and places that offer shisha for recreation, comfort, and entertainment [6], Women wear it to show off and have fun in social situations Getting people's attention, believing that its smoke isn't hazardous, and thinking about the sound of water bubbles in it [7],Maternal smoking of shisha during pregnancy may increase the risk of fetal death [8], due to the effects that smoke has on body organs and the growth of the fetus during pregnancy, via the relationship of maternal smoking with three factors the mother, the fetus, and the placenta [9], as well as causing women to stop menstruating, low bone mineral density [10] and with these misconceptions, researchers all over the world have called for a large number of studies to be conducted in order to determine the dangers and devastating effects on humanity.

Objective: The study was conducted to assess the side effects of hookah smoking on pregnancy.

2. Materials and Methods

2.1 Animal

Twenty female of Swiss albino mice Balb \ C, It was aged with average weight of (27-30) g from the college of Education for Pure Sciences / University of Mosul (Nineveh Governorate, Iraq), the mice were bred in the animal house in plastic cages with metal covers meshed in room temperature (23 ± 2), and on 12h dark / light cycle [11] Standard mice food diet and water were free available [12] and for fertilization three females were placed with one male in the single cage overnight and fertility was examined by observing sperms in the vaginal plug ,The day of mating was the Zero-day pregnancy and the next day was the first day of pregnancy.

2.2 Design of work

Pregnant mice were placed in the exposure room, and 10 g of Al-Mussel was burned in the designated cup, with smoke entering the room in the form of continuous jets, as a single puff of smoke equals 21 liters per exposure cycle for 50 seconds and a time of 30 minutes per exposure meal. The first group was the control group, which received fresh air. The second group was exposed to hookah smoke one daily in the evening and for half an hour in each exposure starting from the seventh day to the eighteenth day of gestation day.

2.3 Morphological examinations

Gross examination of the organ systems (lungs, heart, liver, kidneys) of pregnant mice and their fetus, diagnosis and evaluation of the gross teratogenic effects of embryos derived from the uterine horns, deformed fetus's numbers are proven and their deformations are classified, after gross examination compared to the control group and using an anatomy microscope of kinds Heebrag wild and photographed with digital camera type DSc –w220.

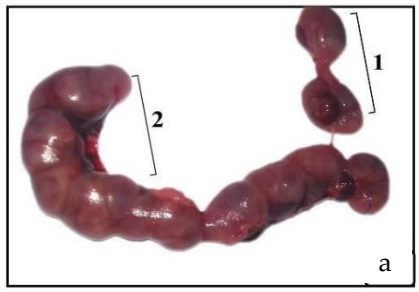
2.4 Histological examinations

At the end of shisha smoking exposure at the 18th gestation day, mice were sacrificed, and the studied organs of pregnant mice and uterine horns containing embryos and their organs were extracted and then fixed in 10% formalin for (24-48) hours [13], The specimens were washed twice with 70% ethanol. The fixed tissues were dehydrated in a series of increasing alcohol concentrations ranging from 70% to 100% (absolute). The dehydrated tissues were cleared in Xylene (twice), infiltrated and then were embedded in paraffin wax, sectioned on rotary microtome; sections were 5µm in thickness, the prepared sections were stained by routine methods using Hematoxylin-eosin method. Under the microscope, the stained sections were examined [14], Loading with DPX was examined under an optical microscope type Richert Neover equipped with an Olympus OM-Japan digital camera, pictures were printed on a Canon color printer type (Mp140), and the final magnification was calculated based on the magnification of the ophthalmologic and objective lenses.

3. Results

3.1 The Gross Description of Uterine horns

The results revealed uterine horn deformations Small and irregular fetuses in one uterine horn, with an increase in size and irregularity in the other uterine horn, as well as the emergence of engorged fetuses outside the uterine horns (fig:a).



3.2 Gross fetal deformities

The findings revealed the presence of gross abnormalities when pregnant white mice were exposed to shisha smoke for 30 minutes one time (in the evening) from the seventh to the eighth day of pregnancy, deformed fetuses emerged at a rate of (93 %), which was represented by the appearance of deformed fetuses, aborted and not clearly described (fig:b).

And the deformation of the head region by 60% is represented by the clarification of hemorrhage between the two hemispheres of the brain (fig:c), the flatness of the vault of the skull, the excencephalon of the external brain, the deformation of the facial region, and the occurrence of a cleft lip ,The eyes were deformed by 33%, and were represented by the loss of the eyes (fig:d), the clouding of the eyes, and the occurrence of bloody bleeding around them and around the auricle (fig:e), and the deformation of the trunk by 53% is represented by the curvature of the trunk, bloating and congestion in the ventral dorsal region (fig:f), scoliosis, and the occurrence of spine bifida in the dorsal region (fig:g), The abdominal was deformed by 26%, as evidenced by abdominal atrophy and congestion (fig:h), and the limbs were distorted by 40%, as shown by shortening and swelling of the front limbs, as well as the loss of the left front limb's digits (fig:k), The tail was deformed by 27.5%, represented by the appearance of a thick, curved tail with a curved end inward, similar to a crescent with a pointed end (fig:v) compared to the control group (fig:u).

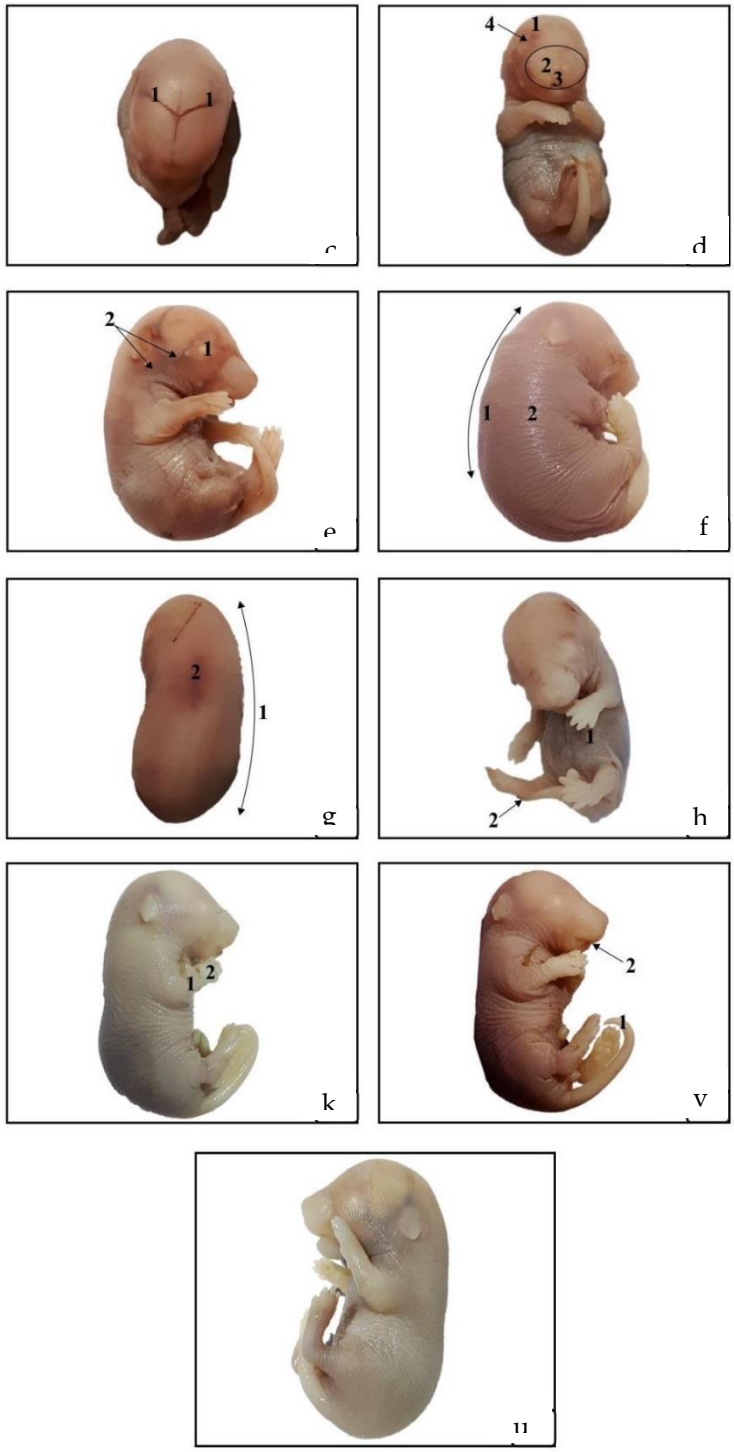

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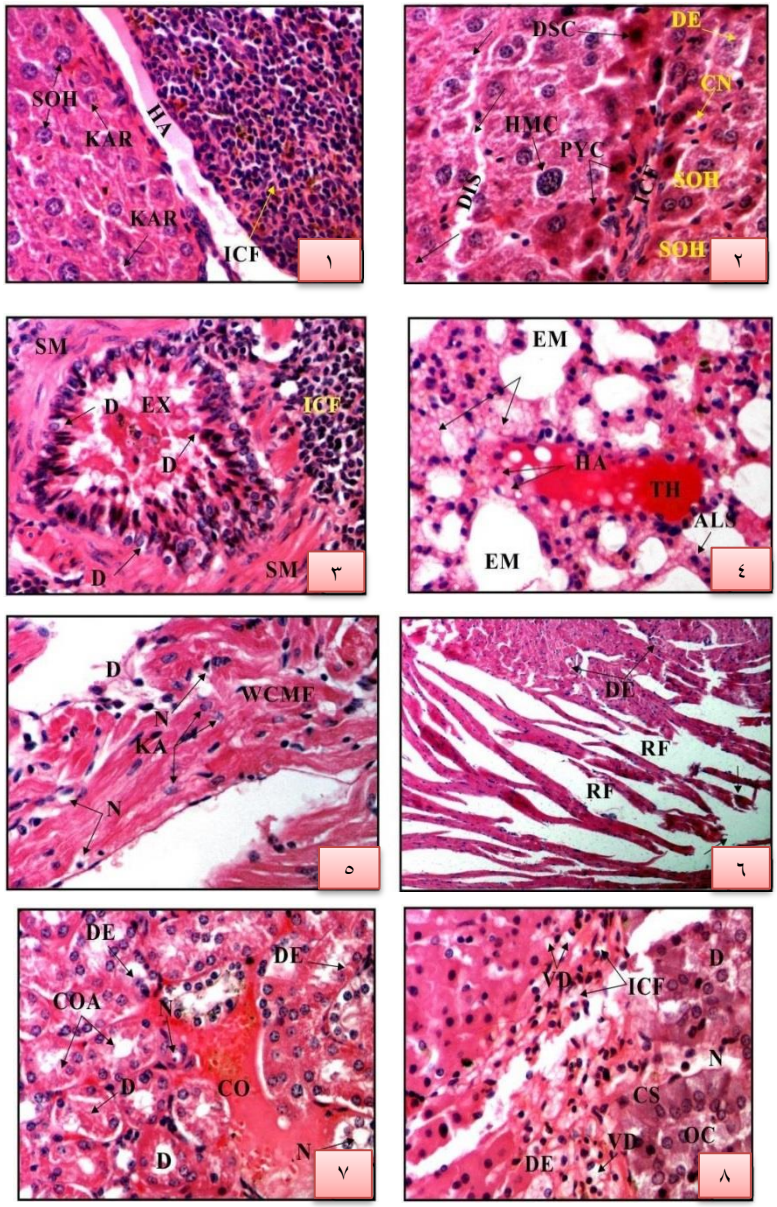
Figure: (a)Small size of fetuses and fewer in one of the horns (1), increased in the other, engorged fetuses outside the uterine horns (2) whose mother was exposed to shisha smoke once in the evening , (b)An aborted, deformed mice fetus ,(c) Frontal view of the fetus of a mice whose mother was exposed to shisha smoke once in the evening, showing hemorrhage between the two hemispheres of the brain (1), (d)Frontal view of mice fetus showing Excencephalon (1), Facial malformation (2), Cleft lip (3), Loss of eyes (4), (e)Lateral view of a mice fetus noticing clouding of the eyes (1), hemorrhage around the auricle and the eye (2),(f) Lateral view of a mice fetus with a curvature of the trunk (1), distension of the dorsal ventral region and congestion (2) , (g) Mice fetus notices scoliosis (1), spinal bifida (2), (h) Anterior view of the mice fetus, noting the atrophy of the ventral region and its congestion (1), short tail engorged at the end (2), (k) Lateral view of a mice fetus showing shortening and swelling of the front limbs (1), loss of the fingers of the left limb (2), (v) Lateral view of a mice fetus noting a thick, crescent-shaped tail end (1), shortened mandible (2), (u) Lateral view of a white mice embryo at 18 days gestation of the control group

3.3 Histopathological changes in the organs of pregnant mice

The experimental group demonstrated Inflammatory cell infiltration, erythrocyte lysis in the vessel, and swollen hepatocytes, Karyorrhexis (fig:1) Hepatomegatocytes differentiate, dark-colored hepatocytes surrounded by light-colored areas, Coagulative necrosis, dilated sinusoid, hepatocytes swell with thickened cytoplasm, degenerate hepatocytes, and inflammatory cells infiltrate into hepatocytes (fig:2), Desquamation of the bronchiolar epithelium, exudate in the bronchial cavity, smooth muscle hypertrophy in the bronchial wall, and dense inflammatory cell infiltration in the lung interstitial fluid (fig:3) , thrombosis and hemolysis, alveolar septal thickening due to inflammatory cell infiltration, fibrous exudation between lung lobules, and an emphysema (fig:4), Rarefaction of the heart muscle, irregular cardiac muscle fibers and their disintegration and destruction of some of their nuclei (fig:5), Waved cardiac muscle fibers damaged, and desquamation of epithelial cells in the epicardium layer, as well as necrosis and karyolitic of cardiac muscle fibers (fig:6), The proximal renal tubules condense and degenerate, and so do the epithelial cells lining the renal tubules, and there is necrosis and hematopoiesis between the renal tubules (fig:7) , swelling of the epithelial cells lining the tubules and their collection in the tubule hollows, infiltration of inflammatory cells, stenosis and occlusion of the cavity of some tubules, tubule vacuolization, and tubule ruptures Degeneration in a vacuum (fig:8).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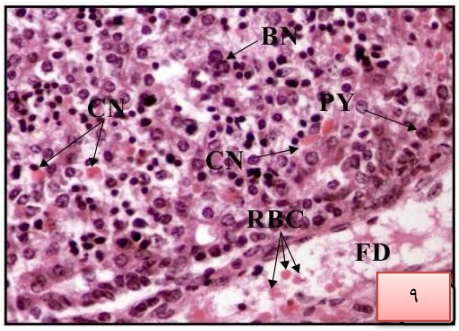
(1) Mice were exposed to smoke for 30 minutes for one time in the evening from the 7-18th day of pregnancy. An increase in ICF and (HA) in the blood vessel, hepatocytes swollen (SOH) and nuclear material was observed(H&E, 400X) (2) The liver of pregnant female mice exposed to hookah smoke for 30 minutes for one time in the evening from day 7-18 of pregnancy showed signs of inflammation, thrombotic necrosis and thickened cytoplasm. The sinusoids (DIS) and (SOH) are enlarged and contain thickened proteins in the hepatic parenchyma (H&E, 400X) ,(3) The lung of pregnant mice exposed to hookah smoke for 30 minutes once in the evening from day 7-18 of gestation is destroyed. Damage to the epithelium lining the bronchioles, inflammatory exudate differentiation (EX) and smooth muscle hypertrophy (SM) are shown (H&E, 400X) (4) A section of the lung of pregnant mice exposed to hookah smoke for 30 minutes for one time in the evening from day 7-18 of gestation, blood clotting (TH), hemolysis (HA), thickening of alveolar sacs (AlS), fibrillar aspirate pool between lobules (arrows), Increased emphysema (EM) (H&E, X400), (5) Heart section of pregnant rats exposed to hookah smoke for 30 minutes once in the evening from day 7-18 of gestation for cardiac muscle fibers (H&E, x 400),(6) Heart section of pregnant rats exposed to hookah smoke for 30 minutes once in the evening from day 7-18 of gestation Rarefaction (RF) cardiac arrhythmias and dissociation (arrows), and nuclear degeneration (DE) (H&E, X 400) (7) Histological section of the kidney of pregnant female mice showing fusion of Coalescence (COA) and degeneration (DE) and desquamation (D) of the epithelial cells lining the renal tubule, and (N) and (Co) in renal tissue (H&E, 400X) (8) Histological section in the kidney of pregnant female mice ,The cellular swelling (CS) of the epithelial cells lining the tubules and their collection in the lumen of the tubules and the (ICF), and blockage of the OC (the hollow of some tubules) and the (ICF) were observed. DE) and (VD) (H&E, 400X)

3.4 Histopathological changes in fetus organs

From the 7^{th} to the 18^{th} days of gestation, histological evaluation of the organs of mice embryos exposed to shisha smoke for 30 minutes and once every day in the evening resulted throughout many fetal histopathology (Fig:21-26).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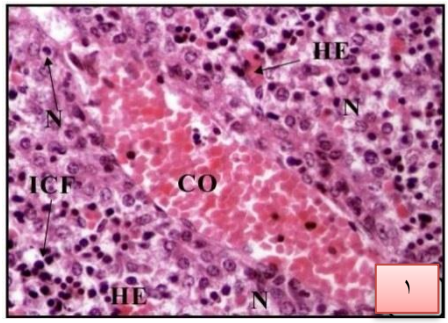
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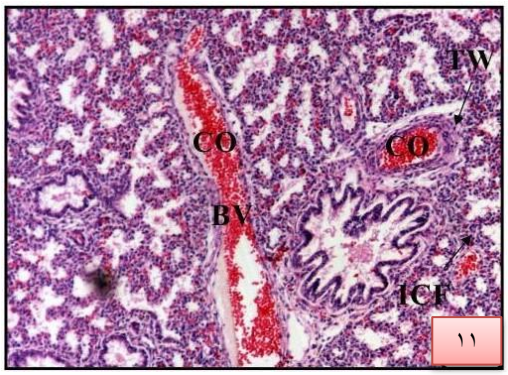
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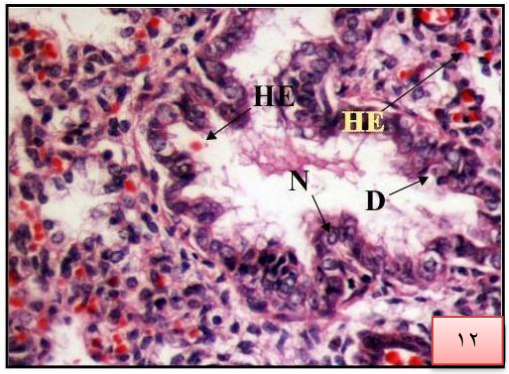
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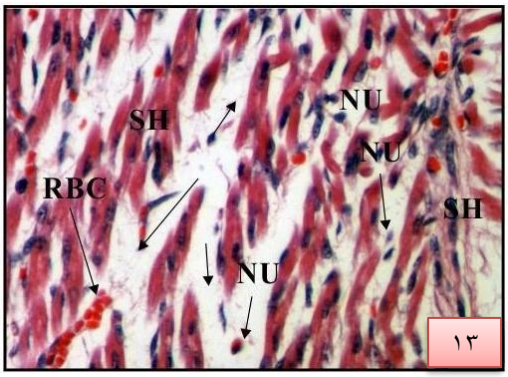
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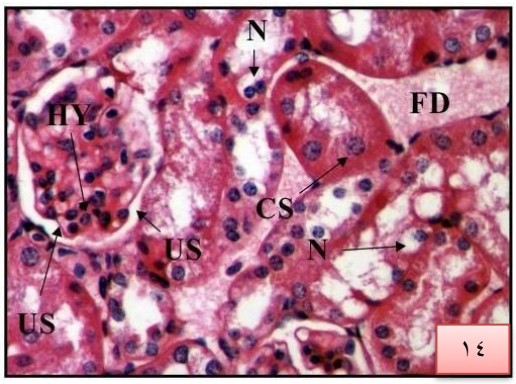
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(٩) A histological section of the liver tissue of a mice fetus whose mother was exposed to hookah smoke for once in the evening for 30 minutes from the 7-18th day of pregnancy shows fibrin deposition (FD) and RBC accumulation in the CV cavity, nucleolar thickening (PY), and nucleated (PY) cells. Hepatic binucleated (BN), thrombotic necrosis (CN) (H&E, X400) (١٠) Histological section of the liver tissue of a mice fetus whose mother was exposed to hookah smoke for once in the evening for 30 minutes from the 7-18th day of pregnancy. The (CO) in the central vein and (HE), and (ICF) and (N) in the liver tissue H&E, X400). ,(١١) Histological section of mice fetal lung tissue showing severe blood vessel congestion (CO) and vessel wall thickening (TW), and clustering (ICF) around it (H&E, X100) (١٢) Histological section of mice fetal lung tissue that notes the (D), (N) and (HE) degeneration of the lining epithelial cells, and (N) in the alveolar septum (H&E, X100), (١٣) Histological section of the heart tissue of a mice fetus notes the disintegration of muscle cells and their nuclei destroyed (arrows) and differentiation of NU nuclei in irregular locations, RBC aggregation and SH contraction in cardiac muscle fibers (H & E, X100) ,(١٤) Histological section of mice fetal kidney tissue noting cytosolic swelling (CS) of epithelial cells lining the renal tubules, necrosis (N) of epithelial cells lining, narrowing of the urinary space (US), hyperplasia (HY) of cells lining the renal tubules and necrosis (N), and fibrin deposition (FD) (H&E, 400X)

4.Disscusion

At the morphological level, Mice exposed to smoke a shisha once a day (in the evening) for 30 minutes from the seventh to the eighteenth day of pregnancy detection of some abnormalities at the morphological and histological levels and represent with deformed fetuses aborted with uncertain characteristics, as reflected by the appearance of deformed fetuses. Our findings are consistent with those of [15],who concluded that polluted air causes spontaneous abortion, or that it could be due to nicotine, which is one of the most important components of hookah smoke and has a role in the occurrence of abortion [16], the clarification of the hemorrhage between the two hemispheres of the brain, the flattening of the external cerebral vault, and the distortion of the facial region all constitute head deformation. The occurrence of a cleft lip and congenital cleft lip is a malformation that occurs as a result of various connected and intra-factors after exposure during the first trimester of pregnancy to the upper jaw and palate [17], loss and clouding of the eyes as well as bleeding surrounding them and around the auricle, indicate that the eyes are malformed. The formation of free radicals associated with nicotine in mice may be to responsible for the poor embryonic development [18], The curvature of the trunk, bloating and congestion of the ventral dorsal region, scoliosis, and spina bifida congested in the region all represent trunk deformation and possibly because prenatal nicotine exposure causes genetic structural changes that affect not only fetuses but also adults

[19,20], And the deformation of the abdomen was represented by atrophy of the abdominal region and its congestion, and this result is consistent with what was achieved [21], and the deformation of the extremities was represented by shortening and swelling of the front limbs, as well as the loss of the fingers of the left front limb, and the tail was deformed in proportion and represented by the appearance of a thick, curved tail with the end twisted inward, similar to The end, as well as shortness of the lower jaw and a short engorged tail end, and these abnormalities corresponded with what the researchers recorded [22] in their study on the risk of maternal smoking on offspring. While at the histopathological lesions in pregnant mice the study progress in the liver Inflammatory cell infiltration, Karyorrhexis, Hepatomegatocytes differentiate Similar to what was discovered by [23]who discovered the effects of smokeless tobacco on the liver tissue in mice, the reason could be the nicotine present in hookah smoke and its role in the high level of nitric oxide and oxidative radicals [24], as nitric oxide is one of the free radicals that is produced in mammalian cells and interferes with vital processes, and its increased [25], and in lung Desquamation of the bronchiolar epithelium thrombosis and hemolysis and an emphysema Similar to what the researchers [26] reported on the effect of tobacco smoking on lung parenchyma in white rats, the reason could be attributed to the high percentage of carbon monoxide in tobacco smoke, and since hookah smoke contains a high percentage of toxic substances, including carbon monoxide, which is absorbed first by the lung, the hookah smoker is exposed to ten times more carbon monoxide than smoking one cigarette ,the increase in inflammatory cells such as macrophages causes the alveolar sacs to thicken [27], and show the heart Rarefaction of the heart muscle, irregular cardiac muscle fibers ,Waved cardiac muscle fibers damaged These findings are consistent with what the researchers stated [28] about the effect of two types of hookah smoke on rats, and hookah smoke caused many pathological tissue lesions [29], and the findings were consistent with what the researchers stated [30] about the effect of hookah smoke in rats, and the reason could be due to the oxidative stress caused by flavored tobacco (al-Mu'assel), which causes significant cardiovascular toxicity, in the kidney the study explained The proximal renal tubules condense and degenerate , necrosis and hematopoiesis between the renal tubules these histological changes are consistent with what [31] mentioned that nicotine administration for a period of 21 days leads to degeneration of the kidney tissue, blood congestion and the expansion of Bowman’s space. Glomerular necrosis as well as effects on the filtering capacity of the kidneys [32] , and the results are consistent with what was recorded by [33] that cigarette smoking caused bleeding, congestion, inflammation and infiltration of inflammatory cells, glomerular atrophy and damage to the tubules when rats were exposed to cigarette smoke.

As for histopathological changes in fetal organs, microscopic examination of mice liver Our findings are consistent with what researchers [34] found in terms of smoke causing necrosis and programmed death, as well as what researchers [35] found in terms of necrosis of various types being a final result in liver tissue injury [36] , Previous research has shown that a defect in insulin function in the brain leads to low levels of glycogen in the liver, where glucose cannot be absorbed and stored as glycogen. It has been observed in female newborns whose mothers were exposed to cigarette smoke during pregnancy, resulting in damage [37] , our study has suggested that microscopic inspection of the lung of mice embryos it was consistent with the findings of [38] who found that maternal cigarette smoke exposure induces an imbalance in the lung development process. Direct exposure to cigarette smoke also activates glycation end products receptors, which are products that play a major role in the pulmonary blood vessels that respond to types of Reactive oxygen (RO) produced by the oxidative stress of smoking is a major regulator of pulmonary inflammation, as well as the inflammatory cytokines IL-1 and TNF, which were significantly increased, especially in the offspring of mothers exposed to cigarette smoke [39], The occurrence of heart damage may be due to some chemical compounds of passive smoking that cross the placental barrier and reach the fetus [40], It is also noted that nicotine in the blood of these smoking women causes a reduction in blood flow in fetuses as well as the opposite effects on fetal organs such as the heart and other vital organs [41], As for the kidney lesions their cause may be the occurrence of microscopic lesions in the kidney, as [42] indicated of the effect of cigarette smoke on the kidneys of fetuses of rats whose mothers were exposed to smoke, and the role of nicotine in causing the mother's inability to adapt to the process of pregnancy, as well as its role in reducing the renal expression of sodium and water transporters [43].

5. Conclusions

Shisha smoking may cause fetal abnormalities, so pregnant women should avoid being exposed to shisha smoke, either directly or indirectly (passive smoking).

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Conflicts of Interest: “The authors declare no conflict of interest.”

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.Prevalence of patients allergic to general anaesthesia

Dr. Haider Ali Ibraheem Ghazalat

(M.B.CH.B. \ D.A. \ F.I.C.M.S. \ (Anesthetist

Ministry of Health, Baghdad Medical office Al-Karkh, Al-Yarmouk .Teaching Hospital, Baghdad, Iraq

ha3498755@gmail.com

Dr. Bashar Ghanim Ameen Al-Dabbagh

(M.B.CH.B. \ HIGH DIPLOMA \ (Anesthetist

Ministry of Health, Department of Health Nineveh, AL-Mosul General .Hospital, Nineveh, Iraq

bashar.ghanim67@gmail.com

Dr. Shurooq Kadhim Jawad

(M.B.CH.B. \ F.I.C.M.S. \ (Anesthetist

Iraqi Ministry of Health, Baghdad Health Office Al-Karkh, Al Karkh General Hospital, Baghdad, Iraq.

Abstract

This paper aims to knowing the Prevalence of patients allergic to general anaesthesia in Iraq were. A cross-sectional study was conducted on patients in different hospitals in Iraq, and 20 patients were collected. The study was devoted to knowing the Prevalence of patients allergic to general anaesthesia

distributed patients according to age between 25 years to 50 years, and through the statistical analysis SPSS IBM SOFT mean value and SD was for age 33±6.1

Positive results of the prick test It showed a high percentage of Meperidine for six patients, and positive results were distributed according to gender: 3 male patients and three female patients, and Morphine for four patients, according to sex (3 male patients and one female patient (

Allergic reaction may be more severe in patients with asthma, heart disease, etc. Allergic reaction appears in most cases within minutes from the moment of exposure to the allergen

Keyword

General anaesthesia, IgE, Allergic, NSAID, Meperidine.

Introduction

The incidences of allergy to general anesthetics ranges between

1/350 in IRAQ [1]. The incidence of peranesthetic allergic reactions estimated in 2006 in IRAQ was 1/9000, all drugs confounded, and the incidence of allergic reactions to NMBA was evaluated to be 1/6500 anesthesia. Allergic reactions can be benign or fatal in some cases (6%),

The problem of the development of adverse reactions as a result of the use of diagnostic and medicinal products in medicine is becoming increasingly relevant [2,3,4].

So, according to different authors, such reactions are observed in 10-30% of the population; in 3% of cases, they are the reason for visiting doctors, [5,6]in 5% - the cause of hospitalization, in 3% - the cause of intensive care, in 12% - they lead to an increase Significant in patients' length of stay in the hospital, and in 1% of patients overall can be the cause of death [7,8,9]. The frequency of true drug allergy (LA) only in the population ranges from 1 to 2%, which may Annually

lead to 100-2000 deaths from drug anaphylactic shock [10,11,12]. Among subjects treated frequently and for a long time, LA is already observed in 15% of cases. Also, the clinical manifestations of LA interfere or interfere with the professional activities of medical personnel, incl. 17% of junior nurses, 30-45% of intermediate and senior nurses, and 6-30% of physicians of various specialties [13,14,15]. According to the World Health Organization (2004), the mortality rate in drug therapy ranks fifth in the world after cardiovascular diseases, oncology, lung diseases, and injuries and is 0.1%, while in surgical interventions, it is ten times lower (0.01%)

Material and method
Patient sample

A cross-sectional study was conducted on patients in different hospitals in Iraq, where 40 patients were collected, and the study was devoted to knowing the Prevalence of patients allergic to general anaesthesia

Study design

design of the study was systematic by conducting a survey of the Prevalence of allergic to general anaesthesia, in which 20 patients were collected by relying on the electronic record in the hospital, and the inclusion criteria were positive history of patients such as allergic rhinitis and asthma and patients with Antihistamines. In addition, pregnant women and patients under 18 years of age were excluded

To diagnose hypersensitivity to this group of drugs, it is recommended to use a skin test, in particular, an intradermal test and a prick test with different concentrations of muscle relaxants

LA during anesthesia often occurs in the form of anaphylactic shock, bronchospasm or laryngospasm, and skin manifestations; the diagnosis is rather complicated and requires a thorough examination of the immunosensitivity of patients; this problem with anesthesia is associated with great difficulties since during anesthesia, the patient is under medical anesthesia and muscle relaxation, which greatly complicates the assessment of the clinical course of LA during surgery.

And by evaluating the clinical symptoms through which the allergy was diagnosed in relation to other medicines

A positive dosage of the IgE specific to antibiotics was also used to confirm the diagnosis. However, a negative result didn't eliminate the diagnosis knowing the low sensibility of the IgE

Study period

Through cooperation with the relevant committees for the purpose of obtaining the required approvals for collecting patient data. The study period lasted a full year, from 16-6-2020 to 20-6-2021

Aim of research

This paper aims to knowing the Prevalence of patients allergic to general anaesthesia

Statistical analysis

Statistical analysis was carried out based on the SPSS IBM SOFT 25 program and Microsoft Excel 2013, where the statistical differences between groups of patients were calculated; in addition to that, the value and prevalence were calculated.

Results

Table 1 – Distribution of patients according to age

age					
		Frequency	P%	VP	CP
Valid	25.00	2	10.0	10.0	10.0
	26.00	1	5.0	5.0	15.0
	28.00	2	10.0	10.0	25.0
	29.00	1	5.0	5.0	30.0
	30.00	2	10.0	10.0	40.0
	31.00	2	10.0	10.0	50.0
	33.00	1	5.0	5.0	55.0
	35.00	1	5.0	5.0	60.0
	36.00	2	10.0	10.0	70.0
	37.00	1	5.0	5.0	75.0
	38.00	2	10.0	10.0	85.0
	39.00	1	5.0	5.0	90.0
	40.00	1	5.0	5.0	95.0
	50.00	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

Fig 1- Distribution of patient according to sex

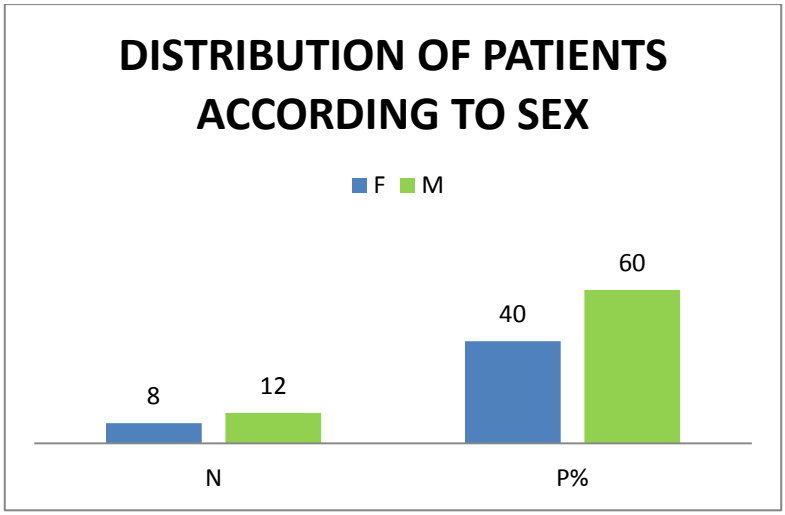

Table 2- results of patients according to prick test

prick test					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Alfentanil, Vecuronium	1	5.0	5.0	5.0
	Cisatracurium	1	5.0	5.0	10.0
	Cisatracurium and Vecuronium	1	5.0	5.0	15.0
	Etomidate	1	5.0	5.0	20.0
	Etomidate, Ketamine	1	5.0	5.0	25.0
	Meperidine	6	30.0	30.0	55.0
	Meperidine, Atracurium	1	5.0	5.0	60.0
	Morphine	4	20.0	20.0	80.0
	Propofol, Meperidine	2	10.0	10.0	90.0
	Sufentanil, Morphine	1	5.0	5.0	95.0
	Vecuronium	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

Table 3- Prevalence of allergy to patients

allergy					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Allergic rhinitis	2	10.0	10.0	10.0
	Allergy to cosmetics	1	5.0	5.0	15.0
	Allergy to eggs	1	5.0	5.0	20.0
	Asthma	5	25.0	25.0	45.0
	Asthma, allergy, Atopy	1	5.0	5.0	50.0
	Family history	2	10.0	10.0	60.0
	Metronidazole	1	5.0	5.0	65.0
	NSAID	3	15.0	15.0	80.0
	Penicillin anaphylaxis	1	5.0	5.0	85.0
	Seafood allergy	2	10.0	10.0	95.0
	Sulfamids	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

Table 4- outcomes result of allergy with prick test

Cisatracurium and Vecuronium	Asthma, allergy, Atopy
Propofol, Meperidine	Asthma
Cisatracurium	Asthma
Meperidine	Asthma
Morphine	Asthma
Meperidine	Asthma
Meperidine	Allergic rhinitis
Sufentanil, Morphine	Allergic rhinitis
Etomidate	Allergy to cosmetics
Morphine	Family history
Meperidine	Seafood allergy
Propofol, Meperidine	Penicillin anaphylaxis

Alfentanil, Vecuronium	Allergy to eggs
Meperidine	NSAID
Morphine	Sulfamids
Morphine	Metronidazole
Vecuronium	NSAID
Meperidine	NSAID
Meperidine, Atracurium	Family history
Etomidate, Ketamine	Seafood allergy

Fig 2- frequency to Prevalence of patients allergic

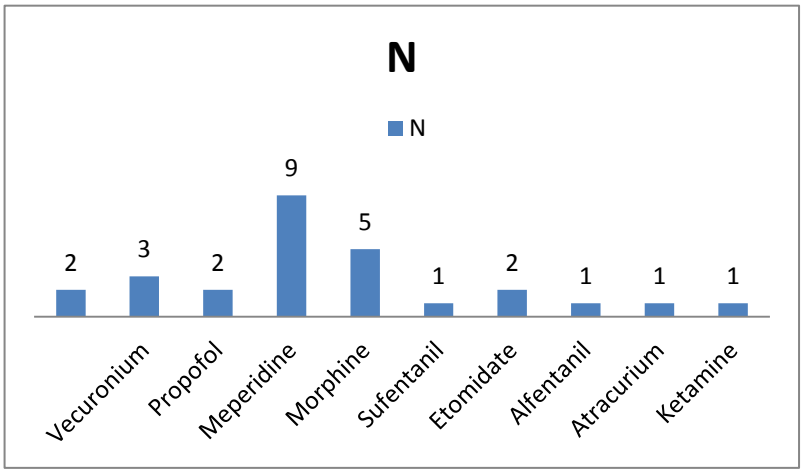

Table 5- relative risk

		CI 95%	Sig
Cisatracurium and Vecuronium	Asthma, allergy, Atopy	11 (6-18)	0.001
Propofol, Meperidine	Asthma	10 (8-14)	0.006
Cisatracurium	Asthma	5 (2-8.5)	0.05

Meperidine	Asthma	12 (9.9-15.2)	0.001
Morphine	Asthma	10 (9-12.1)	0.0022
Meperidine	Asthma	8.8 (6.6-11.1)	0.0098
Meperidine	Allergic rhinitis	9.8 (6-14.1)	0.001
Sufentanil, Morphine	Allergic rhinitis	7.6 (4.1-8.9)	0.098
Etomidate	Allergy to cosmetics	3.4 (1.2-6.1)	0.02
Morphine	Family history	2.7 (0.9-3.1)	0.04
Meperidine	Seafood allergy	1.5 (0.5-1.9)	0.06
Propofol, Meperidine	Penicillin anaphylaxis	2.5 (1.1-3.8)	0.04
Alfentanil, Vecuronium	Allergy to eggs	2.2 (0.8-40.4)	0.033
Meperidine	NSAID	6.5 (4.2-9.1)	0.055
Morphine	Sulfamids	4.4 (1.55-7.9)	0.01
Morphine	Metronidazole	5.8 (1.8-8.8)	0.01
Vecuronium	NSAID	4.7 (3.7-8.4)	0.02
Meperidine	NSAID	1.88 (0.54-3.34)	0.99
Meperidine, Atracurium	Family history	1.2 (0.3-2.2)	0.78

Etomidate, Ketamine	Seafood allergy	1.1 (0.3-1.88)	0.55

Discussion

Twenty patients were collected from the hospital, where a cross-sectional study was conducted on patients. In Table 1, in which patients are distributed in consideration of age, we find between 25 years to 50 years, and through the statistical analysis, SPSS IBM SOFT mean value and SD were for age 33±6.1, as shown in the table below.

Table 6- mean SD AGE of patients

Statistics		
age		
N	Valid	20
	Missing	0
Mean		33.2500
Median		32.0000
Std. Deviation		6.19741
Range		25.00
Minimum		25.00
Maximum		50.00

The percentage of male patients was more than females, and the patients were distributed according to gender (males 12 patients with 60% 4% and females eight patients with 40%) as shown in Figure 1

Positive results of the prick test It showed a high percentage of Meperidine for six patients, and positive results were distributed according to gender: 3 male patients and three female patients, and Morphine for four patients, according to sex (3 male patients and one female patient) as shown in table 7.

Table 7- distribution of Prick test according to sex

Prick test * sex Cross tabulation

Count

		sex		
		F	M	Total
pricktest	Alfentanil, Vecuronium	1	0	1
	Cisatracurium	0	1	1
	Cisatracurium and Vecuronium	0	1	1
	Etomidate	1	0	1
	Etomidate, Ketamine	0	1	1
	Meperidine	3	3	6
	Meperidine, Atracurium	1	0	1
	Morphine	1	3	4
	Propofol, Meperidine	0	2	2
	Sufentanil, Morphine	1	0	1
	Vecuronium	0	1	1
Total		8	12	20

The most common allergens associated with anesthesia were Meperidine, which was present in 9 patients, then Morphine in 5 patients, especially patients with asthma, and Vecuronium in 3 patients, especially those who were allergic to the following factors: Asthma, allergy, Atopy, NSAID and Propofol, Etomidate for 4 Patients

An article published in the Singapore Medical Journal in 2008 mentioned that 65% of patients are actually allergic to the NMBA.

This result matches the value found in other studies. This is best explained by the presence of quaternary ammonium common to all NMBA, which is responsible for this kind of allergy

Conclusion

We conclude from this study that scientific studies of sensitivity to general anesthesia are very few, and NMBA is the most common in Iraq.

According to studies, risk factors for allergic hypersensitivity associated with anesthesia include the gender and age of the patient, the presence of a history of other types of allergies, and external factors [16,17].

More than 50% of patients who reported anaphylactic reactions to neuromuscular blocking agents had not previously received these drugs. This means that IgE antibodies that the body makes as a result of contact with other compounds participate in the formation of such an allergic reaction.

According to studies, hypersensitivity to non-anesthesia drugs cannot cause intraoperative anaphylaxis. But any life-threatening reaction during anesthesia administered early can be sensitive [18].

Recommendations

In fact, the field of anesthesia today is a safe and low risk; however, there are a number of ways that can be taken to reduce the potential risks of exposure to anesthesia, and these methods include the following

1. Ensure that there is a family history of a bad allergic reaction to the anesthesia.
2. One of the most important ways to avoid allergies is not to use medications that cause it; with careful observation of the patient's breathing and to increase the proportion of inhaled oxygen, the patient must take plenty of fluids to maintain the normal rate of blood pressure.

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Assessment of the removal rate of bacterial biofilm or organic film simulating biofilm by a sodium hypochlorite irrigant delivered into flow cells

Saifalarab Mohmmed[1]
[1]Unit of Dentistry, Almustafa University College, Baghdad, Iraq

Abstract

The *in-situ* investigation of biofilm removal by irrigants helps to understand the process of irrigant/ biofilm interaction, thereby improving the removal capacity of irrigation solutions. This study aimed to assess the removal rate of *Enterococcus faecalis* biofilm or organic film (hydrogel, collagen) grown or applied onto a slide of flow cell model using sodium hypochlorite irrigant. The mimic behaviour of organic films in comparison to biofilm was tested.

Methodology

Sixty slides mounted in flow cell were distributed to three groups (n = 20) according to the test material (biofilm, hydrogel, collagen). These were subdivided to two subgroups (n = 10) according to irrigation regimen. The irrigant used was 9 mL NaOCl or water for 60 seconds. The removal rate was recorded using a camera. Percentages of the residual film or biofilm, and the number of bubbles present during irrigation were measured using image analysis software. The amount of available chlorine, pH and chemical content of bubbles in the outflow irrigant were measured.

Results

The duration of irrigation had a significant influence surface-area coverage with residual biofilm or film ($P = 0.001$). Biofilm removal rate was significantly less than collagen ($P < 0.001$). Hydrogel removal was significantly more than collagen ($P < 0.001$). Available chlorine and pH values of the outflow NaOCl showed significant reduction in all groups ($P = 0.001$).

Conclusions

The debridement efficacy of 2.5 % NaOCl was insufficient for complete removal of biofilm or film. Removal was greatest for hydrogel than collagen film and least for biofilm. The use of NaOCl irrigant was more efficient than water.

Key words: biofilm, organic film, NaOCl irrigant flow, slide surface, time dependence.

Introduction

Root canal is a dental procedure designed to either prevent the development or resolve established periradicular diseases (e.g. apical periodontitis) (Loest 2006). Bacteria are the main aetiological factor for the development of this disease. Bacteria adhere to the root canal surfaces and form biofilms (Costerton *et al.* 1999); which are defined as a community of microorganisms of one or more

species embedded in an extracellular polysaccharide matrix that is attached to a solid substrate (Wilson 1996).

Root canal treatment involves microbial control through instrumentation and irrigation. Root canal is enlarged and shaped by instruments to optimise delivery of irrigant (Gulabivala *et al.* 2010), helping degradation of bacterial biofilms (Bryce *et al.* 2009).

Sodium hypochlorite (NaOCl) is the most popular irrigant (Craig & Mader 1987). It shows antimicrobial activity against a broad spectrum of microorganisms (Harrison 1981). In addition, it has capacity to dissolve organic tissue within the root canal (Koskinen *et al.* 1980).

Root canal disinfection relies on the combination of fluid mechanical and chemical effects of the irrigant (Kishen 2010). Bacterial removal depends on antimicrobial irrigant type and concentration (Macedo *et al.* 2010), contact area (Moorer 1982), and interaction time between irrigant and infected material (Ragnarsson *et al.* 2014).

The reasons of incomplete removal of biofilm are: (1) stagnation of irrigant flow beyond irrigation needle tip (Ram 1977), and (2) gas bubbles or vapour lock effect ahead of advancing front of the irrigant (Tay *et al.* 2010).

Significant work has been done to investigate efficacy of irrigant to remove bacteria from root canal. The assessment was achieved after irrigation procedure. Many questions related to the rate of degradation of biofilm in relation to *in situ* irrigant and biofilm interaction still remain unanswered. An artificial test model provides a real time observation of the biofilm degradation.

Flow cell is a device that allows the microscopic observation and imaging of degradation and removal process of biofilm by irrigant. Thus, it may be possible to create a single species biofilm model that provides a method to understand nature of interaction between irrigant and biofilm.

Aim

The study aimed to investigate the removal rate of *Enterococcus faecalis* single species biofilm or organic film (hydrogel, collagen) grown or applied onto a slide of flow cell model using 2.5 % sodium hypochlorite irrigant. It also aimed to investigate the mimic behaviour of organic films in comparison to bacterial biofilm.

Methods

Sixty polystyrene plastic microscopic slides (75 × 25 × 1.2 mm) (Fisher scientific, USA) were divided to three groups. Group 1 was hydrogel films (n = 20), group 2 for collagen films (n = 20), and group 3 for bacterial biofilms (*E.faecalis*) (n =

20). Each group was subdivided according to irrigant regimen. Subgroup A received treatment with 2.5 % NaOCl (n = 10), and subgroup B was treated with sterile demineralized water (n = 10). Hydrogel was prepared by dissolving 3 g of gelatine (Merck, USA) and 0.06 g of hyaluronan (Fisher, USA) in 45 mL of distilled water at 50 ºC using stirrer (Bibby Scientific, UK). The collagen (Type I rat tail collagen) was applied without any modifications (First Link, UK). Crystal violet stains (Merck, Germany) (0.2 mL) was mixed with 10 mL of hydrogel on a stirrer (Bibby UK). Four layers of each organic film were applied along 18 mm length of the plastic slide using a nylon brush (Blodmere, UK). The time interval before the application of any subsequent layer was 10 minutes.

Preparation of bacterial strain

Biofilms were grown from single bacterial stains (*Enterococcus faecalis;* ATCC 19433). Strain was supplied in form of frozen stock in a brain-heart infusion broth (BHI) (Sigma-Aldrich, USA) and 30 % glycerol stored at -70 °C. Strain was thawed to a temperature of 37 °C for 10 minutes and swirled for 30 seconds (Siqueira *et al*. 2002). After thawing, one hundred microliters strain were taken and plated onto BHI plate with 5 % defibrinated horse blood (E&O Laboratories, Scotland, UK) and incubated at 37 °C in the 5 % CO_2 incubator (LEEC, Nottingham, UK) for 24 hours.

A concentration of 10^8 CFU/mL was used as standard inoculum. Six colonies were removed from the agar plate and placed into 20 mL of BHI broth and incubated at 37 °C in a 5 % CO_2 incubator for 24hours. BHI containing *E.faecalis* grown to 0.5 absorbance at wavelength of 600 nm using a spectrophotometer (Al Shahrani *et al.* 2014).

Generation of single species biofilm on slide surface

Each slides of group 3 were placed inside empty 60 mL plastic bottles (Fisher Scientific, UK), and sterilised in a steam autoclave (Ascot Autoclaves, UK) (121°C, 15lb/inch/15mins). 16.5 mL of standard *E.faecalis* inoculum (10^8 CFU/mL) was delivered into the sterilised plastic bottle that contained the sterilised plastic slide using a sterile syringe (BD Plastipak™, USA) and a 21-gauge needle (BD Microlance™, USA), until the 18 mm length of the slide was immersed. These bottles were incubated at 37 °C in the 5 % CO_2 incubator for 10 days. Every three days, half inoculum was aseptically discarded and replaced using pipettes (Alpha Laboratories, UK) with fresh BHI broth (De-Deus *et al.* 2007). After incubation, slide with biofilms were removed from the plastic bottle and prepared for staining with a crystal violet dye (CV). Each slide was rinsed with 3 mL sterile distilled water (Roebuck, UK) for 1min using a sterile 10 mL syringe (Plastipak, USA) to remove loosely attached cells. Using a micropipette, 2

µL of CV stain (Merck, Germany) was applied to the biofilm (18 mm) and left for one minute. The slide was subsequently washed with 3 mL sterile distilled water for one minute to remove excess stain.

Irrigation experiments

The slide coated with hydrogel, collagen or biofilm was placed onto the mounting base of the flow-cell model FC 71 (Friedrich and Dimmock, USA) with a flow channel (0.2 mm deep, 11 mm wide, 40 mm long).

Flow cell was placed on stage of an inverted fluorescence microscope (Leica, UK). Test irrigants used in experiment were 2.5 % NaOCl (Teepol® bleach, UK) and demineralized water (Roebuck, UK). Concentration of available NaOCl was verified before experiments using iodometric titration (British Pharmacopoeia 1973). 9 mL of irrigant (NaOCl) were delivered using a 10 mL syringe (Plastipak, USA). The syringe was attached to a programmable precision syringe pump (NE-1010) to deliver the irrigant at a flow rate of 0.15 mL s^{-1}. Outflow irrigant was collected in a 15 mL plastic tube (TPP, Schaffhausen, Switzerland).

Recording of biofilm removal by the irrigant

Removal of biofilm or organic film removal was recorded using a high-resolution CCD camera (QICAM, Canada). The camera was connected to a 2.5 × lens of a fluorescence microscope (Leica, UK). Fluorescing (red filter) light was used during time-lapse recording of interactions between the irrigant and the biofilm or organic film.

Image analysis

Video was obtained to each second of footage (60 images). The slide surface coverage by biofilm or residual organic film and bubbles present after every second of irrigation (0.15 mL) were visualised and automatically quantified using Image-pro Plus 4.5 and ipWin4 software (MediaCybernetics®, USA).

Investigation of chemicals in the outflow irrigant

Measurement of chlorine and pH of outflow irrigant

After one minute of the irrigation protocol, amount of available chlorine (%) and pH of 1 mL of the outflow NaOCl were measured using iodometric titration (British Pharmacopoeia 1973), a pH calibration meter (HANNA pH 211).

Assessment of composition of bubbles between NaOCl and bacterial biofilm film (collagen, hydrogel)

Three mL of the outflow irrigant collected from flow cells containing bacterial biofilm (*E.faecalis*), hydrogel film, or collagen film were delivered separately into vials of Gas Chromatograph-Mass spectrometry machine (GC-MS) (Thermo Scientific™, TRACE™ 1310, UK) using 10 mL syringe (Plastipak, USA). Mass spectra generated for composition of NaOCl using Thermo Scientific™ TargetQuan 3 software (Thermo Scientific™, TRACE™, UK).

Data analyses

Univariate general linear mixed models with Dunnett post-hoc comparison tests was used for the comparison between means of residual biofilm and organic films. Multi-variable linear regression model was used to test difference of removal rate between test materials (biofilm, hydrogel, and collagen). Univariate linear mixed models were used to test effect of each second of number of bubbles present on surface of slide with residual biofilm. One way ANOVA test difference between the means of available chlorine present in the outflow NaOCl solution collected from biofilm group and film groups (collagen, hydrogel). The mean values of pH of the outflow NaOCl did not follow normal distribution so non-parametric Kruskal-Wallis tests was performed to determine statistical significance between the mean values of pH of the experimental groups.

Results

Univariate general linear mixed model revealed that following irrigation with NaOCl, slide with residual biofilm was 13.7 % (95 % CI: 11.28, 16.28) higher than the slide with residual hydrogel. Slide with residual biofilm was 8.2 % (95 % CI: 5.72, 10.72) higher than slide with residual collagen. Slide with residual *E.faecalis* biofilm was 14.8 % (95 % CI: 13.28, 16.31) higher than the slide with residual hydrogel.

Multi-variables linear regression model (Table 1) revealed duration of irrigation using NaOCl had a significant influence on the mean percentage of surface-area coverage with residual biofilm in all experimental groups (P = 0.001). Slide with biofilm decreased by 0.85 % s^{-1} (95 % CI: 0.9, 0.7), while surface of slide with collagen or hydrogel decreased by 1.03 % s^{-1} (95 % CI: 1.1, 0.9) and 1.25 % s^{-1} (95 % CI: 1.3, 1.2).

Univariate general linear mixed models revealed that the removal of biofilm by NaOCl was not significant less than hydrogel (P = 0.2) and collagen (P = 0.1) films during the first 12 seconds. Between 13 and 18 of irrigation, removal of biofilm was statistically significant less than hydrogel (P = 0.003), but not significant than collagen (P = 0.025). From second 19 to second 60, the biofilm

removal was statistically significant less than both collagen (P = 0.001) and hydrogel (P = 0.001). In comparison, the removal of biofilm by water was statistically significant less than hydrogel (P = 0.001) and collagen (P = 0.001) throughout irrigation.

Multi-variables linear regression model (Table 2) showed duration of irrigation of biofilm and films using NaOCl had a significant influence on the mean number of bubbles in all experimental groups (P = 0.001). Indeed, bubbles of biofilm group increased by 2.20 % s^{-1} (95 % CI: 2.4, 1.97), against 2.90 % s^{-1} (95 % CI: 2.3, 1.9) for collagen or hydrogel group.

Univariate general linear mixed models revealed that bubbles of biofilm group was not significant against hydrogel (P = 0.2) and collagen (P = 0.1) groups during first 12 seconds of irrigation. Between 13 and 18 seconds of interaction, bubbles in biofilm group were less than hydrogel (P = 0.009); this difference was not significant (P = 0.058). From second 19 to second 60, the number of bubbles in biofilm group was statistically significant less than both collagen (P = 0.003) and hydrogel (P = 0.001).

Averages of the available chlorine of NaOCl present in outflow solution are presented in table 3. Reduction was more remarkable with organic films than bacterial biofilm. One-way ANOVA revealed average of available chlorine in biofilm group was 0.25 % (95 % CI: 0.4, 0.1) more than hydrogel group. Furthermore, average in biofilm group was 0.17 % (95 % CI: 0.3, 0.2) more than collagen group. This difference was statistically significant (P = 0.02).

The mean pH values of the outflow NaOCl solution are presented in table 4. Reduction of pH in the outflow solution was more remarkable with organic film than biofilm. Non-parametric Kruskal-Wallis test revealed difference between average of pH present in the outflow solution in biofilm group (mean = 9.6, 95 % CI: 10.3, 9.3) that in hydrogel group (mean = 8.7, CI: 9.6, 8.4) (P = 0.03).

Results of GC-MS analysis of the outflow NaOCl

Mass spectra of the experimental groups using Gas Chromatograph- mass spectrometry are presented in figure 2. Although the main volatile compound in the vials containing NaOCl (control group) was hypochlorous acid (HClO) (68 %) and hypochlorite (ClO) (5 %), the most abundant (%) compounds of bubbles in other groups were related to carbon dioxide (CO_2) and chloroform compounds [Trichloromethane ($CHCl_3$), Dichloromethane (CH_2Cl_2), Acetyl chloride (CH_3COCl)] which were the lowest with biofilm (47 %), then with collagen (97 %) and the highest with hydrogel (98 %).

Discussion

In the present study, a slide of flow cell was used to investigate the visual changes in the biofilm-irrigant reaction by measuring the removal rate of bacterial biofilm (*E.faecalis*) or simulant biofilm (hydrogel, collagen) using sodium hypochlorite (NaOCl) or water (control) irrigant. The 2.5 % NaOCl was selected for the irrigation procedure, as it is commonly used in root canal treatment because of its organic tissue-dissolving capacity (Estrela 2002), and bactericidal effect (Goztas *et al.* 2014).

Biofilm model proposed in this study did not count the representation of root canal geometry that may interfere with the chemo-mechanical action of irrigant, it still represents direct interaction of irrigant and biofilm without inclusion of other varieties. In the present study, irrigant by 9 mL per minute was used since this falls within the range of 0.01–1.01 mL s^{-1} practiced in clinical situation as reported in (Boutsioukis *et al.* 2007).

The simulated biofilms include a collagen film (Huang *et al.* 2008; McGill *et al.* 2008) and a hydrogel film (Verhaagen *et al.* 2012; Macedo *et al.* 2014), both models were used in previous studies (instead of biofilm) to assess the efficacy of irrigation regimens. Rationale for using simulated biofilm is elimination of complications prompted by the standardised microbial growth and a control of bacterial biofilms associated with live bacterial systems (Macedo *et al.* 2014).

This study did not account for multi-species biofilms; the latter would be more representative of biofilms found in infected root canals. This may be considered a limitation of the biofilm models used in the present study. Ten days of biofilm growth was chosen since seven days of growth was identified, as the least time required (Halford *et al.* 2012).

In this study, an epi-fluorescence microscope was used to record biofilm removal using NaOCl. This type of microscopy was used to assess biofilms growth (Roth *et al.* 2012), and adherence to substrates (Tawakoli *et al.* 2013). It allows a direct visualisation of the samples. It was impossible to observe the degradation of single bacterial cells in the biofilm since the lens of the microscope used in this study was a 2.5-x objective lens. The first 12 mm of the slide length was not in the observation area of the lens as aluminium flanges covers it. In addition, it was difficult to control the bacterial growth only on the observed area (24 mm^2). For standardisation purpose, 18 mm of slide length was chosen to apply film or generate biofilm. Image analysis software (Image-Pro Plus) was used to analyse the images from the fluorescence microscope.

Gas Chromatography was used to determine the composition of bubbles because it allowed separation of mixture of gases or volatile liquids into components in a reasonable time that would require hours by any alternative methods i.e. fractional

distillation (Basrani *et al.* 2010). Bubbles that formed during the reactions of NaOCl with biofilm or organic film was chloroforms (mainly $CHCL_3$) as the major products in the outflow NaOCl.

Biofilm consists of polysaccharide $(C_6H_{10}O_5)_n$ and peptidoglycan $(C_{40}H_{67}N_9O_{21})$ of the bacterial cell wall (Macfarlane 2006). For the organic film, Collagen film $(C_2H_5NOC_5H_9)$ contains three polypeptide chains that are held together by inter-chain hydrogen bonds (Rich *et al.* 2014), while hydrogel is consist of Gelatine $(C_6H_7O_2OH_2COONa)$ and sodium hyaluronate $(C_{28}H_{44}N_2NaO_{23})$ (Popa *et al.* 2011).

The findings of the present study showed NaOCl irrigant more effective than distilled water in biofilms removal from the slides of flow cell models. This may be related to the organic tissue dissolution capacity of NaOCl (chemical action) (Estrela *et al.* 2002) that increased by flow dynamics (mechanical action) (Shen *et al.* 2010). Nevertheless, a 2.5 % NaOCl solution and a contact time of 60 seconds was insufficient to remove 100 % of *E.faecalis* biofilm provided to be more resistance than simulant biofilms. The results of the present study are consistent with those of previous studies that show the incomplete removal of a biofilm after the application of a NaOCl irrigant to the root canal (George 2007; Krause *et al.* 2007; Ordinola *et al.* 2013).

This finding provides information about the nature of interaction between NaOCl irrigant and biofilm during the time of irrigation. This may support the importance of intracanal irrigation with optimal antimicrobial efficacy to improve the prognosis of the infected root canal. Further research is essential for understanding of removal efficacy of bacterial biofilm by irrigant (activation) delivered within the root canal.

Conclusion

Within the limitations of the present study, plastic slide mounted in flow cell chamber was a method to visualise and examine the efficacy of root canal irrigants during irrigation regimen. This study showed that debridement efficacy of 2.5 % NaOCl was insufficient for the complete removal of the test targets (biofilm, films). Removal was greatest for a hydrogel rather than a collagen film and least for an *E.faecalis* biofilm. Use of NaOCl irrigant was more efficient in biofilm removal than water.

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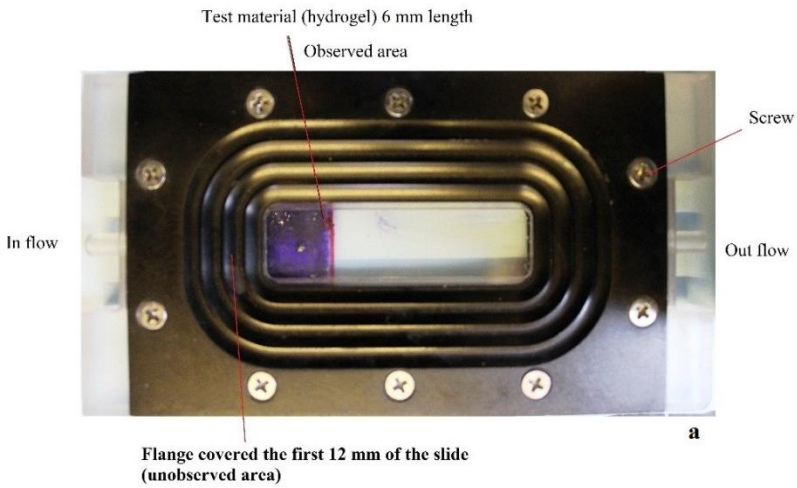

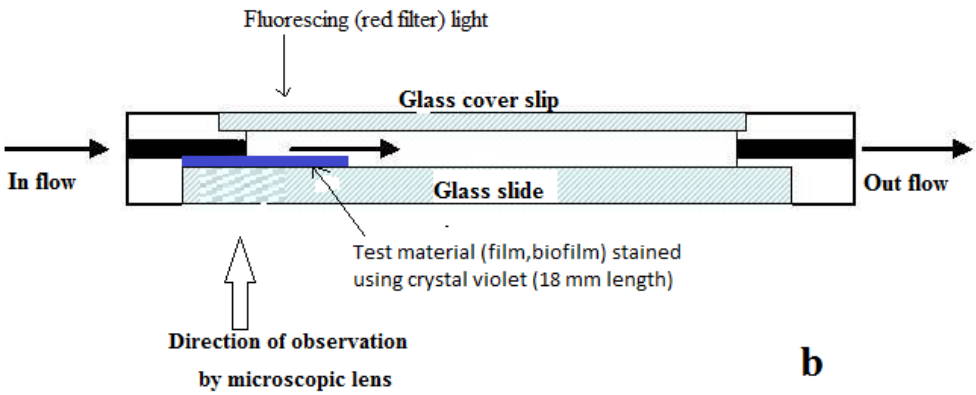

Figure 1: A. Image of Flow cell with test material (hydrogel) applied on slide surface, and B. schematic diagram of the direction of irrigant (2.5% NaOCl) delivery into the flow cell (lower).

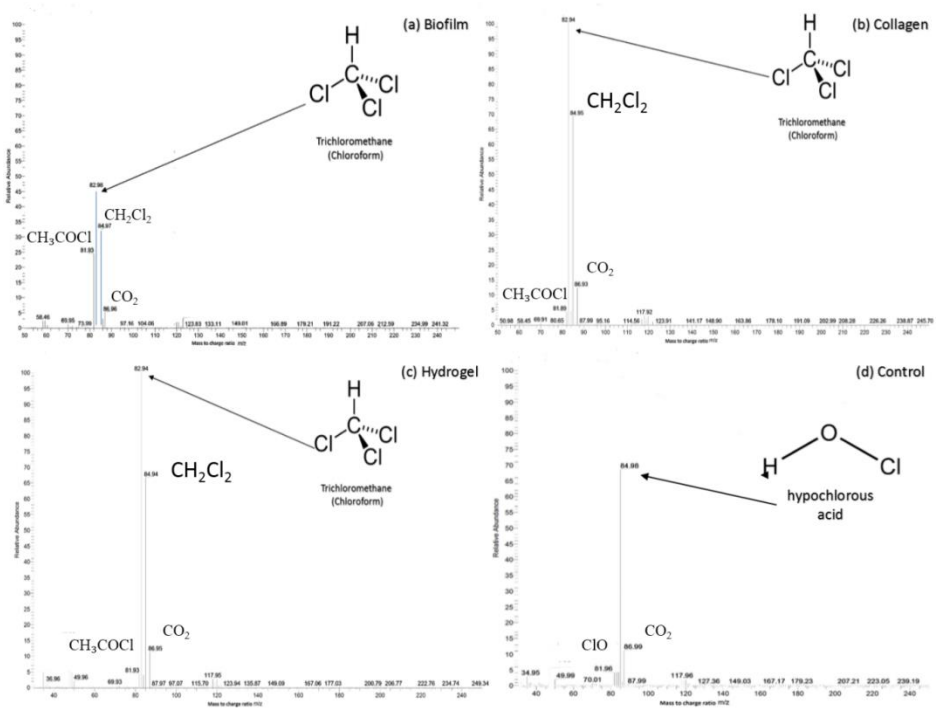

Figure 2: Spectra of Gas Chromatography mass spectrometry of the experimental groups. (a) Biofilm group; (b) collagen group; (c) hydrogel group; and (d) control group.

Table 1: General linear model analyzing the effect of time on the area percentage of slide surface coverage with residual film or biofilm for each experimental group (n=10 per group).

Experimental variable (reference category)	*Coefficient for time effect	95 % Confidence interval for coefficient	*P* value
Time (biofilm)	-0.85	-0.9, -0.7	0.001
Time (collagen film)	-1.03	-1.1, -0.9	0.001
Time (hydrogel film	-1.25	-1.3, -1.2	0.001

*Coefficient for time effect represents the rate of biofilm or organic film removal.

Table 2: General linear model analyzing the effect of time on the number of bubbles present during irrigation using NaOCl for each experimental group (n=10 per group).

Experimental subgroups (reference category)	*Coefficient for time effect	95 % Confidence interval for coefficient	*P* value
Time (biofilm)	2.20	2.4, 2.0	0.001
Time (collagen film)	2.90	3.3, 1.9	0.001
Time (hydrogel film)	5.16	5.9, 4.4	0.001

*Coefficient for time effect represents the rate of organic film or biofilm removal.

Table 3: Mean values (%) and standard deviation of available chlorine (Total n = 30, n = 10 per group) of 2.5% NaOCl after 60 seconds of irrigation of biofilm or organic films in flow cells.

Experimental subgroups (n = 10)	Mean (SD) of % of chlorine of NaOCl after irrigation (time = 60 seconds)
Biofilm	1.4 (±0.1)
Collagen film	1.2 (±0.1)
Hydrogel film	0.9 (±0.2)

SD = standard deviation available chlorine before irrigation =2.5%

Table 4: Mean pH values (Total n = 30, n = 10 per subgroup) of NaOCl before and after 60 seconds of irrigation for biofilm or organic films in flow cells.

Experimental subgroups (n = 10)	Mean pH (SD) of NaOCl after irrigation (time 60 seconds)
Biofilm	9.6 (±0.3)
Collagen film	9.4 (±0.3)
Hydrogel film	8.7 (±0.4)

SD = standard deviation pH value before irrigation =12.36

Effect of the Biological Drug Etanercept on levels of Interluekin 2, 17 in Psoriatic Patients

Rasha Hussain Kuba *1 , Ban Noori Al-Qadhi 2 , and Ass. Prof. Dr. BasmanMedhat Fadheel 3

***1, 2 Department of Biology, College of Science, University of Baghdad, Baghdad, Iraq**

3 Department of Dermatology, College of Medicine, University of Baghdad, Baghdad, Iraq

Abstract

Psoriasis is a common, chronic, immune mediated disorder. The disease is arising as a result of dysregulated interactions of the innate and adaptive immune system in the context of skin epithelium and connective tissue. The biological drug Etanercept(ETN) approved for use in treated psoriasis. In this study, 48 psoriatic patients were taken before and after treatment who attended to the Dermatology and Venereology Department in Baghdad Teaching Hospital during the period from December 2016 to September 2017and 50 samples were used as healthy control group. The results showed that most psoriatic patients 52.08 % were within the second and third decades 20-35 year, and the majority of psoriatic patients were males 62.5% and the ratio of male to female is 1.67:1. Moreover, the results demonstrated that the males were more expected psoriasis compare with females. Blood samples were collected and IL-2 and IL-17 was estimated in sera of all subjects by using Enzyme Linked Immunosorbent Assay (ELISA). In this study, the serum levels of IL-2 in sera of psoriatic patients (before treatment) 97.5±6.6 ng/ml and after treatment 92.9±5.0 ng/ml, in comparison to healthy control group 77.9±3.1 ng/ml. IL-17 mean level in psoriatic patients (before treatment) 93.8 ± 3.4 ng/ml and its level was 72.7 ± 4.4 ng/ml after treatment in comparison healthy control group 65.8 ± 2.7 ng/ml, there were significant differences between studied groups.

Keywords: Etanercept, Tumor necrosis factor-α, Psoriatic patients.

تأثير العلاج البايولوجي الايتانرسيبت على مستوى المحركات الخلوية ٢ و ١٧ في مرضى داء الصدفية

رشا حسين كبة[1]*،بان نوري القاضي[2]، بسمان مدحت فضيل[3]

[1'2] قسم علوم الحياة،كليةالعلوم،جامعةبغداد، بغداد، العراق

[3]قسم الجلدية،كليةالطب،جامعةبغداد،بغداد،العراق

الخلاصة

الصدفية هو من الامراض الشائعة والمزمنة والذي يحدث نتيجة للاختلالات المناعية. ينشأهذا المرض نتيجة للاضطرابات الوظيفية بالمناعة النوعية واللانوعية قي الجهاز المناعيبالاقتران مع النسيج الظهاري والنسيج الضام في الجلد. العلاج البايولوجي إيتانرسبتملائم لعلاج الصدفية. وهو مثبط لعامل التنخر الورمي. في هذه الدراسة، تم أخذ ٤٨ مريضا بداء الصدفية قبل وبعد العلاج و ٥٠ فرد من الاصحاء. سجلت النتائج أن معظم مرضى الصدفية ٥٢,٠٨٪ كانوا ضمن العقدين الثاني والثالث ٢٠-٣٥ سنة، وكان غالبية المرضى من الذكور ٦٢,٥٪ ، حيث ان نسبة الذكور إلى الإناث كانت ١,٦٧: ١. أن أكثرية المرضى كانوا من الذكورمقارنة بالاناث. جمعت عينات الدم و وتم تقدير المحركات الخلوية ٢ و ١٧ في مصول جميع المرضى باستخدام تقنية الاليزا.كان معدل مستوى المحرك الخلوي ٢ في مرضى الصدفية قبل العلاج٩٧,٥ ± ٦,٦نانوجرام / مل، وبعد العلاج كان ٩٢,٩ ±٥,٠نانوجرام / مل مقارنة مع مجموعة السيطرة ٧٧,٩ ±٣,١نانوجرام / مل،بينما المحرك الخلوي ١٧ كتن مستواه في مرضى الصدفية

قبل العلاج ٩٣,٨ ±٣,٤ وبعد العلاج ٧٢,٧ ± ٤,٤ بالمقارنة مع مجموعة السيطرة ٦٥,٨ ± ٢,٧أظهرت النتائج فروق معنوية بين المجاميع قيد الدراسة.

Psoriasis is one of the most common, chronic and currently incurable and an immune-mediated skin disease in recurring manner (Parisi et al., 2013a). It was considered to be a chronic inflammatory dermatosis with albeit, genetic factors involved in the pathogenesis. Psoriasis is coming from "psora" Greek word meaning "itch" or "rash", although most patients suffering from the condition do not complain of itching. It has been known since ancient times and was originally considered a type of leprosy (Das et al., 2009).Psoriasis was initially thought to be primarily a disease of dysfunctional proliferation and differentiation of the keratinocytes. However, now it is widely accepted that T helper (Th)1 and Th17 lymphocytes contribute to the disease pathogenesis through the release of inflammatory cytokines that promote further recruitment of immune cells, keratinocyte proliferation, and sustained chronic inflammation (Monteleone et al., 2011). Well-demarcated erythematous plaques covered by white silvery scales are typically observed on extremities and scalp of patients with psoriasis (figure 1)(Woolacott et al., 2006).

The prevalence of psoriasis may vary from region to region due to variable environmental and genetic factors (Asokan et al., 2011). Estimates of the prevalence of the disease have varied across studies. A systematic review of international population-based studies found wide variation in the global prevalence of ps. There is no clear gender predilection for ps. Although psoriasis can begin at any age, the disease is less common in children than adults. There seem to be two peaks for the age of onset: one between the ages of 30 and 39 years and another between the ages of 50 and 69 years (Parisi et al., 2013b). Geographic location influences the likelihood of having psoriasis; disease prevalence tends to increase with increasing distance from the equator. A systematic worldwide review found the prevalence of psoriasis ranged from 0.5 to 11.4 percent in adults and 0 to 1.4 percent in children (Michalek et al., 2017).

Cytokines, including Th1-related (tumor necrosis factor - alpha (TNF-α), interferon gamma (IFN-γ), interleukin- (IL-2) and Th17-related (IL-17A, IL-17F, IL-22, IL-26, and TNF-α) proteins, together with IL-23, IL-20, and IL-15 were increased in the sera of psoriasis patients (Oka et al., 2012). Corresponding cytokines that may be involved include IFN-γ, TNF-α, IL-23, and IL-17(Bai et al., 2018). More recently, IL-9-secreting Th9 cells have been identified, and the inflammatory responses of keratinocytes, T regulatory cells, and other cell types in psoriasis have been explored (Kim et al., 2015).

Interleukin-17 (IL-17) plays a role in neutrophil recruitment, host defense and immuno-inflammatory pathology(Girolomoni et al., 2012). It is secreted mainly by Th17, but also by Treg cells, NK cells, mast cells and neutrophils(Adami et al., 2014). IL-17is an important cytokine not only for protective immunity against

extracellular pathogens (Rudner et al., 2007), but also for the clearance of intracellular pathogens (Huang et al., 2004). Also it is responsible for development of inflammation in many disorders, especially in autoimmune diseases (Kuwabara et al., 2017)like rheumatoid arthritis, psoriasis, juvenile idiopathic arthritis, Crohn's disease and many others(Adami et al., 2014). Keratinocytes are the principal target for IL-17 in psoriasis. IL-17 receptors are constitutivelyexpressed on the surface of keratinocytesthroughout the epidermis and on scattered dermalcells, including some dendritic cells, dermal fibroblasts, and endothelial cells (Nograles et al., 2008).

Etanercept (ETN) (Enbrel trade name) was the first TNF-α inhibitor to be approved for use in Psoriasis. ETN is a dimeric, soluble fusion protein consisting of the extracellular ligand binding portion of the TNF receptor linked to the Fc portion of human IgG1 (figure 1.6). It is capable of binding and neutralizing soluble TNF and transmembrane TNF (Kerensky et al., 2012). It is a soluble tumor necrosis factor receptor fusion protein that reversibly binds to tumor necrosis factor, (Giannini et al., 2009), furthermore, it alters neutrophil migration, dendritic cell and T-cell maturation and migration, thus decreasing the local and systemic production of pro-inflammatory cytokines and their subsequent effects (Tracey et al., 2008).

ETN is composed of the extracellular portion of two human TNFRII linked to a Fc portion (CH2 and CH3 domains) of human IgG1. ETN is supposed to form 1:1 complex with the TNF-a trimer (Kivelevitch et al., 2014)

Materials and methods:

A total of 48 Psoriatic patients that must be suffering from sever to moderate psoriasis disease were included in the present study, who attended to the Dermatology and Venereology Department in Baghdad Teaching Hospital during the period from December 2016 to September 2017. These patients stopped their response to all other treatments so they were diverted to take biological therapy such as Etanercept (ETN).

Blood sampling

Five milliliters of blood were collected by venipuncture from all patients and control groups. Each collected blood sample was placed in the tubes and then centrifuge was used to obtain serum for immunological measurements. Interluekin- 2 (IL-2) and IL-17 Human ELISA Kit, Demeditec, Germany.

Statistical analysis system (SAS) program was used for data analysis. Person Chi-square -$\chi 2$ test, and mean ± SE, ANOVA Table by using computer program

IBM SPSS version (SAS, 2004). P value <0.05 was considered statistically significant.

Results and Discussion

Demographical distribution of the studied groups according to the age is summarized in table (1.1). The results clarified that the age was ranged between 20-60 years and the mean age for psoriasis was 42.8±2.0. The results recorded that most psoriasis patients (52.08 %) were within the second and third decades (20-35) year, while the lowest percentages were in (51-65) year.

Table 1.1: The percentage distribution of the studied groups according to the age:

Studied group		Age range (years)			Total	Mean age (years)±SEM
		20-35	36-50	51-65		
Psoriasis patients	N	25	14	9	48	42.8±2.0
	%	52.08%	29.17%	18.75%	100	
Healthy control	N	16	23	11	50	36.6±2.2
	%	32%	46%	11%	100	

This results were in agreement with (Gupta et al., 2005; Lopez-Estebaranz et al., 2016), who indicated that the age of psoriatic patients was within the second and third decades. The psoriasis disease can occur at any age, and its prevalence increase with age and its peak appeared between the second and third decades usually (Parisi et al., 2013b). Geographic location influences the likelihood of having psoriasis; disease prevalence tends to increase with increasing distance from the equator. A systematic worldwide review found the prevalence of psoriasis ranged from 0.5 to 11.4 percent in adults and 0 to 1.4 percent in children (Michalek et al., 2017).

Table 1.2: The percentage distribution of the studied groups according to the gender

Studied group	Gender		Total	M/F Ratio
	Female	Male		

Psoriasis patients	**N**	**18**	**30**	**48**	**1.67:1**
	%	**37.5%**	**62.5%**	**100**	
Healthy control	**N**	**34**	**16**	**50**	**0.43:1**
	%	**68%**	**32%**	**100**	

Distribution of studied groups according to their gender showed that the majority of psoriasis patients (moderate or severe) were males (62.5%) with males to females ratio of (1.67:1) table (1.2). It seems that males preponderance among psoriasis patients in comparison females.

This result was higher than previously results by Al-Mokhtar et al., (2017) and Sharquie(Sharquie, 2017) who mentioned that the prevalence of psoriasis among males to females were equal. Other studies also shown that equal incidence of psoriasis in both sexes (Gupta and Gupta, 1995; Gupta et al., 2005).

In the present study, the high frequency of psoriasis attack was among males rather than females, this may be due to the hormonal differences between them (Cemil et al., 2015)(Roman et al., 2016), and in turn, their effect on immune response (Bouman et al., 2005), consequently males tend to provoke more T-helper cells which have a pro-inflammatory role in inducing or development of psoriasis to become severe incidence (Cai et al., 2012).

IL-2 has essential roles in key functions of the immune system, tolerance and immunity, primarily via its direct effects on T cells(Liao et al., 2011). IL-2 was initially discovered as a growth factor for T cells and essential for T cell effector differentiation (Osinalde et al., 2011). It has been shown that IL-2 increased the proliferation of keratinocytes(Lebwohl et al., 2003). In this study, according to the results, serum levels of IL-2 were significantly elevated ($P<0.05$) in sera of psoriatic patients (before treatment) 97.5±6.6 ng/ml in comparison to healthy control group 77.9±3.1 ng/ml, while there were no significant differences ($P>0.05$) between psoriatic patients before and after treatment 97.5±6.6 ng/ml and 92.9±5.0 ng/ml respectively, Figure (1).

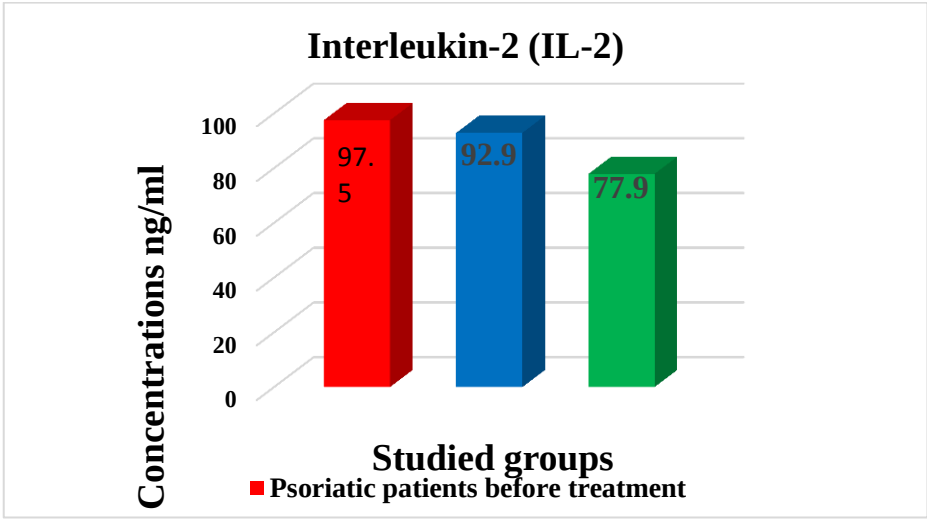

Figure (1): Mean levels of IL-2in psoriatic patients before and After treatment in comparison with healthy control group.

The present study found that serum concentrations of IL-2 were elevated in moderate and severe cases of psoriasis comparing with healthy control group. This results confirmed by(Kapp, 1993)(Roussaki-Schulze et al., 2005), who mentioned that serum levels of IL-2 were elevated in psoriatic patients.

Cytokines are important mediators and modulators of local and systemic inflammation and are therefore involved in many cutaneous inflammatory disorders. The first clinical observation concerning psoriasis and ILs by Lee et al. who reported that administration of IL-2 in patients with a past medical history of psoriasis suffering from renal carcinoma metastasis led to appearance and clinical exacerbation of psoriasis.

Psoriasis is an erythematosquamous skin disorder associated with elevation in the serum and affected skin of the T-helper-1 interleukins (Kapp, 1993). IL-2 is produced by T-lymphocytes as well as by monocyte macrophages and dendritic cells and is associated with inflammation of the skin due to increased cutaneous lymphocyte antigen, which attracts and accumulates inflammatory cells at the site of inflammation. IL-2, the most potent inducer of proliferation and expansion of T-lymphocytes is postulated to participated in the pathogenesis of psoriasis (el Barnawi et al., 2001).

After three months' treatment with ETN to psoriatic patients, the concentration of IL-2 remains ranged at the same levels. IL-2 is a monomeric glycoprotein with a molecular weight of approximately 15 kDa that is primarily produced by activated CD4+ T cells, CD8+ T cells and dendritic cells (Nelson et al., 2004). IL-2 is a proinflammatory cytokine that is secreted by Th-1 cells, and it effectively participates in the activation of T cells to produce TNF-α and interferon gamma (IFN-γ); IL-2 can also enhance the cytolytic activity of natural killer cells (NK)(Sakaguchi et al., 2008). Therefore, IL-2 remains ranged at the same levelsin psoriatic patients treated with ETN, because the role of ETN drug in the blocking TNF-α receptors (Madhusudan et al., 2005). Also IL-2 is used therapeutically to stimulate the immune system (Smith and Humphries, 2009), contributes to the development of regulatory T cells, which control the expansion and apoptosis of activated T cells(D'Souza and Lefrancois, 2003), and influences cell survival, differentiation(Gaffen and Liu, 2004), thereby ensuring their significance in the control of the immune response (Malek et al., 2008).

In addition to its important role in protective immunity, IL-17 plays a critical role in the pathogenesis of various autoimmune inflammatory diseases. IL-17-producing cells, including T cells, natural killer cells, and innate lymphoid cells(Cua and Tato, 2010). The current study showed that there was a significant difference ($P<0.05$) in IL-17 cytokine levelsbetween psoriatic patients (before treatment) 93.8 ± 3.4 ng/ml and healthy control group 65.8 ± 2.7 ng/ml, and its level was decreased significantly (72.7 ± 4.4 ng/ml) ($P<0.05$) after treatment in comparison with psoriatic patients before treatment, figure (2).

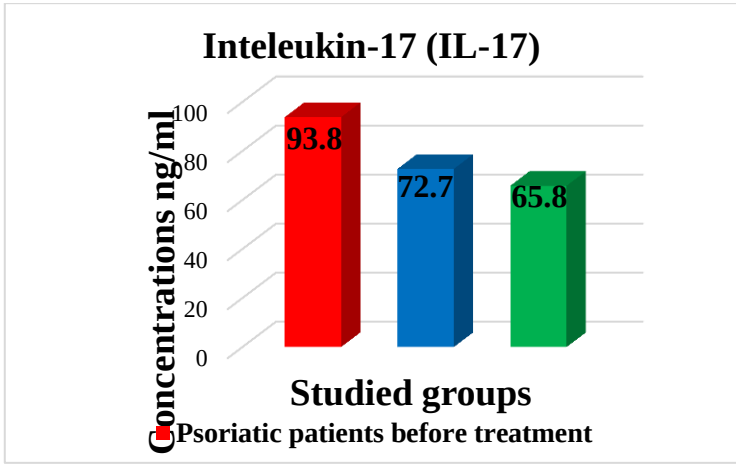

Figure (2): Mean levels of IL-17in psoriatic patients before and After treatment in comparison with healthy control group.

High serum levels of IL-17 in psoriatic patients before treatment proved by other studies (Caproni et al., 2009)(Michalak-Stoma et al., 2013)(de Oliveira et al., 2015) who demonstrate that IL-17serum concentrations were significantly higher in psoriatic patients than in the healthy control group.

Psoriasis arises as a result of dysregulated interactions of the innate and adaptive immune system in the context of skin epithelium and connective tissue (Nestle et al., 2009). Other key innate immune cell types act on dendritic cells such as keratinocytes (mediated through IL-1, IL-6 and TNF-alpha), macrophages (mediated through TNF-alpha) and natural killer (mediated through TNF-alpha and Interferon gamma).Dendritic cells are key immune system sentinels that drive the adaptive immune response in psoriasis. Their numbers are increased in psoriatic plaques and can induce auto-proliferation of T-cells when activated (Nestle et al., 1994). Activated dendritic cells function as antigen-presenting cells and secrete cytokine mediators including IL-12 and IL-23 which drive differentiation of T-cells into Type 1 and Type 17 T-helper cells respectively. Th17 cells are particularly important and may have a role in epithelial immune surveillance (Di Cesare et al., 2009). Activated Th17 cells produce cytokines of innate immune cells induce a pro-inflammatory cytokine cascade mediated through IL-1, IL-6, TNF-alpha, and Interferon gamma. These cytokines can induce auto-proliferation of T-cells when activated. Activated Th17 cells produce cytokines including IL-17A, IL-17F and IL-22. IL-17 (Rosenberger et al., 2007). As a result, in increasing the Th17 activities this will lead to increase the levels of IL-17. Th17 cells and the cytokines produced by these cells are foundin increased levels within skin affected by psoriasis (Harper et al., 2009).

The current study showed that the serum levels of IL-17 in psoriatic patients after treatment were significantly decreased comparing with psoriatic patients before treatment. In line with this results, most studies have reported that the serum levels of IL-17 decreased after treatment with ETN (Antiga et al., 2012; Zaba et al., 2009).

Psoriasis however, requires a more complex model of disease that is only indirectly modulated by TNF-α. Some studies in genetics have shown that alleles of genes encoding p19 and p40 subunits of IL-23, and IL-23R confer risk for development of psoriasis(Nair et al., 2008). This pathway controls the development of Th17 T cells, which may contribute IL-17 and IL-22 to an inflammatory skin environment. The importance of this pathway is also supported by therapeutic response of psoriasis to monoclonal antibodies that inhibit IL-12

and IL-23, producing major improvement in 70-80% of cases(Papp et al., 2008). Since TNF-α inhibitors (ETN) can also confer nearly equivalent therapeutic benefit, there may be some overlap in inflammatory circuits regulated by TNF-α and p40 cytokines. One possible intersection between TNF-α and Th17 T cells has been suggested from ETN effect on synthesis of IL-23, IL-17 and IL-22, (Chiricozzi et al., 2018)namely that TNF-αmay serve as a dendritic cells activator for IL-23 production, which then promotes activation of Th17 T cells(Zaba et al., 2009).

The analysis of the effect of ETN on inflammatory pathways. Broad sets of genes distinctly regulated by TNF-α, IL-17, and IFN-γ can be measured during a many week period of disease improvement induced by ETN. Since the set of inflammatory genes regulated by ETN increases over time, additional indirect effects of TNF-α on more complex cellular or molecular circuits(Zaba et al., 2009). For example, TNF-α has been shown to be a "co-stimulus" for T cell activation as well as a critical molecule for dendritic cells development and maturation (Chomarat et al., 2003).

The progressively larger set of genes that increase over time suggest that many cellular activation circuits, and especially those linked to dendritic cells and adaptive immunity, are impacted by blocking TNF-α in a therapeutic context. The resolution of psoriasis by ETN thus appears to be linked more to modulation of adaptive immune circuits, rather than innate immune circuits, although both pathways are modulated by this TNF-α antagonist(Zaba et al., 2009). So, ETN that was inhibitTh17 pathways results in reduced expression of IL-17 and IL-23 and reduced disease outcomes (Armstrong et al., 2011).

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"Evaluation of Salivary Profile among Adult Type 2 Diabetes Mellitus Patients

Mohammed F.Jubaz [1]& Rawaa M. Mohammed[2]

Mc.s in Oral Physiology, Dep. of Dentistry, Al-Mustaqbal University College/Iraq.

Ph.D in Clinical

ABSTRACT

Background:" There has not been much agreement on the hypothesis that diabetes is associated with salivary dysfunction, thus we looked at salivary parameters in diabetic and non-diabetic people. Diabetes mellitus may be diagnosed and monitored more effectively if saliva is used instead of blood.

Objectives: Comparing salivary flow rates between diabetic (D) and non-diabetic (ND) subjects.

Material and Methods: At least two years before the start of the trial, all participants had been diagnosed with Type 2 Diabetes mellitus in one form or another and were on antidiabetic therapy. All of the saliva was collected in a fasting state without any stimulus. Measurements of saliva's organic and inorganic content, pH, flow rate, and other parameters were made. These findings were then put under statistical scrutiny.

"Results: Salivary pH, flow rate and salivary amylase were significantly lower in diabetics who were on antidiabetic therapy. They had significantly higher levels of salivary glucose, total proteins, sodium and potassium and lower levels of calcium in comparison to those in the non-diabetic group."

Conclusion: Diabetics and non-diabetics differed significantly in the physical and biochemical properties of their saliva. It is possible to screen, diagnose, and monitor for diabetes using salivary characteristics, which are less intrusive than blood tests.

"Key words: Saliva, Type 2 Diabetes mellitus (T2DM), Salivary flow rate, Salivary glucose"

INTRODUCTION

Although Type 2 Diabetes Mellitus (T2DM) may be treated, long-term complications remain the biggest health dangers. Worldwide and in Babil, epidemiological research reveal that the burden of T2DM is increasing significantly. Per J E Shaw et al., diabetes will affect 7.7 percent of individuals (20–79 years old) by 2030 [1]. There are no exceptions to this pattern in Babil or any other South Asian country. With increasing rates of obesity, type 2 diabetes (T2DM) and cardiovascular disease (CVD) mortality and morbidity in the United States are on the rise. There are several organ systems that are affected by diabetes mellitus (DM). It is possible for people with diabetes mellitus type 2 (T2DM) to

develop neuropathy and other neuropathy-related conditions due to long-term high blood sugar levels.

Furthermore, salivary glands seem to be affected. Xerostomia, periodontitis, gingivitis, odontogenic abscesses, and soft tissue lesions of the tongue and oral mucosa are among the documented oral health concerns associated with T2DM that practitioners often observe [4]. As a result of poorly controlled Type 2 Diabetes, salivary function suffers. Autonomic neuropathies, microvascular alterations, hormonal abnormalities, or a combination of these might cause diabetics to have salivary hypofunction and dehydration [5].

T2DM and salivary dysfunction in diabetes have yet to be established as a plausible link between the two conditions. This research was designed to test the hypothesis that physical and biochemical properties of saliva differ between diabetes and nondiabetic patients. Flow rates, morphological properties, and biochemical profiles of participants' saliva were studied, as was the association between fasting plasma glucose levels and salivary parameters, in this study, which included participants with and without diabetes.

MATERIAL AND METHODS

This research included 30 diabetics and 30 non-diabetics. People were chosen at random from a pool of prospective volunteers (30 subjects in each group, as it was a small scale pilot study). Diabetes had been diagnosed at least two years before to participating in this study, and all participants were undergoing ant diabetic therapy at a private hospital in the XXXX. Participants ranged in age from 40 to 55. As early as the first year after diagnosis, it has been shown that DM difficulties begin to develop. T2DM had been present in the lives of the participants for at least two years. In order to exclude participants with depression, edentulism, or systemic illness, the researchers eliminated individuals with radiation to the head and neck. [7–9].

People who were not diabetic but had gone to the ED or lab for another test made up the control group. The University's Institutional Ethics Committee had no objections to the study. This study required all participants to complete a written informed consent form before they were allowed to participate in it.

At 7 to 8 a.m. in the morning, while they were fasting, researchers administered demographic and medical questionnaires to the participants, after which samples of saliva were taken from them. For five minutes, we collected unstimulated entire saliva using a standardized spitting method. To ensure that there was no selection bias, all of the individuals' saliva was collected by a single observer. Glass

electrodes from Systronics' pH system were used to test the salivary pH in less than an hour after the samples had been collected from the subjects.

Calculated salivary flow rates were represented as millilitres per minute (ml/min).

At 5000 rpm, the samples were centrifuged, and the supernatant was collected and kept at – 8000C until further analysis was possible. There was also a look at the biochemical features of the saliva. Inorganic elements such as sodium and calcium were present together with organic substances such as glucose and total protein (analysed by using a semi auto analyzer). SPSS version 15 was used to do the statistical evaluation. A Student's t-test was used to compare the salivary parameters between diabetics and those without diabetes.

RESULTS

We recruited a total of sixty participants, 30 of whom had diabetes and were on antidiabetic therapy and 30 of whom had normal blood sugar levels. Participant average was 48.7 years. It was reported that there were 30 diabetics in all, with a median age of 49.11 years for the 12 men and 18 females. Average age for the non-diabetic individuals was 44.44 years; 14 men and 16 women were in excellent health at that age. A comparison of pH, salivary flow rates, and biochemical markers in the male and female groups revealed no differences.

In Table 1, we display the mean standard deviation for salivary pH and entire salivary pH at rest in non-diabetics and diabetics. In diabetics, salivary pH levels were much lower than in individuals without diabetes. (Non Diabetics (ND) =8.11 ± 0.17, Diabetics (D) =5.83 ± 0.05, p=0.000) The flow rate in diabetics was considerably reduced with values of 0.38 ± 0.22 and in ND it was 0.61 ± 0.17 which was statistically significant (p=0.002). Non-diabetics and diabetics differed significantly in their biochemical profiles [Table 2]. Diabetics had higher amounts of salivary glucose, total protein, sodium, and potassium, as well as lower levels of calcium (p= 0.0001). Among diabetics, there was a statistically significant drop in salivary amylase concentrations (p= 0.0001).

Parameter Studied	on Diabetic ıbjects (MEAN ± D)	iabetic Subjects MEAN± SD)	value
alivary p H	11 ± 0.17	83 ± 0.05*	=0.000
alivary flow te(ml/min)	61 ± 0.17	38 ± 0.22*	=0.002

arameter Studied	on-Diabetic ubjects (Mean ± d)	iabetic Subjects Mean ± SD)	Value
lucose (mg/dl)	27 ± 0.17	.55 ± 1.55*	=0.000
alivary alpha nylase	03.51 ± 08.55	5.88 ± 1.6*	=0.005
otal proteins(g/l)	56.38± 186.33	56.19 ± 403.67*	=0.000
odium(mEq/l)	89 ± 0.36	5.52 ± 0.98*	=0.000
otassium(mEq/l)	2.12 ± 0.67	3.77 ± 0.22*	=0.000
alcium(mEq/l)	08 ± 0.22	66 ± 0.08*	=0.000”

DISCUSSION

Drugs such as anticholinergic and diuretics, antihistamines, anti-hypertensives, etc., may modify salivary parameters in people with metabolic and neurological problems as well as those who are dehydrated. [10] Salivary secretions may be altered by diabetes-related microvascular issues and, as a result, autonomic neuropathy. Although several research have been undertaken to examine the effects of T2DM on salivary functioning, the results are still ambiguous. Because of this, we decided to conduct our research on a diabetic population from southern Babil in order to see whether the physical and biochemical properties of saliva in diabetics differ from those of non-diabetic controls. The idea was to suggest that saliva may replace blood in the diagnosis and monitoring of diabetics.

Resting salivary pH in healthy people was estimated in many investigations to be between 5.5 and 7.9 [12]. The pH of saliva is maintained by buffers such as carbonic acid and bicarbonate systems, phosphate systems, and protein systems [13]. Patients with diabetes have pH values that are lower than those of healthy individuals. Diabetic participants exhibited an acidic pH as well, which M E Lopez et al. found to be caused by the presence of bacteria or by the drop in bicarbonate levels that occurred with the increase in flow rate [14]. However, there is a lack of research on salivary pH alterations in T2DM.

In the absence of external stimulation, the mouth produces a combination of secretions known as resting saliva. For those who suffer from dry mouth and hyposalivation, the flow rate is substantially below the normal 0.3-0.5 ml/min resting rate for entire saliva. Citric acid is known to cause an increase in saliva flow rate between 1.0 and 3.0 ml/min. In diabetics, the salivary flow rate is much lower than in the general population. Those with diabetes have been shown to

have a decreased salivary flow rate than those without diabetes. Due to an increased diuresis caused by inadequate glycemic control, diabetics have increased thirst and dry mouth. People with and without type II diabetes who were studied by Cherry–Peppers et al. for flow rate came to the same conclusion [15-17].

Those with Type 1 diabetes were shown to have lower salivary flow rates than those with normal glycaemic control and those who were not diabetic. When blood glucose levels are under control, it seems that normal salivary flow rates may be restored [10,18]. Moreover Sugary saliva production, which is controlled by the autonomic nerve system, may be a symptom of diabetes autonomic neuropathy in diabetic individuals. Studies by Meurman and Tenovuo found no difference in salivary secretion rates between T2DM patients and healthy controls. [19,20]

The levels of glucose in the saliva of diabetics were found to be much greater than those of healthy people. One possible explanation for this is that glucose homeostasis has changed. Blood glucose filters, according to Chatterton RT and colleagues [21], may be influenced by hormonal or neurological regulation of the salivary glands [22]. Another study found that diabetics have higher salivary glucose levels than non-diabetics. It was shown that diabetics' salivary glucose levels had a negative correlation with their glycemic status, as well as their HbA1c levels, in another study by Lopez et al. [12, 13]

Karjalainen et al. [16] found that once insulin therapy was began, diabetics' salivary glucose levels dropped. There was no difference in salivary glucose levels reported by Sharon et al. [23]. Diabetics have lower levels of salivary amylase than non-diabetics. Streptozotocin-treated rats had lower levels of parotid gland amylase and amylase mRNA, but insulin therapy raised amylase levels prior to any change in mRNA levels [24], which was in agreement with our findings. This data suggests an early impact on protein translation and maybe a long-term transcriptional effect [25]. He observed that people with poorly controlled noninsulin-dependent diabetes who had increased amylase activity had changed taste sensations. Amylase levels in the saliva of diabetics have yet to be established as a reliable indicator. Diabetes patients' salivary amylase levels were found to be significantly greater than those of the controls, as reported by Yavuzyilmaz et al. and by Chatterton RT et al. In the research by J. Tenouvo et al., [26], no variations were seen in the amylase activity across the study groups.

The findings of this investigation indicated that diabetics had considerably higher amounts of salivary total proteins. Microorganism activity or periodontal tissue-derived proteins may be to blame for a rise in salivary protein levels. Exocrine

gland proteins may be more likely to enter secretions in people with diabetes if the basement membrane is more permeable, according to Mandel's hypothesis. [10]. Even while diabetics' salivary protein concentrations have been reported to be greater than those of non-diabetics in certain investigations, this has not been the case in other studies. Proteins released from gingival fluid rather than saliva have been associated to high levels of active periodontal disease in diabetics, according to research [4].

Sodium and potassium levels in diabetics were greatly high, whereas calcium levels were dramatically lowered, according to the findings of our research. T2DM and IDDM (Insulin Dependent Diabetes Mellitus) patients had considerably higher potassium levels in their saliva than healthy controls, too [4]. As a result of either hyperaldosteronism or a decreased Na+-K+-ATPase function, diabetic individuals may have abnormally high potassium levels in their salivary glands. Harrison et al. [27] found that potassium levels were in agreement, however calcium levels were in disagreement.

Researchers have looked at the possibility of using saliva instead of plasma to diagnose or monitor type 2 diabetes by evaluating the extent of changes in saliva's composition. Cellular and chemical studies of blood components are the most frequently utilized laboratory diagnostic methods. When it comes to fluids in our bodies, saliva has several unique benefits over other fluids. An examination of salivary gland secretions is a primary tool for determining the particular disease of the glands, such as infection and blockage.

The most common use of a salivary analysis for the assessment of systemic illnesses is the study of entire saliva. In certain cases, systemic illnesses impact the salivary glands in such a way that they not only change the amount of saliva produced, but also its makeup. Like T2DM, these disorders may be diagnosed and detected earlier if they have a distinctive set of symptoms. Because of its simplicity, reliability, and lack of harm, saliva has lately been utilized to make diagnoses for a broad variety of disorders. [10].

Individuals with little training may collect whole saliva non-invasively. For its collection, there is no need for any particular equipment. Children and the elderly may benefit from saliva testing for illness diagnosis since saliva collection is linked with less compliance issues than blood collection. In addition, salivary analysis seems to be a cost-effective strategy for screening huge groups of people.

Because of the limited sample size, we were unable to draw any firm conclusions on the changes in salivary parameters that occur in diabetics in this research. Fasting plasma glucose levels were linked to a variety of salivary indicators, including glucose, although a larger sample size would have allowed us to draw

more certain conclusions. In addition, analysing the HbA1c levels of the participants' glycaemic controls would have added value.

CONCLUSION

T2DM patients undergoing therapy exhibited substantial differences in both physical and biochemical characteristics of saliva, stressing that salivary composition is not merely a reflection of dental health but also of one's overall health. It is possible to undertake larger-scale investigations, taking into consideration the numerous restrictions, in the future Saliva might be used as an alternative to blood as a diagnostic tool for diabetes screening and diagnosis.

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A proposed brain tumor detection algorithm using Multi Wavelet Transform (MWT)

Prof. Waleed A. Mahmoud Al-Jawher

Uruk University

Sarah H. Awad Al-taee

Iraqi Commission for Computer & Informatics

Informatics Institute for Postgraduate Studies

Abstract

Magnetic resonance imaging (MRI) is a technological development in the medical field. It is used to give images of the human body with high accuracy and good quality, facilitating the process of identifying and classifying diseases in the human body. One of the diseases that are diagnosed using MRI is a brain tumor, MRI which helps in the early diagnosis of the tumor, and helps the doctor to diagnose and identify the tumor and thus make the fastest medical decision . This paper used to identification and extraction of brain tumors from magnetic resonance images based on Multi Wavelet Transform (MWT) and image processing techniques . Firstly the location of tumor was presented & next its area computed.

Keywords : MRI , Brain tumor , Multi Wavelet Transform (MWT) .

1- Introduction

1-1 A brain tumor is a development of tissue inside the brain that is abnormal. It can also lead to the destruction of healthy brain tissue [1] . According to the World Health Organization (WHO), the brain tumors are classified into two types: Benign and Malignant [2]. Due to a surge in brain tumors, research in the field of biomedical image processing has become one of the most challenging and promising topics in recent years. Regrettably , Many of these tumors are detected at a late stage in their development. When the disease's symptoms are apparent, as well as when the tumor has grown , It's becoming increasingly difficult to treat or remove the tumor as it grows in size .tumor as well as hazardous. While it is more safer and easier for children to do so, the excision of a small tumor when it is still in its early stages .Glioblastomas (also known as brain tumors) account for about 60% of all tumors. Glioblastoma multiforme (GBM) cancers start off as low-grade tumors .However, with time, these little tumors grow into big tumors[3],[7]. In neuron surgery, computer-assisted surgical preparation and advanced image-guided methods have become commonplace [3]. As a result, when it comes to the creation of medical equipment in general, and medical imaging devices in particular, there are several types and variations . Medical imaging methods have only recently become available. So In the case of brain tumors, a variety of imaging techniques are used. Magnetic resonance imaging, for example, is used to make diagnosis (MRI) , Ultrasound imaging and radiography (such as CT and x-ray) [4],[7]. As a result, the diagnosis of brain tumors is based on MRI image analysis, which is a time-saving technology that has no adverse effects on the human body because it does not require any radiation. There is no longer any radioactivity. It's based on magnetic fields and radio waves [4] . The most common cause of death in children and adults is a brain tumor [5,6]. If

malignancies are accurately discovered at an early stage, the odds of success are better [5,6].

1-2 **Magnetic Resonance Imaging (MRI)** is a cutting-edge medical imaging technique that produces high-resolution images of the human body's internal organs.

When treating brain tumors, ankle problems, and other conditions, imaging is frequently used.We can deduce a lot from these high-resolution photos. comprehensive anatomical data to investigate the human brain anomalies in development and discovery. There are numerous options available nowadays.

There are various methods for classifying MR pictures, all of which are described below. Knowledge, fuzzy approaches, neural networks, atlas methods based techniques, shape methods, and segmentation by variation T1 weighted, T2 weighted, and PD (proton density) MRI [8]. The most successful and widely used tool for detecting brain tumors is magnetic resonance imaging (MRI). Conventional methods based on human data are used in current diagnosis techniques. As a result, there's a higher chance of false detection if you don't have enough experience. determining the presence of brain tumors Analytical tools and methodologies currently available Tumors have become more common, as has their behavior. Image Brain cancers can be detected using a processing technique. Image Images are converted to digital format and actions are performed using processing methods. in order to obtain better and enhanced photos [9]. Pre-processing of MRI images is the first step in image analysis, which includes image enhancement and noise reduction techniques to improve image quality, for this reason used MWT .

1-3 Multiwavelet Transform (MWT)

The wavelet thresholding approach for extracting an image from noisy data was developed as a result of advances in wavelet theory. Wavelets with several wavelets are known as multiwavelets. Scaling functions are a new concept that has recently been introduced. provide orthogonality, symmetry, and brevity at the same time assistance, which is impossible to achieve with standard wavelets, Wavelets with a scalar value are also known as scalar wavelets. Multiwavelets are more suited for many image processing applications, particularly denoising, because of this characteristic. [12]

1-4 Theoretical Aspects of Multiwavelets

The generalization of scalar wavelets gave rise to the concept of Multiwavelet [13,14]. Multiple scaling and wavelet functions are employed instead of one

scaling and one wavelet function. As a result, the construction of Multiwavelets has a greater degree of freedom. As a result, unlike scalar wavelets, Multiwavelets can collect features like orthogonality, symmetry, higher order of vanishing moments, and compact support at the same time.

There are two types of multiwavelets:

1- Orthogonal type such as Geronimo-Hardin-Massopust (GHM), Symmetric Asymmetric (SA4), Chui-Lian (CL).

2- BiOrthogonal type such as Bi-Orthogonal Hermite (Bih52S). [15,16]

Several scaling functions and associated wavelet functions characterize multiwavelets, as shown in Equations (1) and (2), respectively .

$$\phi(t) = \sqrt{2}\ \sum_{k=-\infty}^{\infty} H_K\ \phi(2t-k) \qquad (1)$$

$$\Psi(t) = \sqrt{2}\ \sum_{K=-\infty}^{\infty} G_K\ \phi(2t-k) \qquad (2)$$

Ψ (t) is a Multiwavelet, and ϕ (t) is a multiscaling function.

Note, that (Hk) and (Gk) are matrix filters, i.e., Hk and Gk are r× r matrices for each integer k. These filters have more degrees of freedom than a standard scalar wavelet because of the matrix elements. These extra degrees of freedom can be used to include important qualities like orthogonality, symmetry, and high order of approximation in multiwavelet filters. The goal is to figure out how to best utilize these additional degrees of freedom. To take use of them, multifilter building approaches are already being developed. [17,39,40]

The goal of this multiplicity is to attain the features listed below [1].

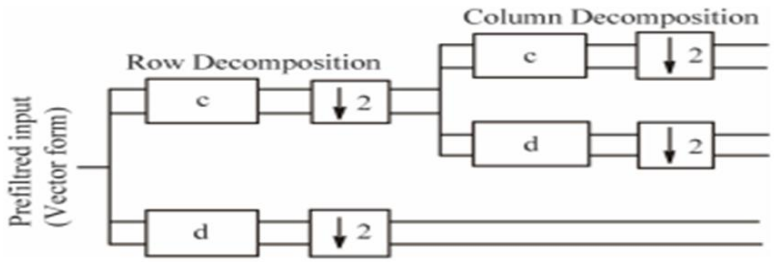


Fig (1) A multifilter bank with low pass filter

The GHM filter suggested by Geronimo, Hardian, and Massopust is a well-known multiwavelet filter. [37] The GHM basis provides a unique mix of orthogonality, symmetry, and compact support that no other scalar wavelet basis can match [42].

The GHM which is the type of MWT that used in this proposed algorithm as a bank of filter , to locate the tumor in brain MRI, when the GHM works with the indicated image will partition it into several levels of image or parts (16 parts), and then we just take the part (L1L1), which means the image is several times clearer than the input image and will be clear package sequences when doing the tumor detection method.

L_1L_1	L_1L_2	L_1H_1	L_1H_2
L_2L_1	L_2L_2	L_2H_1	L_2H_2
H_1L_1	H_1L_2	H_1H_1	H_1H_2
H_2L_1	H_2L_2	H_2H_1	H_2H_2

Fig (2) After one level of Multiwavelet decomposition, image sub-bands

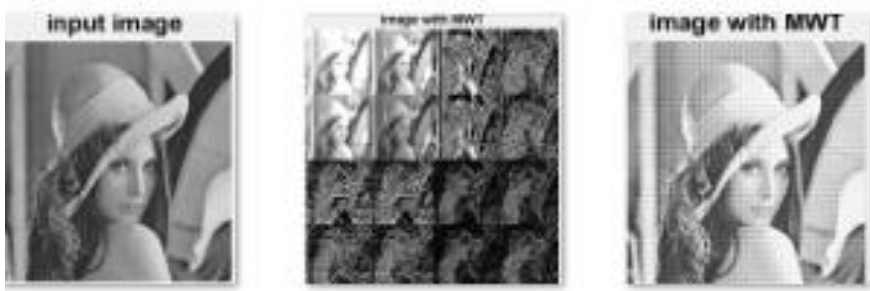


Fig (3) After applying GHM on image

3- Related work

Many studies have attempted to provide an automatic classification strategy for brain cancers based on medical MRI images [29], many techniques have been proposed for the classification of brain tumors in MR images, including fuzzy clustering means (FCM), support vector machine (SVM), artificial neural network (ANN), knowledge-based techniques, and the expectation-maximization (EM) algorithm technique.

BWT and SVM image analysis algorithms were proposed by Bahadure et al. for MRI-based brain tumor identification and classification. Skull stripping, which removed all non-brain tissues for the detection purpose, yielded a 95 percent

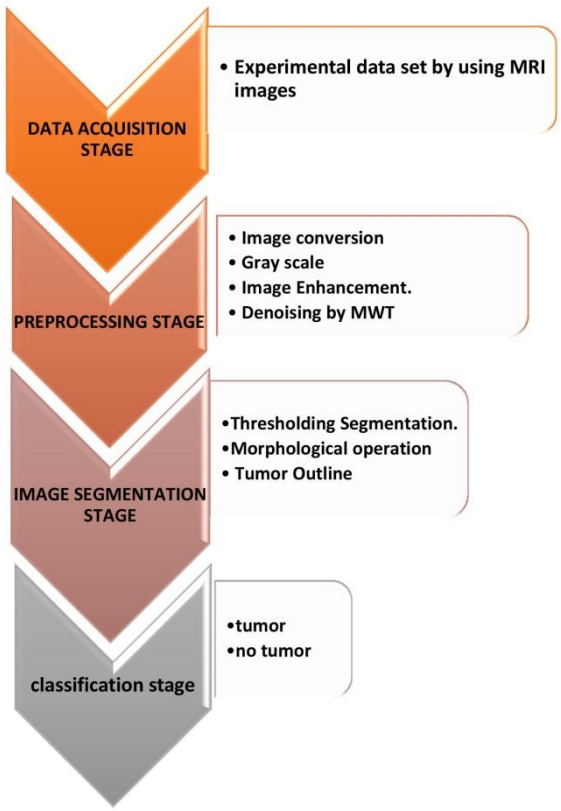
accuracy in this procedure [1]. For the detection of tumor images, Joseph et al. proposed segmentation of MRI brain images using the Kmeans clustering algorithm combined with morphological filtering [2] . Alfonse and Salem. proposed utilizing a support vector machine to automatically classify brain tumors in MRI images[3] . Two sections of the brain MRI picture must be separated in order to retrieve brain tumor regions. The tumor aberrant cells are found in one section of the region, while normal brain cells are found in the other [4]. Zacharaki et al. published a study in 2009 that introduced two classification methods. The first technique divided glioma types into three categories: Grade 1, Grade 2, and Grade 3, while the second divided them into low and high grades. The study used SVM and KNN algorithms to classify the data and found that multi-classification accuracy was 85 percent and binary classification accuracy was 88 percent [61] . In [67] the authors proposed a method for detecting and localizing MRI medical tumor pictures. There are three basic steps in the approach (i.e., pre-processing, segmentation and edge detection for the image, and finally classification). To distinguish the infected from the healthy zone, the researchers employed the k-means clustering technique. Another study [68] proposed a brain tumor detection device that is automated. Filters were used to improve the quality of MRI images, and then the segmentation method was used to pinpoint the tumor's location. Following that, the study relied on specialists to identify tumor location from the segmented image with a rate of accuracy of 91.67 percent using Principal Component Analysis (PCA).

3- Proposed algorithm

Image classification is the task of categorizing and assigning labels to groups of pixels or vectors within an image dependent on particular rules. The categorization law can be applied through one or multiple spectral or textural characterizations. Image classification techniques are mainly divided into two categories: Supervised and unsupervised image classification techniques. A brain tumor consists of cells that show abnormal growth in the brain. The nature of brain tumors is malignant because they occupy the space of the brain to replace the tissues needed for vital functions of the body. Due to the invasive nature of brain tumors, these tumors affect the most important organ (brain); however, any brain cancer is instinctively life-threatening and rigid due to its invasive and diffuse nature in the confined skull space—brain tumors (even malignant types) are not always fatal and deadly. Brain tumors can be benign with no danger or malignant and cancerous; although, the definition of malignant or benign neoplasm in the brain is different from the definitions typically used in other types of cancerous or non-cancerous tumors in other parts of the body. Because of the complex structure of the brain, the tumor diagnosis is turned into a challenging task. Early diagnosis of the tumor and estimation of its progress for better

treatment of this disease is crucial. Currently, in clinical applications, the tumor range in the brain image is manually determined, so manual processing is unenforceable when the volume of information is high. Tumor diagnosis based on abnormal magnetic resonance imaging (MRI) has a significant impact on cancer research and clinical practice. Generally, MRI brain tumor imaging is one of the most challenging fields in medicine.

The main block diagram of the proposed method of brain tumor detection algorithm using Multi Wavelet Transform (MWT) is given in Fig. (2) below.



Fig(2) The main block diagram of proposed algorithm

Fig(2) The main block diagram of proposed algorithm

3.1 Data acquisition stage

Experimental data set by using MRI images . collected 979 MR brain images (250 normal and 729 abnormal) from Kaggle website, which is an online community of data scientists and machine learning practitioners. Kaggle allows users to find and publish data sets, explore and build models in a web-based data-science environment ,

3.2 Pre-processing stage

Pre-major processing's goal is to improve the precision of MR images and make them appropriate for subsequent processing by a human or machine vision system. The grayscale image is useful for a variety of purposes, including such as image segmentation, feature extraction, and Using the (rgb2gray) function of the RGB image was converted to the grayscale image using MATLAB software [18]. Noise in MRI imaging must sometimes be deleted and removed. The high frequency of radio waves and the patient's mobility during treatment are the sources of this noise. [19]. However, noise removal should not obliterate the image's boundaries or diminish the image's clarity and quality. Pre-processing of MRI images is the first step in image analysis, which includes image enhancement and noise reduction techniques to improve image quality, for this reason used MWT So we use the (MWT) as abank of filter to obtain an MRI image with a high-resolution and without noising.

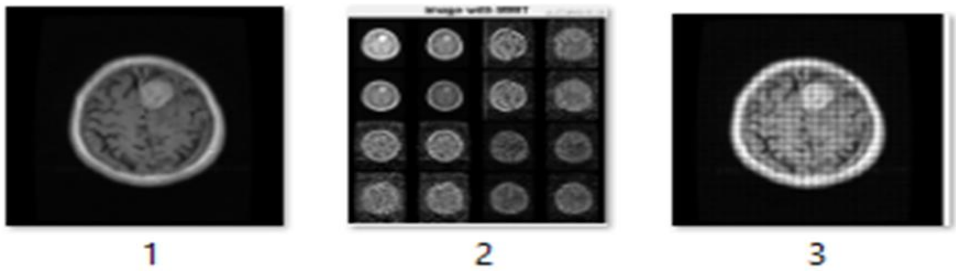


Fig (4) brain MRI after MWT

3-3 Image segmentation stage

The next step in the detection process is segmentation, which is the most important aspect of image processing. This procedure includes an extraction procedure that is useful in determining whether or not a region is infected .The problem of segmenting brain tumors from MRI scans is complicated by noise in the image, low contrast, and other factors. Loss borders, varied intensities within tissues, and different tissue types are all factors to consider.[20,29]. Scholars such as ategorised segmentation techniques as threshold-based, region-based, boundary-based, and pixel-based [21, 22].The former, which is based on a threshold, posits that pixels are sorted into one of two classes when they fall within a certain range. [23] .The region-based technique assumes that the attributes of neighboring pixels in a region are the same. [24]. The third strategy assumes that the pixels' properties abruptly change from area to region along the border line [25]. [26]. combining two or more of the preceding techniques this results in a hybrid strategy[27-28-29].

3-3-1 Thresholding based

Thresholding methodology is the most basic image segmentation technique. A threshold value is employed to transform a gray-scale featured image to a binary image in this technique. The ability to choose the threshold value is a big benefit of this strategy.[31]

3-3-2 Morphological operations

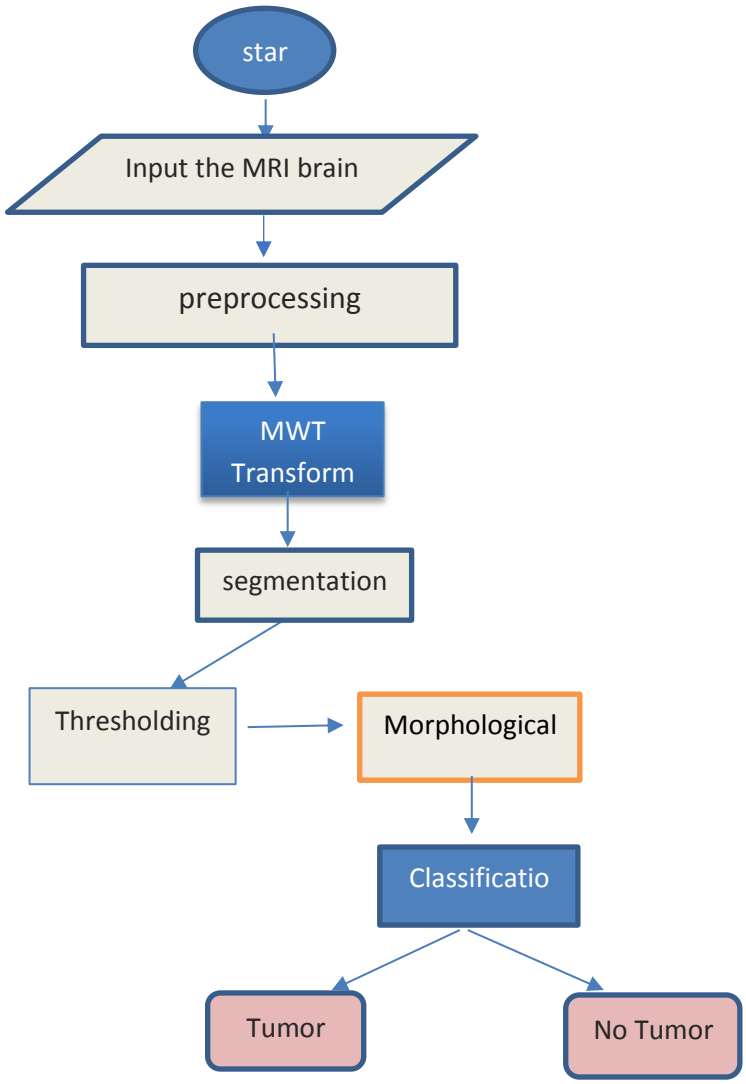
Morphology is the study of shapes and the derivation of boundary areas from brain tumor pictures. Rearranging the order of pixel values is known as morphological operation. It works by organizing elements and input photos. Elements of structure

are qualities that investigate a specific feature of interest. The fundamentals Dilation and erosion are the processes utilized here. Dilation The procedure adds pixels to the boundary region, whereas erosion removes them. removes the pixels from the object's border region .These operations were carried out in accordance with the plan elements. Dilation compares all of the values and chooses the best one. pixel values in the immediate vicinity of the input image represented by Erosion, on the other hand, Erosion, chooses the lowest value by comparing all the pixel values in the input image's vicinity. [30].

3-4 Classification

The segmentation problem can be turned into a classification problem by training and categorization, and a large number of MRI scans, as well as recognized ground reality, are required to segment the problem from distinct instances . In this paper used Statistical Classification Methods to classify the input MRI brain into normal or abnormal.

3-4 The algorithm is implemented on the MATLAB software.



Fig(4) Flowchart of proposed algorithm

1- Read an image of the brain MRI input.
2- Change the size of the array to [256 265] in order to ensure that the image that will be entered on MWT will be equidistant and also that the length N is power of 2 ,
3- Convert the resizing image to gray scale .
4- Input the converting image to the MWT .
5- Convert the result image to BW image by threshold = 0.5
6- Using Bwlabel command for each disconnected components, will labeled by auniq number .
7- Using Regionprops to :
A - compute statistics of binary connected components
b - compute statistics properties of binary object like : area , centroid, bounding box, solidity .
8- Density, Pixel density : is a measure of the number of pixels contained in measured area.

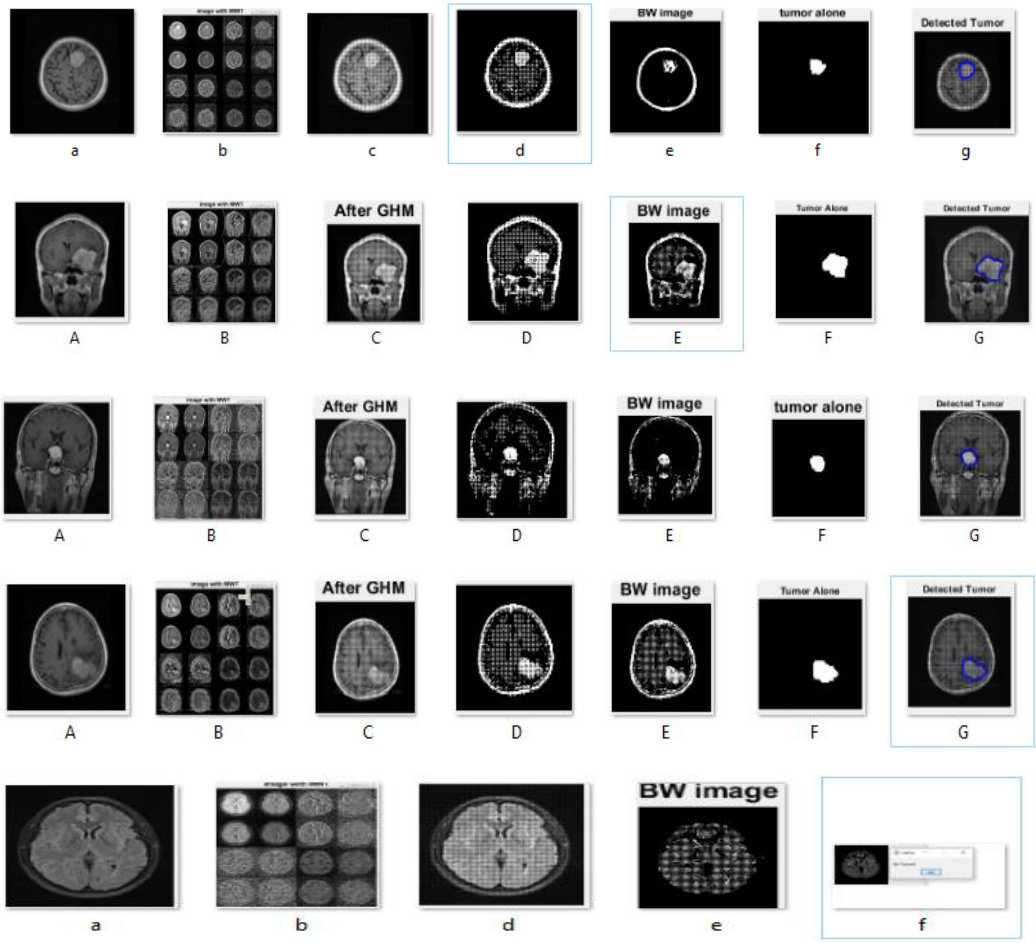
Pixel density is a metric telling us how many pixels there are in a fixed area of a display. It's a very important metric because it lets us know how closely packed the pixels on a display are. This is something that determines the quality, clarity, and readability of the image displayed. It is usually measured in a unit called pixels per inch (ppi).

$$pixel\ density = \frac{\sqrt{width^2 + lenght^2}}{screen\ size\ (diagonal)}$$

9- Using Find command :which is used for Find indices and values of nonzero elements .
10- Using Morphological structuring element
a- A strel object represents a flat morphological structuring element, which is an essential part of morphological dilation and erosion operations .
b- Morphological Dilation and Erosion

The most basic morphological operations are dilation and erosion. Dilation adds pixels to the boundaries of objects in an image, while erosion removes pixels on object boundaries. The number of pixels added or removed from the objects in an image depends on the size and shape of the structuring element used to process the image.

4- Results



Fig(5) Brain tumor detection stage

5- CONCLUSION

In this project Multi Wavelet Transform (MWT) used in preprocessing stage to enhance the input image and denoising . Thresholding based is used for segmentation methods, classification of brain tumor is done using Statistical Classification Methods to classify the input MRI of brain into normal or abnormal.

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Knowledge regarding children's immunization among sample of Iraqi Mothers

Assistant Lecturer Tabarek A. Noori (MSc)* &
Assistant Professor Khadija Shaban Hassan (MSc)**
Zaman Jabbar Abd Al-Saied ***

*Middle Technical Univ., College of Health & Medical Technology; email: tabarknoori94@gmail.com
** Middle Technical Univ., College of Health & Medical Technology; email: prof.almzory@gmail.com
** Middle Technical Univ., College of Health & Medical Technology

Abstract:

Background: Greatest than any medical interference; vaccination saved millions of children worldwide in the last decades.Vaccination: is the administration of vaccine (biological agents) to individuals (child, women, and any susceptible persons) in order to provoke (induce) body's immune system against any specific diseases.

Objectives: To determine prevalence of missed opportunities of routine vaccination, to identify reasons of missed opportunities of vaccination in children less than 5years and to maintain knowledge regarding importance of immunization among sample of Iraqi mothers.

Methods: A descriptive observational study conducted on 150 Iraqi mothers for a duration of three months from 24 November 2021 to 22 February 2022 in Baghdad city in the primary health care sector in Al-Sadr City for primary health care centers affiliated with the sector. Inclusion & Exclusion criteria: Mothers with children of age 5 years or below who attend to primary health care centers for the purpose of medical consultations during the study period and dropped out of vaccination were enrolled in the study. Mothers who did not cooperate for the interview, Children take steroid medication such as cortisone, children has received blood or any of its derivatives such as plasma, those receiving immunosuppressive drugs and treatment (chemical or radiotherapy)were excluded from the study.

Results: More than fifty percent of mothers were in the age group 26 years. Approximately (92.6%) of the mothers were completed primary and secondary education. 32.67% of mothers have no knowledge regarding purpose of vaccination. Moreover; 54% of mothers declared that they acquire information about immunization from relatives and friends. The association between educational level of mothers and reasons of missed opportunities of immunization was found to be statistically significant (p=0. 004). The relationship among mother's education and purpose of vaccination highly significant at (P-value= 0.004).

Conclusion: The greatest percentages of mothers in current study receive their information about child immunization from relatives and friends. Around one- third of them ignored immunization schedule. Significant association found among mother's educational levels and incomplete child's immunization as well as knowledge regarding purpose of immunization.

Key words: *MOI, knowledge, mothers, vaccine*

Introduction:

Greatest than any medical interference; vaccination saved millions of children worldwide in the last decades [1]. It is one of the most cost-effective, safest and easiest public health ways to fighting many communicable diseases and improve the people life [2, 3]. Vaccination: is the administration of vaccine (biological agents) to individuals (child, women, and any susceptible persons) in order to provoke (induce) body's immune system against any specific diseases [4, 5].

In Iraq, two type of vaccines available (live attenuated and inactivated vaccines) that they targeted serious diseases, namely (Hepatitis B, Tuberculosis, Poliomyelitis, Diphtheria, Pertussis, Tetanus, Measles, Mumps, Rubella, Haemophilus Influenzae and invasive pneumococcal disease (IPD)) [6] as shown in the following schedule:

The Iraqi immunization schedule currently used is as follows:

Vaccine	Dose	Age of child
HB vaccine	-	24 hours after birth
OPV	0 dose	1st week
BCG	-	
OPV	1	2 months
Pentavalent vaccine *	1	
Pneumococcal conjugate vaccine	1	
Rota virus	1	
OPV	2	4 months
Pentavalent vaccine	2	
IPV	1	
Pneumococcal conjugate vaccine	2	
Rota virus	2	
OPV	3	6 months
Pentavalent vaccine	3	
IPV	2	
Pneumococcal conjugate vaccine	3	
Rota virus	3	
Single measles		9 months
Vitamin A 100,000 IU		
MMR *	1	12months
OPV	1st booster	18 months
DPT	1st booster	
MMR	2	

Vitamin A 200,000 IU		
OPV	2nd booster	40-6 years
DPT	2nd booster	
Vitamin A 100,000 IU		

* BCG: Bacillus of Calmette and Guerin
*OPV: Oral Polio Vaccine
* Pentavalent vaccine: (Diphtheria, Pertussis, Tetanus, Hepatitis B vaccine, Haemophilus Influenzae)
* IPV: Injectable Polio Vaccine
* MMR: Measles, Mumps, Rubella
* DPT: Diphtheria, Pertussis, Tetanus

Nationally vaccines provided through "routine health systems (i.e. all types of vaccine) or supplementary immunization activities (SIAs)" (mainly for measles and poliomyelitis) [7]. The core aim of routine immunization is to provide fulfil doses immunization's schedule in that country through effective and right manner for all children against highly contagious deadly diseases. Therefore, if this programs are fully covered and goals achieved; the reduction of children's morbidity and mortality could be resulted [8]. Occasionally, additional doses of vaccination to increase coverage rate beyond routine levels are required this is carried out through Supplemental immunization activities (SIAs). This is intended to complete routine immunization but not substitute it. It gave to unimmunized, partially immunized or those never receive vaccines at all [9].

The coverage rates for immunizations is varied widely according to the kinds of vaccines and several other factors; the worldwide coverage rate in 2019 was 86% whereas in 2020 was 83% [10]; Iraqi coverage rate in 2013 was below national goal of 95% for all vaccines [11]. Missed opportunities of immunization (MOI) is defined as absence of vaccination in the absence of contraindication even though children contact health care services and are eligible to getting it, they does not receiving the vaccine doses for which he or she is eligible [12, 13]. Nonetheless, the issues for MOI are poorly understood [14] but thought to be as a result of multiple reasons (Parent's misinformation about vaccination, Lack of health facilities or vaccine availability, fear of side effects that associated with administration of vaccine)[15].

Parent's knowledge must be taken into consideration in particular the mothers; new parents must have knowledge of child's vaccinations during pregnancy or at least during 3rd trimester. They should have comprehensive perception about the vaccination schedule for children in their country [16]. Deficiencies in

immunization knoweldge schedule among parents often leads to missed opportunities of immunization or doses and time mistake that make child susceptible to harmful diseases [17].

Aims: To determine prevalence of missed opportunities of routine vaccination, to identify reasons of missed opportunities of vaccination in children less than 5years and to maintain knowledge regarding importance of immunization among sample of Iraqi mothers.

SUBJECTS & METHODS:

Study design: This was a descriptive observational study targeted 150 Iraqi mothers for a duration of three months from 24 November 2021 to 22 February 2022 in Baghdad city in the primary health care sector in Al-Sadr City for primary health care centers affiliated with the sector.

Ethical approval: Prior to data collection, the necessary approval and official permissions were obtained by the Ministry of Health and Environment/ Baghdad Rusafa Health Department/ Public Health Department/ Training and Development Department/ Primary Health Care Sector in Al-Sadr City and Primary Health care Centers (No. 3/11/2203, Dt 8/11/2021).

Inclusion & Exclusion criteria: After declaring the aims of research work clearly, an informed consent was taken from mothers who had shown their willingness to participate. Mothers with children of age 5 years or below who attend to primary health care centers for the purpose of medical consultations during the study period and dropped out of vaccination were enrolled in the study. Mothers who did not cooperate for the interview, Children take steroid medication such as cortisone, children has received blood or any of its derivatives such as plasma, those receiving immunosuppressive drugs and treatment (chemical or radiotherapy)were excluded from the study.

Data collection: Data was collected through interviewing mothers of cases using questionnaire consisted of multiple-choice and closed-ended questions related to immunization. First part contains demographic data such as (residence, mother's age, marital status, mother's educational level and occupation, number of rooms in the house, family member, number of children and type of house). Second part of questionnaire was about mother's knowledge about immunization process. Another parts include questions regarding (source of information and reasons of missed opportunity of vaccination.

Statistical analysis: in the current descriptive cross-sectional study (count and percentage) were used to describe the qualitative variables whereas (mean and standard deviation) used for quantitative variables. The association between variables obtained using Chi-square at significant level less than 0.05. Statistical analysis was performed using SPSS software version 24.

RESULT

Hundred fifty mothers were recruited in the present study, 58% of them were in the age group 26 years or above whereas 42% were within 25 years old or below. Most of them 84% were married while the remaining were widow and divorced (10%, 5.3%) respectively. Approximately (7.3%) of the mothers were completed graduation while the majority of them had primary and secondary education (92.6%). Concerning educational status of fathers; most of them 89 (59.3%) had primary education, 34 (22.7%) secondary education followed by 27(18%) were graduate. Hundred forty four (96%) mothers were housewife and 6 (4%) employee, on the other hand eighty (53.3%) of fathers were earner, around 70 (46.7%) of them were employee as shown in table (1).

Table (1): Socio-demographic characteristics of study sample.

		No.	%
Mothers Age	15-20yeas	19	12.7%
	21-25years	44	29.3%
	26-35years	64	42.7%
	36-45years	23	15.3%
Marital Status	Married	127	84.7%
	Widow	15	10.0%
	Divorced	8	5.3%
Mothers Education	Primary	80	53.3%
	Secondary	59	39.3%
	Graduate	11	7.3%
Fathers Education	Primary	89	59.3%
	Secondary	34	22.7%
	Graduate	27	18.0%
Mothers	Housewife	144	96.0%

Occupation	Employee Or Laborer	6	4.0%
Fathers Occupation	Earner	80	53.3%
	Employee Or Laborer	70	46.7%

Almost more than quarter of mothers 32.67% under study have no knowledge regarding purpose of vaccination, 38% thought that the immunization status necessary to prevent children from diseases, the remaining (17.33%, 12%) mention another advantages of immunization.

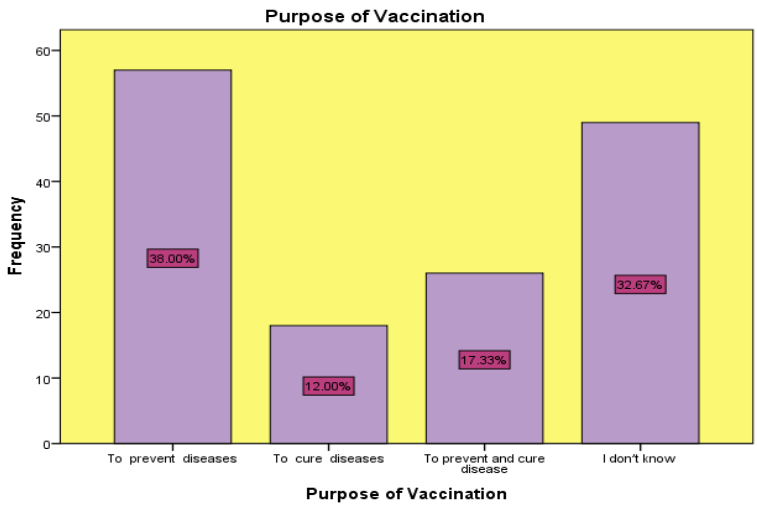

Figure (1): purpose of immunization among mothers.

Fifty four percent of mothers mentioned that they acquire information about immunization from relatives and friends, (0.67%) said that television was the main source of their vaccination's facts.

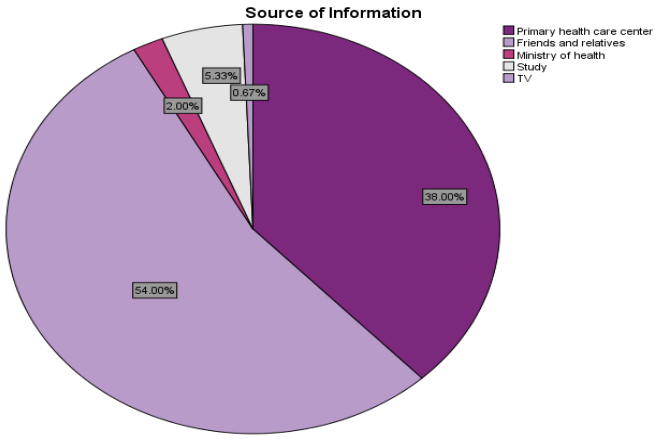

Figure (2): source of information regarding immunization.

There are several reasons for missed opportunities of immunization of children, a total of 51 (34%) mothers had ignored children's immunization schedule, 21 (14%) said that father not staying at home or the child exposed recently to infections. Moreover 16 (10.7%) of mothers lost immunization card. The 41(27.3%) of the studied sample mention different causes about incomplete immunization.

Table (2): Reasons for missed opportunities of immunization of studied sample

		No	%
Reasons for missed opportunities for	Immunization clinic closed	3	2.0
	Child too small to be brought for vaccine	5	3.3
	Lost immunization card	16	10.7
	Immunization not advised	3	2.0
	Ignored the immunization schedule	51	34.0
	Mid acute illness regardless of fever	4	2.7
	Convalescent's phase of illness	9	6.0
	Current antimicrobial therapy	12	8.0

immunization	Recent exposure to infection	21	14.0
	Father not staying at home	21	14.0
	Refusal by head of family	5	3.3

The association between educational level of mothers and reasons of missed opportunities of immunization was found to be statistically significant (p=0. 004), Highest percentage of mothers with primary and secondary education (43.8% & 27.1%) ignored immunization schedule of their children however the children missed immunization's opportunities. (27.3%) of graduated mothers don't complete child's immunization due to children's exposure to infection recently.

The relationship among mother's education and purpose of vaccination highly significant at (P-value= 0.004), the majority of mothers who don't complete their education (45%) don't know the purpose of immunization, while mothers with secondary and higher education thought that vaccination can prevent disease (39.0% and 63.6%) consequently.

Table (3): Association between mother's educational level and causes of missed opportunities of immunization and purpose of this process

		Mothers Education						P value
		Primary		Secondary		Graduate		
		No.	%	No.	%	No.	%	
Reasons For Missed Oppo	Immunization clinic closed	1	1.3	2	3.4	0	0.0	0.004**
	Child too small to be brought for vaccine	2	2.5	3	5.1	0	0.0	
	Lost immunization card	5	6.3	10	16.9	1	9.1	
	immunization not advised	3	3.8	0	0.0	0	0.0	
	Ignore immunization schedule	35	43.8	16	27.1	0	0.0	
	Mid acute illness regardless fever	1	1.3	1	1.7	2	18.2	
	Current antimicrobial	4	5.0	6	10.2	2	18.	

rtunit ies	therapy						2	
	Recent exposure of infection	6	7.5	12	20.3	3	27. 3	
	Convalescents phase of illness	5	6.3	2	3.4	2	18. 2	
	Father not staying at home	14	17.5	6	10.2	1	9.1	
	Refusal by head of family	4	5.0	1	1.7	0	0.0	
Purp ose of Vaccin ation	To prevent diseases	27	33.8	23	39.0	7	63. 6	0.00 4 **
	To cure diseases	8	10.0	10	16.9	0	0.0	
	To prevent & cure disease	9	11.3	13	22.0	4	36. 4	
	Don't know	36	45.0	13	22.0	0	0.0	

DISCCUSION:

The majority of mothers in present study 64 (42.7%) were within age group 26-35 years, married 127 (84.7%), had primary education 80 (53.3%) and housewife 144 (96.0%). Study conducted in America [18] and Nigeria [19] show the same percentage. As regard with mother's education; more than half of studied sample 53.3% had primary education, study in India [20] and Nigeria [19] show opposite results. This may be explained as in Iraq poverty level increased continuously that lead to female to leave school and got married [21].

More than fifty percent of present study obtained information about immunization from friends and relatives, 38% from PHCs, the lowest percentages (5%, 2% and 0.67%) from study, ministry of health and television respectively. Another study conducted in Georgia [22] and in USA [23] showed that the majority of mothers received their knowledge from medical workers (doctors and clinic nurses). As in these countries medical staff provide more educational message to the mothers, on the other hands the educational level of mothers might play important role.

Unawareness of immunization schedule lead to incomplete immunization process for around 34% of current study, whereas 14% were refused to bring their children to health care centers as they exposed to infections recently. Nearly same results concluded through study in Georgia in 2019 [24].

According to Centers for Disease Control and prevention recommendations; vaccines should be initiated at first day of life. Delay or mistakes in the immunization process related to several reasons particularly parent's knowledge [25]. The level of parental education is the most important factor related to immunization knowledge and practices of parents [26].

Mother's knowledge regarding child's immunization is poor in current study as 24% of mothers don't know that vaccines given at first day of life as compared with 1% in another country [27]; moreover they don't have enough knowledge about vaccines contraindications as the majority of mothers in present study have primary education and not receive information from right source i.e. Ministry of health.

Highest proportion of graduated mothers (63.3%) assumed that the main purpose of vaccination process is to prevent disease whereas (45%) don't know the advantages of immunization, the association highly significant statistically at P-value= 0.004. Study performed by Al-lela et al in 2014 [28], and by Tagbo et al 2012 [29] concluded that the majority of studied sample mention that purpose of vaccination process is to prevent disease particularly the major killer diseases. This differences as a results of dissimilarities between educational levels of mothers in these studies.

Conclusions:

- The greatest percentages of mothers in current study receive their information about child immunization from relatives and friends.
- Around one- third of them ignored immunization schedule.
- Significant association found among mother's educational levels and incomplete child's immunization as well as knowledge regarding purpose of immunization.

Recommendations:

- Iraqi ministry of health must direct efforts toward increasing mother's knowledge about importance of vaccination and appropriate time and dosage of vaccine, particularly for those about to get married.

- Mother's should be cautious from the sources of information regarding immunization that they receive from.

Limitation of the study:

1- Absence of director in many primary health care centers cause difficulty in obtaining official approval.
2- Some mothers refused to participate in the study particularly when her baby sick and can't stay extra time in health centers.

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Isolation of *Staphylococcus aureus* from gingivitis patients

***Tuqa.A.KareemHameed **Wasan Q.Turki *** Noor A.Hanon**

* Assistant lecturer of Department of medical laboratory tech, Al-Mustafa University College.

** Assistant lecturer of Department of medical laboratory tech, Al-Mustafa University College.

***Assistant lecturer of Department of medical laboratory tech, Al-Mustafa University College

Corresponding Author: Tuqa A. Kareem Hameed

Email: tuqa.ma@almustafauniversity.edu.iq

wasan.turki@almustafauniversity.edu.iq

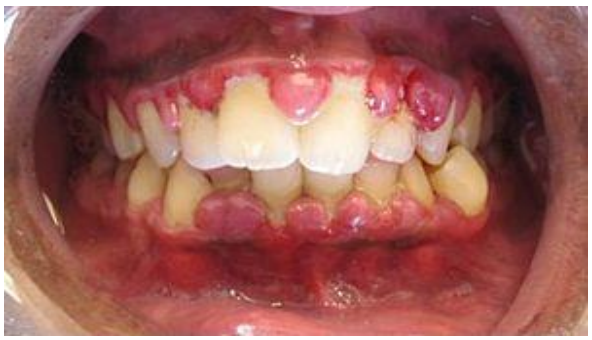
noor.hanon@almustafauniversity.edu.iq

Abstract

(50) swabs were collected during the period October 2017 to January 2018 collect from patients in dentist clinics in Baghdad (Ahmed Majeed dental clinic, Meem dental clinic, Omer Nabil dental clinic, Rusul Ahmed Alahmed othro dental clinic, Ehab Ali dental clinic, Mustanseria local health center). Specimens were taken from mouth parts (teeth, gingivitis) with normal swabs and gel swabs, these samples were processed in the laboratory within 30min of collection. The results of bacteriological media by using blood agar and mannitol agar for the isolation and primary identification of bacterial growth showed (positive culture) to 5 of samples. Biochemical and morphological characterization tests showed that (2) isolates were identified as *Staphylococcus aureus* and (3) isolates as *Streptococcus spp*. All bacteria isolated in this study were identified by identified by an automatic identification system, Vitek-2.

Introduction

Gum are pinkish brown coloured soft tissue holding the teeth in bony sockets by adhering them firmly through periodontal ligaments to periosteum. Gums are called basically gingival and their inflammatory diseases are called gingivitis in general. Gum disease is an infection of the gum tissue that surrounds and supports the teeth (1). Gingivitis Occurs mainly due to plaque accumulation and factors responsible for plaque formation and propagation are poor dental and oral hygiene. It is early and reversible disease. In this disease gum become red, swollen and bleed easily while provocation like touching, brushing or sometimes even spontaneous dental/gum bleeding happens (2).



A severe case of gingivitis (1)

The oral cavity contains some of the most varied and vast flora in the entire human body and is the main entrance for two systems vital to human function and physiology, the gastrointestinal and respiratory systems. Several diseases involve these two systems and manifest in the oral cavity. In addition, a specific pathologic condition, such as periodontitis (ie, inflammation of the periodontal attachment of the teeth and the alveolar bone), may be present in the oral cavity. These specific conditions in the oral cavity may create foci of infection that can affect many other vital systems, such as the cardiovascular and renal systems. Foci of infection in the oral cavity arising from chronic periodontitis or chronic periapical abscesses (ie, inflammation and ab The bacteria include hundreds of types of organisms of which only "22 predominant ones have been identified." A variety of organisms in the microenvironment of the oral cavity adhere to abscesses (of the tissue attached to the apex of the root) may lead to subacute bacterial endocarditis and glomerulonephritis the gingival sulcus, the tongue, and the buccal mucosa (3). Each site has a unique way of allowing the organisms to establish their residency. The normal flora in healthy individuals maintains similar patterns. When a local or systemic disease process or concomitant use of medications alters this overall pattern, atypical organisms begin to predominate and some normal organisms with a benign nature, such as *Candida albicans*, become pathogenic (4) The microenvironment of the oral cavity changes with the age of the patient, the eruption or loss of teeth, and the appearance of disease states (eg, caries, periodontal disease). Systemic changes, such as pregnancy or drug intake, also alter the number and proportion of flora (5). 700 different strains of bacteria have been detected in the human mouth, though most people are only host to 34 to 72 different varieties. Most of these bacterial species appear to be harmless when it comes to our health. Anaerobic bacteria in the oral cavity include: *Actinomyces,Arachnia,Bacteroides,Bifidobacterium,Fusobacterium,Lactobacillus, Leptotrichia,Peptococcus,Peptostrepccus ,Propionibact erium, Selenomonas, Treponema, and Veillonella* (6).The species of Staphylococcus most often found in the mouth include *Staphylococcus epidermidis* and *Staphylococcus aureus*. These bacteria have a thick cell wall, known as gram-positive, and are oval in shape These organisms are opportunistic pathogens, and can cause infection in humans, given the optimal set of circumstances. An illness in another part of the body may cause reduced immune function, resulting in a secondary infection from *Staphylococcus*. (7*)*

Material and methods

Specimens

Fifty swabs were collected during the period October 2017 to January 2018 collect from patients in dentist clinics in Baghdad, (Ahmed Majeed dental clinic, Meem dental clinic, Omer Nabil dental clinic, Rusul Ahmed Alahmed othro dental clinic, Ehab Ali dental clinic, Mustanseria local health center.

Specimens were taken from mouth parts (teeth, gingivitis) with normal swabs and gel swabs, these samples were processed in the laboratory within 30min of collection.

Isolation and Identification

All collected samples were inoculated on blood agar and Mannitol salt agar as mention incubate at 37C for 24 hours. All isolates were obtained using the procedure described by Mandell *et al.* [10]. Biochemical assays were carried out such as: Catalase production, Growth at 45ºC, Growth in NaCl 7-9%, Coagulase production, Haemolysis patterns on blood agar Bacterial. identification confirmed also according to workers by microscopic examination.
The biochemical tests were performed by using Vitec-2 system (bioMérieux) in Al-Kenday Hospital laboratory for identification of the isolates.

Results and Discussion

More than fifty samples collected from a lot of dentist clinics in Baghdad, the samples were included mouth swab (teeth and gingivitis). (2) specimens were collected as Staphylococcus aureus isolates that on Mannitol Salt Agar appear as yellow colonies because staphylococcus aureus is lactose fermenter salt agar which considered the selective and differential medium for genus *Staphylococcus*, the colonies of staphylococcus aureus appeared round, smooth, raised and glistening surface. microscopic examination was applied to (2) isolates after staining by gram stain and the cells appeared as Gram positive cocci arranged in grape-like irregular clusters.

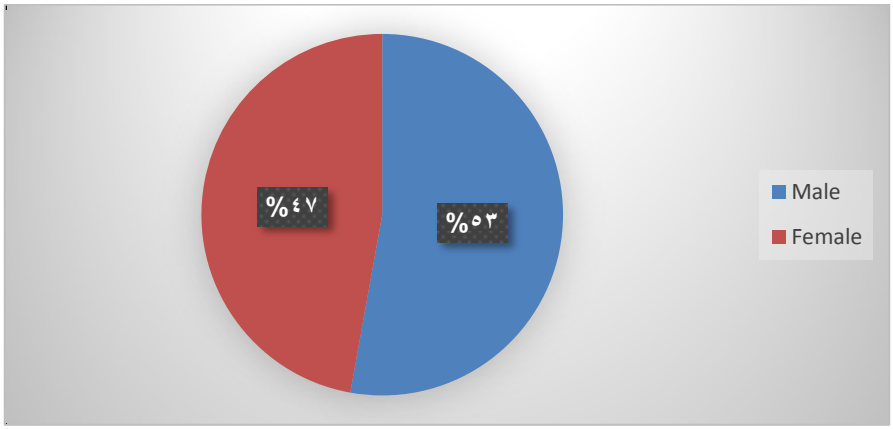


Figure (1) prevalence of gingivitis in Male/Female among positive patients

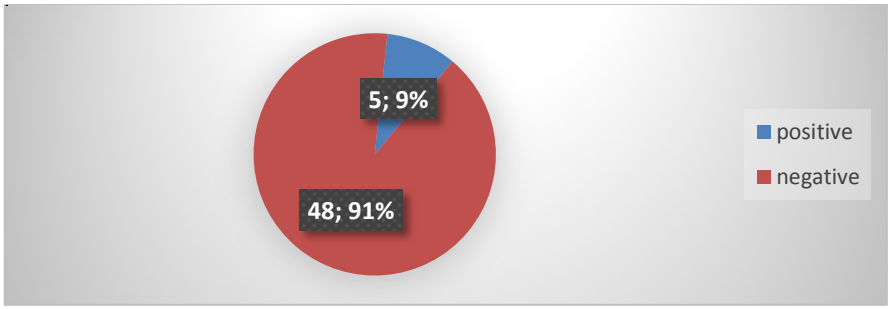


Figure (2) Percentage of infected patients among the studied samples.

Figure (3) *Staphylococcus aureus* growth on Mannitol salt agar after 24 h

(4) isolation have the ability to grow on blood agar, after doing gram stain under microscope its appear as, cocci in clusters, short chains, diplococci and single cocci. the colonies of streptococcus appeared as cocci nonmotile, non-spore forming, catalase negative, oxidase negative, facultative anaerobic.

Untreated intraoral diseases as gingivitis and periodontitis can ultimately progress to, in response to bacterial accumulation, serious problems ranging from teeth loosening reaching to even systemic diseases. Moreover, growing prevalence of these inflammatory conditions (from one hand and of microbial resistance to Gingivitis is a superficial inflammation of the soft tissues surrounding the teeth capable of being reversed. It is started only post a few period of insufficient oral hygiene via local plaque often of bacterial deposits close to the highly vascularized tissues of gingival. The results appeared that *S. aureus* (2), *Streptococcus spp*.(4) were major pathogens associated with gingivitis oral infection , This finding is in agreement with studies carried out by (1 and 10) who found that *Streptococcus mutans* can creating favorable condition to adherence of opportunistic pathogens such as S. aureus to the surface of teeth. Moreover, primary colonizer such as *Streptococcus spp* and *Lactobacillus spp* able to prepare a favorable environment for secondary colonizer (8).

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The Effect of Galangin and β-Cyclodextrin Combination on Blood Glucose Level of Mice

Zainab S. Abbas, Ghassan M. Sulaiman, Majid S. Jabir

as.18.25@grad.uotechnology.edu.iq

Division of Biotechnology, Department of Applied Science, University of Technology, Baghdad, Iraq

Introduction

Flavonoids are plentiful in fruits, vegetables, cereals, and traditional medicinal plants [1]. Flavonoids are polyphenolic chemicals that may be found in a variety of plant-based diets. Humans eating a high-fruit and vegetable diet are thought to consume up to 1 g of these chemicals each day [2,3]. Galangin (3,5,7-trihydroxyflavone) is a flavonoid that is natural ingredients [4] Galangin is a perennial ginger family plant. Galangin has been traditionally used for many years to treat several different diseases including cold, pain, inflammation, stomach ache, and microbial infection, and it also works as an antioxidant and anticancer agent [5]. Galangin has biological properties such as metabolic enzyme regulating [6]. Nanomedicine includes a large number of drug delivery nano systems [7]. Nanostructures can protect pain pills encapsulated within them from hydrolytic and related enzymes in the digestive tract, target the transmission of a wide variety of drugs to various parts of the body for extended release, and thus deliver drugs, peptides, and genetic makeup via the peroral treatment [8, 9]. cyclodextrins are utilized as medicinal excipients, primarily as solubilizing and absorbents for lipophilic compounds [10]. The development of an inclusion complex solubilizes a variety of molecules in cyclodextrin solutions. The functional properties of pharmacological molecules are also known to be affected by cyclodextrins [11]. The outside surface of cyclodextrin molecules is hydrophilic, whereas the interior cavity is less polar. Because a compound's photochemistry behavior is heavily influenced by its surroundings (for example, polarity), interactions with macromolecules in a pharmaceutical formulation might modify a drug's engagement and boost. The addition of a complexing agent (e.g., cyclodextrins) to a solution might therefore result in a significant change in product high stability [12]. The purpose of the study was to prove the safety effect of gala/β-CD inclusion complex on animal model.

Materials and methods

Experimental animals

Swiss albino male mice weighing 19 - 25 gm, obtained from the animal house facility, by Iraqi Center for Cancer and Medical Genetic Researches, Mustansiriyah University, Baghdad, Iraq, were maintained. The animals were kept in an air-conditioned room at 25 ± 1°C and exposed to a 12-hour light–dark cycle.

The institutional Research Ethics Committee approved the experimental procedure and animal care (Approval by Animal Care and Ethics Committee at Biotechnology Division, Applied Sciences Department, University of Technology, Baghdad, Iraq) as per the Guidelines of U.S. National Institutes of Health (NIH) Guide for the Care and Use of Laboratory Animals (NIH Publication No. 86–23, revised in 1996).

Drug and chemicals

Galangin (gala), β-Cyclodextrin (β-CD) were purchased from Biotech Co., China.

Characterization of gala/β-CD

Atomic Force Microscopy (AFM) was construed using (DME DS 95, Germany). To describe the molecule size and morphology of the conjugate gala/β-CD.

Experimental design

A total of 15 mice were divided in three groups (five animals per group), Group I: Normal untreated mice, Group II: gala/β-CD (20 mg/kg), and Group III: gala/β-CD (640 mg /kg). At the end of the treatment period, the blood was collected in tube for the separation of serum and the glucose was carried out.

Statistical analysis

SPSS statistical software (Version/18.0; SPSS Inc., Chicago, IL) was used to analyze the submitted data. The analysis of variance (ANOVA) was used to see if there were any substantial differences between both the study means. A 0.05 p-value was tested for significance.

Results and Discussion

Atomic force microscopy (AFM)

The AFM was used to assess the shape and homogeneity of the gala/β-CD in a three-dimensional sample surface. The modified gala/β-CD indicated that the majority of nanoparticles have flat surfaces and a much more depend on the shape layout with the diameter 11.7 nm as shown in Figure1. Nanoparticles are located

on rough substrates, in some cases forming self-organized structures or even several layers. Nanoparticles are combined with three standard AFM tip shapes to tackle diverse tip dispersion effects [13]. The measurand in this situation is an equal diameter that corresponds to the diameter of a spherical NP with the same attribute as the measured NP [14].

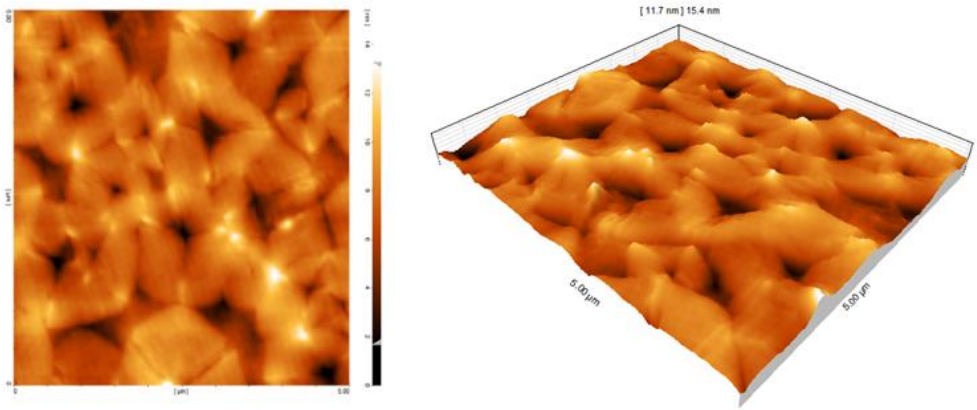

Figure 1: Atomic force microscopy (AFM) in 2D and 3D shape by area (5×5) µm.

Effect of gala/β-CD on serum glucose of mice

As shown in figure 2, there are two different concentrations 20 mg/kg and 640 mg /kg of gala/β-CD were given orally to mice. The results are displayed non-significant reduction ($P \leq 0.05$) compared to control untreated group. Examination the effect of gala/β-CD on blood glucose to indicate the safety of mechanism level of drug on mice. The combination of gala/β-CD has improved best glucose homeostasis, because the control of glycogen metabolism occurs by phosphorylation and dephosphorylation of both glycogen phosphorylase and glycogen synthase catalysed by various protein kinases and protein phosphatases. The hormonal effect is to stimulate glycogenolysis by the intermediary of cyclic AMP, which activates directly or indirectly the protein kinases. The glucose effect is to activate the protein phosphatase system; this occurs by the direct binding of glucose to glycogen phosphorylase which is then a better substrate for phosphorylase phosphatase and is inactivated. Since phosphorylase a is a strong inhibitor of synthase phosphatase, its disappearance allows the activation of glycogen synthase and the initiation of glycogen synthesis [15]. Glycolysis, a

simple pathway of glucose metabolism, critically regulates insulin secretion and metabolic functions of various cells. Depending on cell types, rates of glycolysis are determined at various steps of glycolysis that are subjected to the control of key metabolic and regulatory enzyme(s), which include glucokinase, 6-phosphofructo-1-kinase, and 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase. These enzymes are regulated by both nutritional and hormonal signals at the levels of transcription, translation, and post-translational modifications. In hepatocytes, glycolysis is involved in the control of hepatic glucose production. The latter, when excessive, contributes to hyperglycemia in diabetes. In pancreatic b cells, glycolysis couples' glucose-stimulated insulin secretion [16]. All this action occurs in liver, the finding observed safety on mechanism level of gala/β-CD in liver.

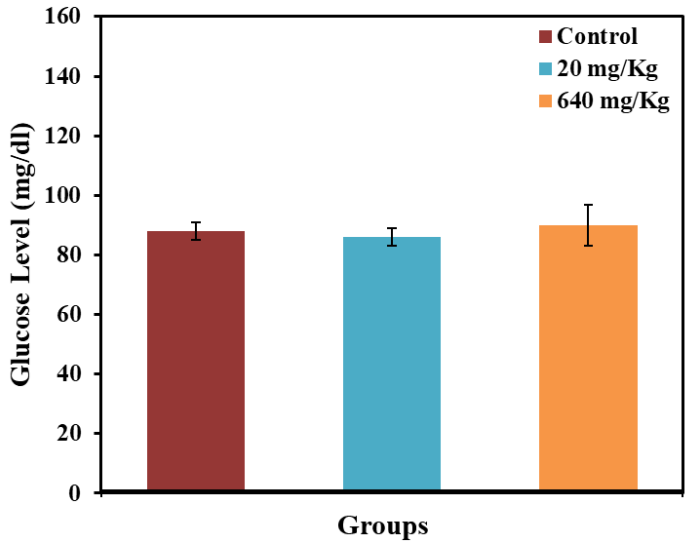

Figure 2: The effect of gala/β-CD on glucose level in mice blood. Data are mean ± SEM. *P< 0.05 compared to the control group.

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The rational for referring hydronephrosis paediatric cases to renal scintigraphy: A comparative study between ultrasonography and MAG-3 screening among Iraqi patients

Rasha Saad Aldoury[2], Sarah Ahmed Khalid[3] Ali Yousif Nori[1]*,

1 Department of Pharmacy, Al Mustafa Private University College, Baghdad, Iraq.

2 Radiology Techniques Department- Al Salam University College.

3 College of Pharmacy, University of Baghdad, Baghdad, Iraq.

@ ali.yousif.pharm@almustafauniversity.edu.iq

Abstract:

Hydronephrosis describes a urinary tract abnormality where hydrostatic dilatation of the renal pelvis and calyces exists and considered as a hallmark for obstruction to urine flow downstream. Detecting the pathologic hydronephrosis cases along with the cause using the least invasive techniques is a matter of interest since ages especially in pediatric community. In the Iraqi healthcare practice, many cases are referred for advanced urology imaging tests without clear rational. This study aims to evaluate the rational of referring hydronephrosis pediatric cases to renal scintigraphy studies by comparing the results with the ultrasonography using particular parameters. A cross-sectional observational study involved prospective measurement of a number of variables via two main radiology techniques; sonography and scintigraphy was carried on in Baghdad, Iraq. Classical US and dynamic renal MAG-3 were performed on the same day for each of 35 children aged between 1-5 years presumed or suspected to have obstructive type of hydronephrosis by earlier US work-up. Results revealed a clear statistical significance between normal differential renal function and the good quality of renal drainage of Mag-3 test with the undilated PCS category (p-value 0.028) when measured by our team using the sonography technique. Other results of the calyceal dimension (CD) and the parenchymal thickness (PT) have failed to obtain a statistical significant difference when compared with the categories of the three variables of MAG-3. This study supports the inference of assessing renal function based on sensitive parameters of evolutionary sonography. Each radiologist / nephrologist / urologist should evaluate the measurement of reliable parameters of sonography especially the anteroposterior diameter of the pelvicalyceal system (APD of PCS) at the hilum area and the parenchymal thickness (PT) in millimeters and set the pediatric patient for logical follow-up before recommending the dynamic scintigraphy tests.

Keywords:

Hydronephrosis, pediatrics, ultrasonography, scintigraphy, pelvicalyceal system.

Introduction:

Imaging studies play an important role in the diagnosis of urinary tract diseases especially among paediatric patients due to its non-invasive ease of access. One of the mostly diagnosed urinary tract conditions in antenatal or postnatal infants is the hydronephrosis (Capolicchio, Braga et al. 2018). Hydronephrosis describes a urinary tract abnormality where hydrostatic dilatation of the renal pelvis and calyces exists and considered as a hallmark for obstruction to urine flow downstream (Kohno, Ogawa et al. 2020). Prenatal hydronephrosis is found in approximately 1 – 5% of all pregnancies, some of the cases are transient and self-reversible while others are pathologic ones (Nguyen, Herndon et al. 2010). According to some literature, pelviureteric junction (PUJ) obstruction is the most common cause for the condition among children (Capolicchio, Braga et al. 2018). Other widely accepted etiologies are vesicoureteral reflux, ureterovesical junction obstruction, and urethral stricture or stenosis due to involvement of posterior urethral valve. However, more than half of cases share more than one anomaly (Karnak, Woo et al. 2008). When the obstructive-type of hydronephrosis is kept untreated, it may trigger clinical symptoms such as urinary tract infections, hematuria, impaired renal function, and permanent kidney failure (Thorup, Jokela et al. 2003).

On the other hand, the most common cause of hydronephrosis in young adults is the urolithiasis. In older adults, the condition is mostly due to benign prostate hyperplasia (BPH) or intrapelvic neoplasms such as prostate cancer (Frizzell 2016).

Imaging workup involves frequent techniques beyond the first-line test which is the renal ultrasonography to visualize the dilated hydroureteronephrosis. However, detecting the grade (severity) and cause of potential obstruction is not usually sensitive with sonography. Each further type of examination has special advantages and disadvantages resulting in a preoperative multimodality workup.

Many methods and techniques are available to diagnose the etiology of hydronephrosis. Among many, ultrasonography is the first-line and has the preliminary picture. However, color doppler can be helpful if a crossing vessel causes the PUJ obstruction. Contrast enhanced ultrasound (US), elastography, and 3D US are a new techniques introduced to be very helpful in knowing much more

details about the urinary tract diseases without risk of radiation (Viteri, Calle-Toro et al. 2020).

The fluoroscopy methods are utilized with x-ray based imaging to visualize the function of the urinary system and can be either antegrade or retrograde pyelography. They involve the intravenous urogram / intravenous urography (IVU), the intravenous pyelography (IVP), and the voiding cystourethrogram / voiding cystourethrography (VCUG) which can be also referred to as the 'micturation cystourethrography (MCUG). These test studies are useful to exclude the possibility of vesicoureteral reflux or the posterior urethral valve etiologies (Ucar and Kurugoglu 2020).

The computed tomography (CT) urography is another imaging test that uses ionizing radiation by the aid of a radiopaque contrast agent to evaluate the urinary passages when there is suspicion of renal stones that are not visible in classical x-rays. This, in turn, has the advantage of showing whether there is an obstruction (especially when it is caused by aberrant renal vessel) as well as demonstrating the function of the other kidney when the case is unilateral (He, Luo et al. 2018).

The static and dynamic renal scintigraphy [also called 'isotope renography'; 'isotope renogram' or 'isotope nephrography (ING)'] has been practiced by making the use of a radiotracer (also called radionuclide; radioisotope; nuclear imaging agent; or radiopharmaceutical) to visualize the anatomy and the physiology of the urinary tract. They involve using the metastable nuclear isomer of technetium-99 (99mTc) chelation with mercaptoacetyltriglycine (MAG-3), or diethylenetriaminepentaacetic acid (DTPA), or hipuran or iodine-123 orthoiodohippurate (OlH), or dimercaptosuccinic (DMSA) compounds to identify the causes of stenosis / obstruction of the renal tract and any potential loss of kidney function (Dhull, Joshi et al. 2018, Banks, Farrell et al. 2021).

Lastly, the magnetic resonance urography (MRU) imaging technique has been widely introduced as an alternative to the fluoroscopy methods due to its potential for simultaneous visualization of the entire urinary tract and renal parenchyma without exposure to ionizing radiation (Damasio, Bodria et al. 2020).

Problem statement & aim:

In the Iraqi healthcare practice, many cases are referred for advanced urology imaging tests without clear rational. Internationally, the economic burden and risks of exposure to the radiation or to the contrast agents when there is sub-optimal need is an alarming matter (Błaszczyk, Cichocki et al. 2018) especially in the developing countries (Botros and Ali 2018). Although the renal sonography is sometimes invaluable in detecting causes of hydronephrosis in high sensitivity, ultrasonography is helpful in the clinical decision and timing of referral of cases that really require further functional investigation. This study aims to evaluate the rational of referring hydronephrosis pediatric cases to renal scintigraphy studies by comparing the results with the ultrasonography.

Material and method:

This cross-sectional observational study involved prospective measurement of a number of variables via two main radiology techniques; sonography and scintigraphy. Classical US and dynamic renal MAG-3 were performed on the same day for each of 35 children aged between 1-5 years presumed or suspected to have obstructive type of hydronephrosis by earlier US work-up. The inclusion criteria for case enrolments were having a unilateral significant hydronephrosis diagnosis referred to the radiology clinic for MAG-3 assessment in Baghdad, Iraq.

If the case contained information about a previous diagnosis with proper documentation of vesico-ureteral reflux; horse shoe kidney; renal agenesis, posterior urethral valve; or previous renal surgery, it was ruled-out to focus on the obstructive phenotype of hydronephrosis.

Ethical approval was sought throughout applying to the Ministerial Ethical Committee to conduct the study and have the proper ethics agreement. Each parent or care giver had signed a consent form that contained full information about the extra study test (the sonography) before setting out the MAG-3 test. The venue of the study was in two professional radiology non-governmental clinics which accommodated referred MAG-3 cases. The two institutes were licenced and specialised for advanced imaging evaluation in Baghdad, Iraq. The sonography assessment and reports were performed and written by the research team while the MAG-3 evaluation was done by the institute's staff.

US was performed pre and post voiding and particularly after 10 minutes of emptying the bladder. All kidney assessments were taken place in an anterolateral scan in a supine position of the child to have transverse renal plane and optimal view. Features of the urinary retention in the pelvicalyceal system (PCS) were assessed by measuring the antero-posterior diameter (APD) of the renal pelvis at the hilum; the parenchymal thickness (PT) and the calyceal dimension (CD) in millimetres.

The PCS was tabulated based on the APD as 'not dilated PCS' versus 'dilated PCS' with a cutoff more than 14 mm to be dilated (Li, McGrath et al. 2020). PT was also tabulated as 'normal' versus 'significantly decreased' if the measurement was less than 10 mm to be significantly decreased (Kadioglu 2010). Calyceal dimension was tabulated as 'not dilated CD' versus 'dilated CD' if the measurement was less than 6 mm to be considered as not dilated (Duong, Piepsz et al. 2015).

MAG3 was performed according to the protocol tubular secretion and furosemide challenge. Patients were given 10–20 mL/Kg of water orally 30–40 min before the test; i.e., there was a minimum duration of 30 minutes between performing the post-void US and the MAG3 studies. The test required an intravenous (IV) injection of 12 µci/kg Technetium-99m MAG3 tracer with a minimum activity of 150 µci (Sivakumar, Indiran et al. 2018). A large field of view gamma camera equipped with a low energy all-purpose collimator was used. The window was placed over the photo peak of the tracer and was opened by 20%. A 128 x 128 image matrix was used. Data were collected in 12-second time frames. The scintigraphic examination lasted 40 minutes and furosemide was administered along with the tracer. Differential renal function (DRF) was calculated using the number of counts in each kidney during the same time interval of 1 – 2 min after background correction using a one-pixel perirenal area. DFR was considered abnormal if it was <45% and normal if it was ≥45%.

The quality of renal drainage (QRD) was evaluated on the basis of the entire renogram, including the residual post-micturition activity. QRD was described as poor when the persistence of high renal activity on the postmicturition with normalized residual activity was more than 2 or as good when almost complete renal emptying and normalized residual activity postmicturition was less than 2. The activity and the half-life (T ½) of renal signal decay (RSD) after furosemide

administration of each kidney was categorized as being normal (T ½ of less than 11 minutes) or abnormal (T ½ more than 10 minutes).

Results:

The median age of the sample was two years and four months with mean kidney length 8.2 millimetres and 3.5 width based on our readings. Majority of cases (32 out of 35) were lacking documented measurements of PCS and PT while more than two thirds (24 case) were without APD measurements using US though they were referred to the MAG-3 test. According to our US measurement, 21(±10.3) mm was the mean APD of the PCS. There was not a prominent difference between the measurements of APD between pre and post void exceeding 2 millimetres in only 3 cases. Therefore, all the statistical tests were done for the pre-void readings.

The statistics were performed using the statistical package of social sciences software (SPSS) version 24. Cross-tabulation was done for descriptive statistics and the Fisher-exact test of chi-square test ($\chi 2$) was done for categorical data. Correlations between continuous data were tested using Pearson's test for normally distributed data and Spearman's test for not normal. P-value was considered as significant if it was less than 0.05.

The correlation between age and APD of PCS was negatively related to each other (-.068) though it was not significant. Results revealed a clear statistical significance between normal differential renal function and the good quality of renal drainage of Mag-3 test with the undilated PCS category (p-value 0.028) when measured by our team using the sonography technique. Other results of the calyceal dimension (CD) and the parenchymal thickness (PT) have failed to obtain a statistical significant difference when compared with the categories of the three variables of MAG-3 (table 2).

Table 01: Characteristics of the study sample (n=35)

Variable	**Groups per variable**	**No. (%)**	**Mean ± (SD) /Median (IR)**	**Min. – Max.**
Age			2.3 (0.52)	0.3 – 4.8
Age	0 – 1 year	7 (20%)		
	> 1 – 2 years	9 (25.7%)		
	> 2 – 3 years	11 (31.4%)		
	> 3 – 4 years	6 (17.1%)		
	4 – 5 years	2 (5.7%)		
Race	Arabic	26 (74.2%)		
	Kurdish	7 (20.1%)		
	Turkmen or others	2 (5.7%)		
Previous APD measurement	Measured	11 (31.4%)		
	Unmeasured	24 (86.6%)		
US / APD			21 8 – 36	(10.3)
US / APD	< 10 mm (normal)	13 (37.3%)		
	10 – 15 mm (mild HN)	17 (48.5%)		
	15 – 20 mm (mild-moderate)	3 (8.5%)		
		2 (5.7%)		

	> 20 mm (moderate-severe)			
US / PCS	< 15 mm (not-dilated PCS)	22 (62.8%)		
	≥ 15 mm (dilated PCS)	13 (37.2%)		
US / PT	≥ 10 mm (normal) (74.3%)	26		
	< 10 mm (significantly decreased) (25.7%)	9		
US / CD	< 6 (not dilated CD)	25 (71.4%)		
	≥ 6 (dilated CD)	10 (28.6%)		
US / kidney length			8.2 (1.5)	3.9 – 9
US / kidney width			3.5	(0.6) 2.2 – 4.1
MAG3 / DFR	≥ 45% (normal)	29 (82.9%)		
	< 45% (abnormal)	6 (17.1%)		
MAG3 / QRD	< 2 (good)	31 (88.6%)		
	> 2 (poor)	4 (11.4%)		
MAG3 / T½ RSD	< 11 minutes (normal)	30 (85.7%)		
	> 10 minutes (abnormal)	5 (14.3%)		

APD = anteroposterior diameter; **CD** = calyceal dimension; **DRF** = differential renal dilatation; **MAG-3** = ^{99m}Tc chelation with mercaptoacetyltriglycine; **PCS** = pelvicalyceal system; **PT** = parenchymal thickness; **QRD** = quality of renal drainage; **RSD** = renal signal decay.

Table 02: Pelvicalyceal dilatation using APD in ultrasound versus normal or good renal function or drainage using MAG-3 (n=35)

Variable	No of US / PCS dilatation cases (%)		P-value*
	< 15 mm (not-dilated PCS)	**≥ 15 mm (dilated PCS)**	
MAG3 / DFR			
≥ 45% (normal)	22	7	0.028
< 45% (abnormal)	1	5	
MAG3 / QRD			
< 2 (good)	28	3	0.048
> 2 (poor)	0	4	
MAG3 / T½ RSD			
< 11 minutes (normal)	29	1	0.067
> 10 minutes (abnormal)	2	3	

* 1-sided Fisher-exact test of $\chi 2$

Figure 1: Measurement of APD of PCS, parenchymal thickness (PT), and calyceal dimension (CD) using sonography imaging

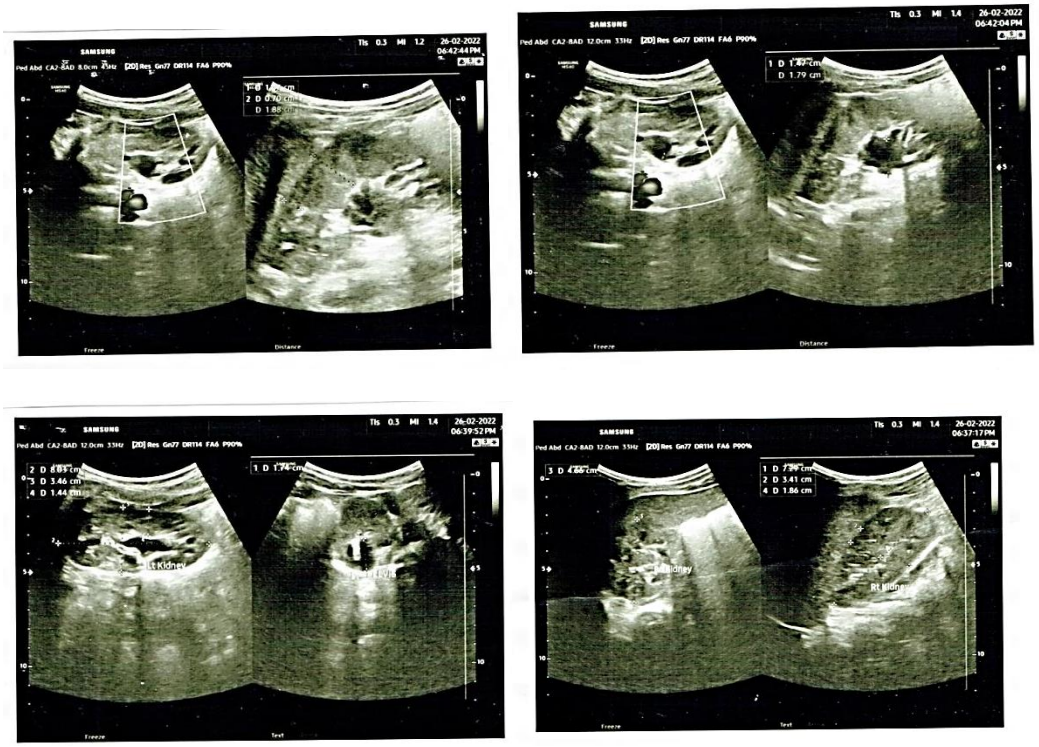
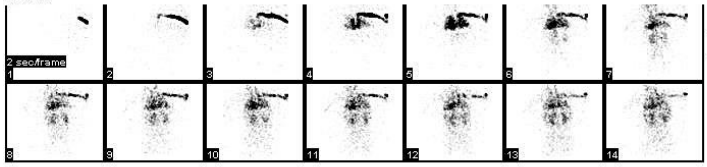


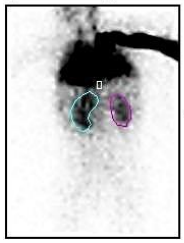
Figure 2: Measurement of DFR, QRD, and T½ of renal signal decay using dynamic MAG-3 scintegraphy scan

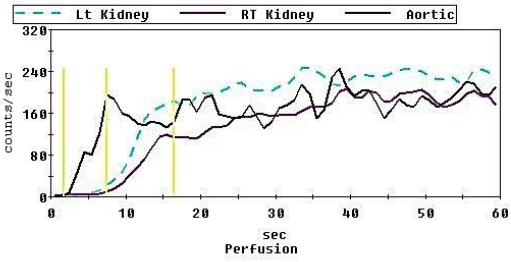
MAG3



Gates GFR
Age:2.2 Years
Height:(cm): 85.
Weight:(kg): 12.
Pediatric state: Yes
Radiopharmaceutical:
Diuretic: Yes
Diuretic dose (mg): 12.
Diuretic time (min): 5.
BSA (m^2): .52

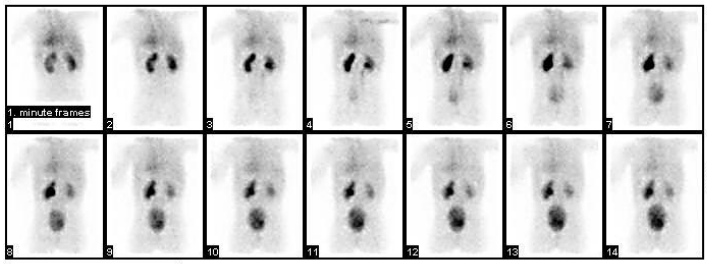
GFR ml/min: 86.77



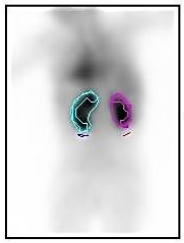


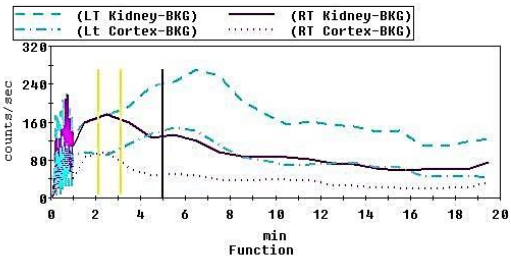
Perfusion 0-30s

Kidney	Left	Right
Kidney Area (cm^2):	28.04	22.52
Kidney depth (cm):	3.19	3.19
Perfusion% (Int):	63.27	36.73
Perfusion% (Slo):	56.36	43.64
Uptake% (Int):	50.83	49.17
GFR:	44.11	42.66
Time to peak:	6.38	2.38
Peak to 1/2 peak:	10.	6.
20min/peak ratio:	.17	.15
20min/3min ratio:	.26	.16
Diuretic T1/2:	10.	6.

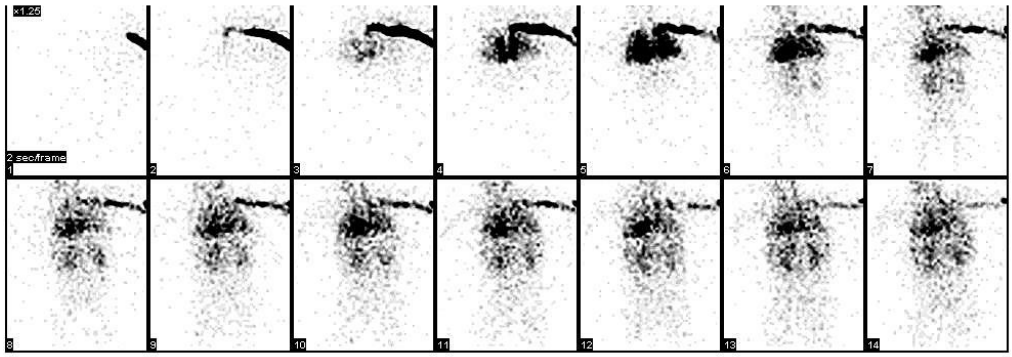


Cortex		
Time to peak:	5.38	2.38
Peak to 1/2 peak:	5.	2.
20min/peak ratio:	.11	.12
20min/3min ratio:	.17	.13
Diuretic T1/2:	5.	2.

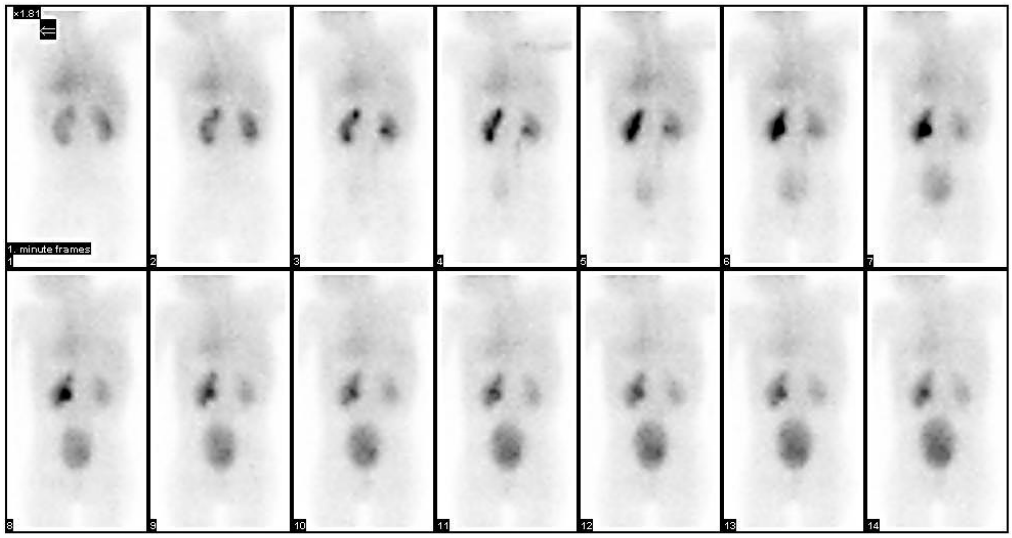




Uptake Interval



2 sec/Frame Perfusion Image



1 min/Frame Function Image

Discussion:

The detection of the cause of presumed hydronephrosis is one of the main controversies in paediatric urology. The debate is how to carefully detect and send for sensitive further rational objective evaluation. A plethora of children are subjected to invasive scans involving ionizing radiation and radioisotope exposure during cumbersome procedures that involve intravenous insertion and urethral catheterization where they indeed do not require those tests at least not in the accurate timing (Erdman, Skreta et al. 2020). Therefore, a reduction in functional renograms would result in cost savings to the patient and health system as well as a reduction in harmful exposures to young patients.

Having any patient with hydronephrosis previously detected incidentally or prenatally prepared for MAG-3 test was the main inclusion criterion because we thought that there are a lot of irrational or false positive results in ultrasonography especially among young children. Many international guidelines have underlined various pitfalls in the evaluation of sensitive parameters when considering the referral for the MAG-3 scintigraphy. DRF represents one of the highly reliable parameters for further evaluation of a follow-up hydronephrosis pediatric case (Tondeur, Nogarède et al. 2013). In our study, DRF along with the QRD factors were concluded as sensitive evaluaters matching the results of the sensitive sonography (Braga, McGrath et al. 2018). Good or partial QRD has been correlated with no severe obstruction aclinically (Nogarède, Tondeur et al. 2010) and it was directly related to lower undilated APD in this study.

It seemed therefore interesting to determine if some US parameters could predict the reproducible scintigraphy parameters to rely on before sending for radio-nucleotide scanning. The initial step was to grade the categories of pelvicalyceal dilatation by measurement at the hulim of the pelvis along with assessment of calyceal dimension and parenchymal thickness or cortical thinning.

In line with number of clinical and experimental studies that suggest that some hydronephrosis cases are not pathologic but instead represents a compensating mechanism created by the kidney autonomic function to temporarily protect the kidney from high pressures and renal damage (Carmody and Carmody 2011, Alsubhi, Alghanmi et al. 2020, Erdman, Skreta et al. 2020, Li, McGrath et al.

2020), this study has found that APD dilatation of the PCS may not be directly related to poor renal function of drainage.

Conclusion:

This study supports the inference of assessing renal function based on sensitive parameters of evolutionary sonography. Each radiologist / nephrologist / urologist should evaluate the measurement of reliable parameters of sonography especially the anteroposterior diameter of the pelvicalyceal system (APD of PCS) at the hilum area and the parenchymal thickness (PT) in millimeters and set the pediatric patient for logical follow-up before recommending the dynamic scintigraphy tests. Reducing the exposures from invasive testing should be a motive and real intention to improve selectivity of the children who are investigated with dynamic scintigraphy testing.

Limitations:

This study has a number of limitations including the scarce of cases and the selection of patients which was based on one scintigraphy canter that may receive biased cases referred from particular urologists. Therefore, generalizability for all renal renograms centres might not be accurate.

Author Contributions:

The first author has contributed in the developing of the research idea and reaching to the comprehension of the problem statement. The second author has contributed in the clinical data collection and performing the medical screenings. The third author has contributed in the research analysis and data cleaning. All the authors have contributed in writing different sections of the manuscript.

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Conflicts of Interest: The authors declare no conflict of interest.

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تحضير مصفوفات تراكيب أوكسيد الزنك النانوي على قواعد السيليكون بطريقة التحلل المائي الحراري

Preparation of ZnO nanostructures arrays on silicon substrate by hydrothermal method

Mohammed H. Ali[1], Ali J. Addie[2] and Mohammed O. Kadhim[3]

محمد حسين علي[١] علي جبر عداي[٢] محمد عبيد كاظم[٣]

[1,2]دائرة بحوث المواد- وزارة العلوم والتكنولوجيا

[3]جامعة الكرخ للعلوم / كلية علوم الطاقة والبيئة / قسم الطاقات المتجددة

E-mail: mohhusali68@yahoo.com E-mail **m.obaid_k@yahoo.com**

الخلاصة

حضرت تراكيب نانوية لأوكسيد الزنك أحادية البعد وألاتجاه (nanorods) على قواعد من السيليكون بتقنية التحلل المائي الحراري بأستخدام نترات الزنك كمصدر للزنك والمركب العضوي ($C_6H_{12}N_4$) Hexamethylenetetramine . وصف التركيب البلوري و الحجم الحبيبي للتراكيب النانوية ل ZnO المحضرة بأستخدام تقنية حيود ألاشعة السينية (XRD) و المجهر الالكتروني الماسح (SEM) ومطياف رامان . بينت النتائج أن التراكيب النانوية لأوكسيد الزنك المحضر بانها بلورية ذات بنية سداسية الشكل (Wurtzite) وحجم بلوري بحدود (35.١٧ nm) كما بينت نتائج SEM بأن التراكيب النانوية ل ZnO أحادية البعد و ألاتجاه (nanorods) ذات قطر (90 nm) و أبعاد تتراوح (٩٠٠ nm- 400 nm) أما طيف رامان فقد أظهر وجود النمط المميز E_2 عند التردد (٤٣٥cm^{-1}) و بناءا" على النتائج أنفة الذكر يمكن الحصول على أنماء جيد للتراكيب النانوية ZnO بأستخدام تقنية التحلل المائي الحراري .

الكلمات المفتاحية : أوكسيد الزنك ، التراكيب النانوية و تقنية التحلل المائي الحراري .

Abstract

ZnO nanorods on the Si substrate have been prepared using Hydrothermal technique by using zinc nitrate as a source of zinc and Hexamethylenetetramine (C6H12N4) as precursors . The crystalline structure and grain size of the obtained ZnO nanoparticles were characterized by using X-Ray Diffraction technique (XRD) ¸Scanning Electron Microscope (SEM) and Raman Spectrometer. Results showed that the nanostructure of zinc oxide was Wurtzite structure and the size of crystals was (35.17 nm) while the SEM results showed that aligned 1-D zinc oxide nanostructures with a diameter (90 nm) and the length (400 nm - 900nm). Raman spectrum confirmed the presence of the distinctive pattern E2 at the frequency 435 cm-1 . The obtained results showed that using Hydrothermal technology can produce good nanoparticles.

المقدمة

يعد أوكسيد الزنك أحد أشباه الموصلات التي تمتلك أهمية كبيرة جدا أذ يمكن أستخدامه في العديد من التطبيقات بسبب خصائصه الفيزيائية والكيميائية الجيدة والتي تتضمن فجوة طاقة واسعة النطاق , (3.36)eV طاقة أرتباط عالية في درجة حرارة الغرفة , (60) meVشفافية بصرية عالية في المنطقة المرئية ، و كهروأجهادية عالية ، بالأضافة الى ذلك فهو عند مقارنته بأكاسيد المعادن ألاخرى يعد مناسب من حيث كونه أقل تكلفة ، صديق للبيئة ، وكفاءة عالية كشبه موصل (Özgür et al.,2005; Wang,2004) وهو مرشح واعد لمجموعة متنوعة من التطبيقات ، مثل الخلايا الشمسية (٨ (Zhang el ,200 .al دايود ليزر (Marjin et al. , 2012), كهروأجهادية (٢٠١١ ,) , . Riaz et al متحسسات غازية ترانزستورات الانبعاثات المرنة ((Hongsith et al., 2008), , (Arnold et al. ,2003)المرشحات الضوئية (٢٠٠٩ , , . Jun et al)التحفيز الضوئي , 2009) (Akhavan , .et al البلورات الفوتونية (Wang et ٢٠٠٨) ,.al وألاجهزة البصرية الألكترونية (Shen et al., 2005)كما أن الخصائص المورفولوجية المتنوعة للتراكيب النانوية لهذا الأوكسيد تستقطب العديد من الباحثين لدراستها والتحكم بها .

وقد تم تحضير التراكيب النانوية لأوكسيد الزنك بطرائق مختلفة وتشمل طريقة الترسيب بالحمام الكهربائي. (Shinde et al ٢٠٠٥،.) طريقة الترسيب بالبخار الكيميائي , ((Yousefi et al. , 2011 طريقة البلمرة (٢٠٠٩ , (Jajarmi , طريقة المحلول – هلام , Bigdeli and Morsal) (UmaSangari and ChitraDevi المايكروويف طريقة2010) (and Lieber,2000 بالليزر ألاستئصال طريقة,2013) , (Duan طريقة الرش بالتحلل الحراري et al. , 2007)

, (Shindeطريقة التحلل المائي الحراري (Kale et al. , 2014)
طريقة الترسيب الكهربائي الكيمياوي 2012, (Orhan and Baykul)
(وطريقة التبخير الحراري (٢٠٠٩ . (Ahn , .et al من بين كل
هذه الطرائق تعتبر طريقة التحلل المائي الحراري من أهم الطرائق في تحضير المواد النانوية و ذلك لانها تمتلك عدة مزايا منها ، سهولتها ، ذات كلفة قليلة ، المعالجة في درجات حرارة منخفضة ، ظروف التفاعل المعتدلة ، ولاتحتاج الى قوالب أو عوامل مساعدة ، صديقة للبيئة ، لاحاجة للتفريغ أو غاز ناقل ، أرتفاع درجة التبلور و سهولة التحكم في المعلمات التحضيرية . (Kale and Lu, 2013) وأيضا ، فأن الفائدة المهمة لهذه الطريقة هي دراسة تأثيرات معلمات التحضير المختلفة على الحجم و التبلور و المورفولوجيا والخصائص الفيزيائية الكيميائية للمنتج المحضر .Peng et al)) ,2006 .

في هذا البحث سيتم تحضير تراكيب نانوية احادية البعد وموحدة الاتجاه (nanorods) لاوكسيد الزنك على قاعدة من السيليكون باستخدام تقنية التحلل المائي الحرارية و يتم التحكم في معلمات التحضير المختلفة للحصول على تراكيب نانوية أحادية البعد وألاتجاه ملائمة لتطبيقات المتحسسات البايولوجية.

المواد و طرائق العمل

في هذه التقنية ، يلعب تنظيف الركيزة دوراً مهما في ترسيب ألاغشية الرقيقة ، أولا يتم تنظيف الركيزة تنظيف جيد بواسطة الكحول ويترك لفترة زمنية ومن ثم ينظف بالماء المقطر قبل الترسيب. المواد المستخدمة بالبحث هي نترات الزنك المائية Zn(NO3)2·2H2O من شركة BDH الانكليزية بنقاوة (٩٩,٥%) مع أستخدام المركب العضوي ((C6H12N4 Hexamethylenetetramine كأضافة لتشكيل المركب لاحقا (precursors) من شركة بيهوا الصينية بنقاوة (٩٨%) مع ماء لاأيوني كمذيب.

تحضير طبقة البذرة (Seed Layer Preparation)

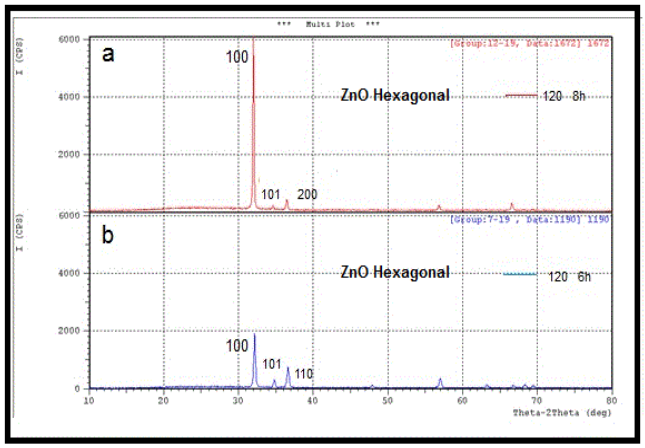
تم أستخدام تقنية الترذيذ بالمكنترون هو نوع من أنواع الترسيب بالبخار الفيزيائي لترسيب غشاء رقيق من الذهب على قاعدة من السيليكون نوع P ذات أبعاد (٢ سم2 x سم) بسمك غشاء (١٠- ٢٠ nm) التيار المستخدم (٣٠) ملي أمبير في زمن (٣٠) ثانية وتستخدم هذه التقنية لترسيب أغشية رقيقة بكثافة عالية و درجة لصق جيدة جدا.

تحضير طبقة ألانماء(Growth layer preparation)

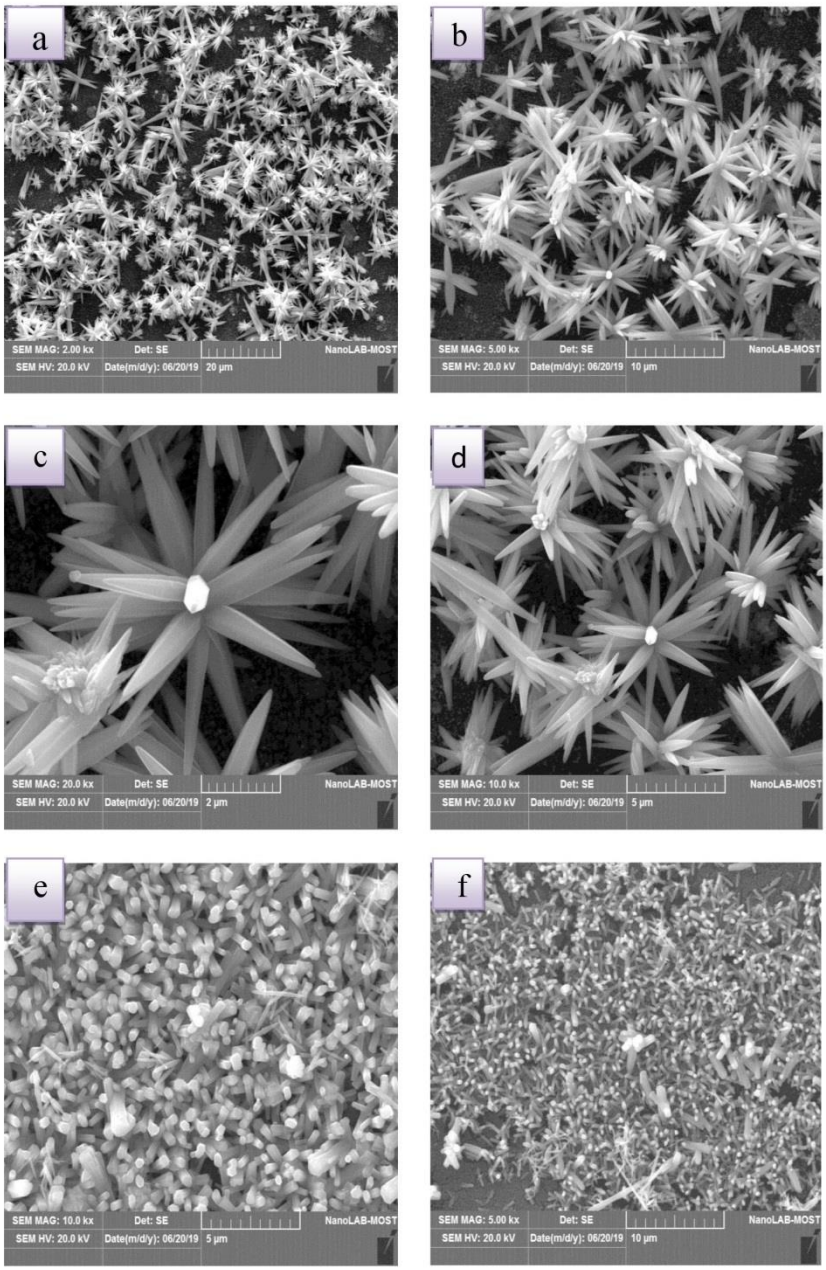
في المرحلة الاولية أخذت (٠,٥) غرام من نترات الزنك أذيبت في (٥٠) مل من ماء لأيوني بحيث يكون التركيز (٣٣٦(٠,٠ مولاري. ثم أضيف ٥٠ مل (تركيز٠,٠٥) مولاري من المركب العضوي Hexamethylenetetramine C6H12N4)) تحت التحريك المستمر. لمدة ساعتين بعد ذلك ، تم نقل ناتج المحلول إلى حاوية تفلون و بالتالي غمس قاعدة السيليكون (substrate)المرسب عليها البذرة بصورة عمودية داخل المحلول ليتم عملية أنماء التراكيب النانوية لأوكسيد الزنك . تم تعشيق حاوية التفلون في الأوتوكلاف المصنوع من الفولاذ المقاوم . تم حفظ الأوتوكلاف في فرن وتم رفع درجة الحرارة تدريجيا إلى ١٢٠ درجة مئوية لمدة ٦ ساعات و ٨ ساعات. بعد الوقت المحدد ، تم تبريد الأوتوكلاف بشكل طبيعي إلى درجة حرارة الغرفة. بعد ذلك ، نرفع القاعدة (substrate) من المحلول الذي تم ألانماء على سطحها بشكل طبقة رقيقة وتغسل حالا بماء لأيوني لأزالة ألاملاح المتبقية من الراسب على السطح . لأجراء الفحوصات التركيبية للنموذج تم أستخدام كل من : تقنية حيود الأشعة السينية (XRD-6000 Shimadzu XRD)) المجهر الألكتروني الماسح SEM (Japan، (Vega 3 – Czech)و جهاز قياس طيف رامان The) Senterra Raman Microscope from Bruker Optics-Germany).

النتائج والمناقشة

يبين شكل (١) نمط حيود ألاشعة السينية XRD للنموذج المحضر على شكل غشاء رقيق من نترات الزنك و هكسأمين (HMT) ، عند درجة حرارة ١٢٠ درجة مئوية و زمن ألانماء ٦ ساعات و ٨ ساعات وقد أظهرت نتائج الفحص بأن جميع قمم الحيود تعود إلى ZnO كما هو مذكور في بطاقة الدولية JCPDS)) رقم ٠١-٠٨٩-٠٥١١ ، مما يشير إلى أن المسحوق المحضر على شكل أغشية رقيقة هو أوكسيد الزنك ذات تركيب بلوري أحادي الطور مع بنية سداسية نوع (Wurtzite) ولم تظهر أي قمم حيود أخرى للشوائب مما يدل على أن النموذج المحضر ذات نقاوة عالية . ويظهر الاتجاه التفضيلي (١٠٠) بشدة أعلى من الاتجاهات ألاخرى كما مبين من خلال العلاقة بين زاوية حيود ألاشعة السينية (**θ**2) والتي تساوي ٣٢ .١٢ والشدة (Intensity) وهذا يتفق مع نتائج البحث (Brintha and Ajitha ,2015) تم حساب الحجم البلوري بواسطة المعادلة شيرر Dav =0.9λ/βcosθ أذ تبين أن الحجم البلوري للنموذج المحضر عند درجة حرارة ١٢٠ درجة مئوية و زمن ٦ ساعات يساوي (nm17.35)



شكل (١) طيف حيود الاشعة السينية لتراكيب أوكسيد الزنك النانوي


a
SEM MAG: 2.00 kx
Det: SE
NanoLAB-MOST
SEM HV: 20.0 kV
Date(m/d/y): 06/20/19
20 µm
b
SEM MAG: 5.00 kx
Det: SE
NanoLAB-MOST
SEM HV: 20.0 kV
Date(m/d/y): 06/20/19
10 µm
c
SEM MAG: 20.0 kx
Det: SE
NanoLAB-MOST
SEM HV: 20.0 kV
Date(m/d/y): 06/20/19
2 µm
d
SEM MAG: 10.0 kx
Det: SE
NanoLAB-MOST
SEM HV: 20.0 kV
Date(m/d/y): 06/20/19
5 µm
e
SEM MAG: 10.0 kx
Det: SE
NanoLAB-MOST
SEM HV: 20.0 kV
Date(m/d/y): 06/20/19
5 µm
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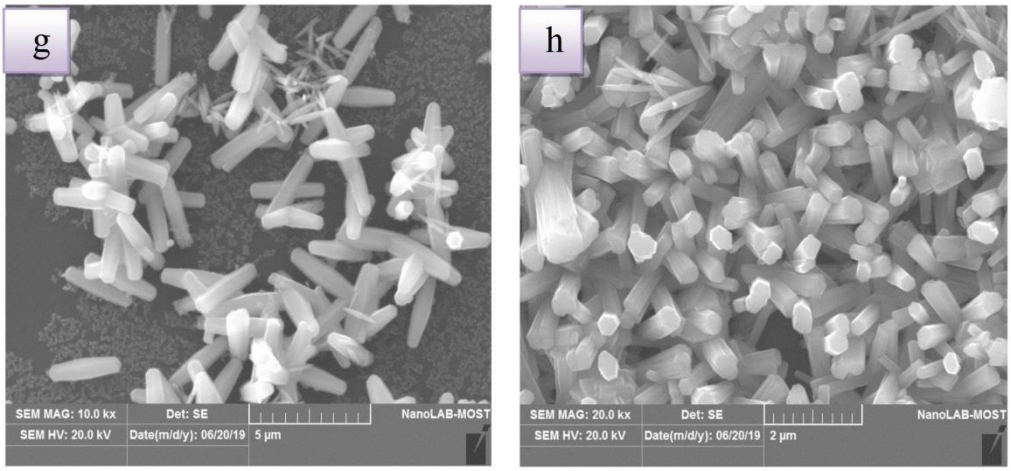
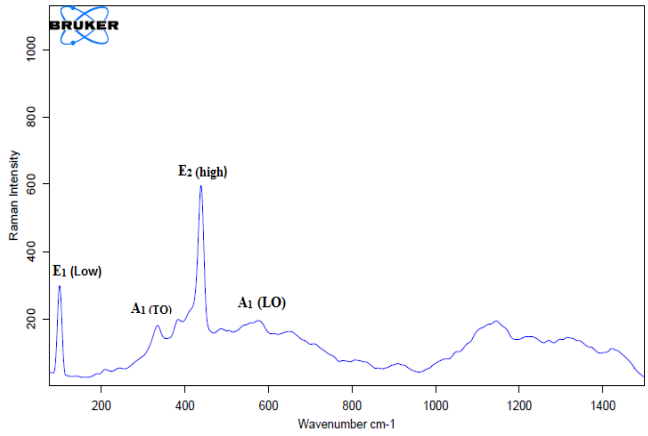
SEM MAG: 5.00 kx
Det: SE
NanoLAB-MOST
SEM HV: 20.0 kV
Date(m/d/y): 06/20/19
10 µm



شكل (٢) صور SEM للتراكيب النانوية لأوكسيد الزنك بتكبيرات مختلفة (d, c, b, a) تراكيب نانوية على شكل زهرة (Flowers) , (h ,g, f, e) تراكيب نانوية على شكل قضبان (Rods)

شكل (٢) تظهر صور بواسطة جهاز المجهر الماسح الالكتروني SEM بتكبيرات مختلفة التراكيب النانوية لأكسيد الزنك. شكل (٢) a ,b ,c ,d للنموذج المحضر على شكل غشاء رقيق من نترات الزنك و هكساأمين (HMT) ، درجة حرارة ١٢٠ درجة مئوية و زمن ألانماء ٨ ساعات يكون على شكل زهرة (Flower) ذات أبعاد من(4 µm – 500 nm) ، شكل(٢)

e ,f ,g, h للنموذج المحضر عند نفس درجة الحرارة لكن بزمن أنماء ٦ ساعات تم الحصول على نموذج ذات شكل قضبان نانوية nanorods)) بقطر (95 nm) بأبعاد تتراوح من (٤٠٠ nm900 – nm) .



شكل (٣) طيف رامان لتراكيب اوكسيد الزنك النانوي

الحسابات النظرية للأطياف الرامان الخاصة ببلورة ZnO هي A1+2E2+ E1 الصيغة القطبية A1، E1 يمكن أن تنقسم الى LO، TO حيث ، (TO) هي ألانماط البصرية المستعرضة ، (LO) هي ألانماط البصرية الطولية . (E2) هي النمط غير القطبي ويتكون من نمطين ، تردد عالي وتردد منخفض . شكل (٣) يبين أطياف الرامان لبلورة ZnO المحضرة وتظهر فيها قمم ألاهتزازات البارزة عند قيم الطول الموجي وهي كالتالي ، (cm-1572، 435، 380، 324) أقوى شدة تظهر عند قيمة الطول الموجي cm-1435 و التي تمثل (E2 (high . أن طيف E2 يكون حاد و قوي بالقرب من cm-1435 ، والذي يؤكد التركيب السداسي (Wurtzite) لبلورة ZnO (Ggautam et al. , 2011) . وبالتطابق (بين القيم النظرية والعملية) يتبين أنه يوجد فرق في التردد المنخفض والعالي للطول الموجي عند قيمة الطول الموجي 435 cm-1 للمواد الكتلية مقارنة مع المواد النانوية المحضرة و قد يعزى السبب في ذلك الى التأثيرات الكمية للدقائق النانوية (confinement) quantum (Alim et al.,2015) لبلورة ZnO) . القمة عند الطول الموجي ٥٧٢١ cm-1 يقع بين A1(LO) و E1 (LO) نمط ألاهتزاز البصري ، الذي ينشأ بسبب نقص ألاوكسجين (Ma et al.,2004). النمط غير القطبي E2 يظهر عند الطول الموجي cm-1 435 (Samanta and Bandyopadhyay, 2012) القمة عند الطول الموجي cm-1 380 هي لـA1 النمط المستعرض. ومن الجدير بالذكر أن النمط المستعرض A1 له

تردد مختلف عن نمط ألاهتزاز المستعرض E1 .

الاستنتاجات

حضرت بنجاح التراكيب النانوية لأوكسيد الزنك على قاعدة من السيليكون بأستخدام تقنية التحلل المائي الحراري . تقنية حيود الاشعة السينية تبين أن التركيب البلوري ل ZnO هو سداسي الشكل (Wurtzite) مع معدل حجم بلوري (nm17.35) صور SEM تظهر مورفولوجية التراكيب النانوية ل ZnO حيث كانت على شكل زهرة ((flowers و شكل قضبان نانوية (nanorods)) بقطر (٩٠ nm) و أبعاد تتراوح (٤٠٠ nm - nm900) أطياف الرامان (Raman Spectra) بينت كل الانماط ألاهتزازية للتركيب النانوي ل ZnO .

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تحضير وتقييم فعالية المستخلص الكحولي من نبات الكرنب الهندي (اكليل الملك) كمبيد حشري فعال لحشرة الذباب الابيض

Preparation and evaluation of the efficacy of alcoholic extract of the *Melilotus indicus* plant as an effective insecticide for whiteflies

فلاح حسن أحميدي[١]-فراس عزيز راهي[٢] - فارس عبد الكاظم دخنه[١] - عبد المجيد حطاب[١] - وليد عبد الواحد حلو[١]-سرى عدنان جابر[١]

١- وزارة الصناعة والمعادن -هيأة البحث والتطوير الصناعي -مركز بحوث ابن البيطار
٢- كلية النسور الجامعة -قسم الصيدلة

الخلاصة

أجريت الدراسة الحالية لتقيم تأثير المستخلص الطبيعي تحت الاختبار المأخوذ من مستخلص نبات إكليل الملك الكحولي وبيان مدى فعاليته مختبريا في قتل حوريات الذبابة البيضاء بطريقة الرش المباشر . اختبر المستخلص الكحولي لنبات إكليل الملك بثلاث تراكيز (٠.٥ ،١، ١،٥) % مع إضافة المادة اللاصقة والناشرة والمواد الأخرى لتعزيز فعالية المبيد وزيادة التصاق المستخلص على جسم الحشرة . أشرت النتائج أن المبيد المحضر من مستخلص نبات إكليل الملك بتركيز (٠، ٥) % قد اعطى تأثيرا واضحا في قتل الحوريات إذ تراوحت نسبة القتل بين (٣٣،٣ – ٤٣،٣ – ٥٣،٦) % للفترة الزمنية (٢٤–٤٨–٧٢) ساعة على التوالي من الرش. بينما كانت نسبة التأثير القاتل للمستخلص الكحولي بتركيز ١ % قد تراوحت بين (٥٠,٧ – ٦٧،٣ – ٨٨،٣) % للفترة الزمنية نفسها أعلاه . في حين كانت نسبة القتل للتركيز (١،٥) غم/لتر قد بلغت (٨٤،٨– ٩٣،٩– ١٠٠)% على التوالي بعد مرور ٢٤ – ٤٨– ٧٢ ساعة على التوالي. شخصت المواد الفعالة لمستخلص إكليل الملك باستخدام الأجهزة(FTIR ،UV، GC mass). حيث بينت النتائج احتواء المستخلص الكحولي لنبات إكليل الملك على العديد من المواد الفعالة والتي يعود إليها تأثير المبيد القاتل وأهمها القلويدات والتربينات والكلاكوسيدات والكيومارين . شخصت العناصر النادرة المتوفرة في هذا النبات، أشرت النتائج احتواء النبات على عنصري الزنك والحديد بنسب (١،٧٥– ١،٥) ملغم على التوالي، كما شخصت بعض الثوابت الفيزياوية مثل الرطوبة ودرجة الحامضية وكانت نسبة الرطوبة (٩،٢٥) ودرجة حامضية (٥،٦٤) .

مفتاحية الكلمات : المبيدات من اصل نباتي . الذبابة البيضاء . نبات إكليل الملك .

Abstract
The present study was conducted to evaluate the effect of the alcoholic

extract of the Eichhornia in some life aspects for Whitefly using the spraying method . (Melilotus indicus) alcoholic extract was tested in three concentrations (0.5,1,1.5)% with the addition of adhesive and spreading material to enhance the effectiveness of the pesticide and increase the duration of adhesion on the surface of the treated plants leaves . Results pointed out that the pesticide prepared with a concentration of 0, 5% gave a poison effect on White fly nymphs , as homicide rate ranged between(33,3-43,3-53,6)% for the period of time (24-48-72) hours respectively. While the rate ranged of the lethal effect of the alcohol concentration 1% was (50,7 – 67,3 – 88,3)% for the same period above. While the rate ranged of the lethal effect of the alcohol concentration 1.5 % was between (84,8 – 93,9 - 100)% for the same period Respectively .The active ingredients of the (Melilotus indicus) plant extract were identified by using various devices such as FTIR ,UV, GC mass. The results showed that the extract of the(Melilotus indicus) plant contains many active substances, which have the killer effect pesticide, The most important of which are Alkaloids, terpenes, glycosides and Coumarin. The elements available in this plant were diagnosed, the results indicated that it contained as zinc and iron by (1.75 - 1.5) respectively, Some physical constants were diagnosed Such as humidity and acidity . the humidity was (9.25) and acidic (5.64).

Key words: Botanical insectcides. The white fly. *Melilotus indicus* plant

المقدمة

استعملت الكثير من المبيدات الحشرية المصنعة لمكافحة الحشرات مما أدى إلى ظهور العديد من الأجيال المقاومة لهذه المبيدات والضرر بالبيئة لذا بدا البحث باستعمال العديد من المستخلصات النباتية من قبل الإنسان كمبيدات حشرية نظرا لما تحتويه النباتات في إزهارها وأوراقها وجذورها من مواد كيماوية ذات تأثير سمي[١]. سبب اختيار استعمال مبيدات ذات الأصل النباتي في مقاومة الحشرات هي امتلاكها لصفات مرغوبة غير متوفرة في المبيدات الكيمياوية منها عدم ظهور المقاومة من قبل الحشرات المعاملة وعدم تلويثها للبيئة لتحللها السريع كما تعد المواد الكيماوية الثانوية في النباتات من المركبات الحيوية

التي تنتجها تحت الظروف الطبيعية لتنجز وظائف دفاعية ضد الأخطار المهددة لها ولها فعاليات حيوية تخص العلاقات البيئية مابين الكائنات الحية الأخرى، كأن تقوم بجذب الحشرات النافعة، إضافة لكونها طاردة للكثير من الحشرات [٢]

إكليل الملك (Melilotus indicus) هو نبات عشبي ويسمى أيضا (الحندقوق) ينتمي إلى العائلة البقولية (Fabeaceae) ينمو هذا النبات في الأماكن الرطبة بعد هطول الأمطار وخاصة في المزارع المروية وحتى في الحدائق المنزلية ، حيث يوجد في العديد من دول العالم ومن ضمنها باكستان و الهند و أوربا وأفريقيا[٣]،وقت التزهير لنبات إكليل الملك يقع بين شهري آذار – آب ، ويعد إكليل الملك من النباتات البرية المتحملة للأملاح بقدرة عالية ويستخدم كمحصول علفي في الأراضي الملحية [٤] وأثبتت كثير من الأبحاث .أن لنبات إكليل الملك قدرة مضادة للبكتريا ومضاد للتجلط ومرطب للبشرة وطارد للبلغم ومعالجة للأسهال الطفيلي وكذلك يستخدم كمرهم للمناطق الملتهبة بالجسم أو الأورام والأوجاع . تحتوي النواتج الأيضية الثانوية لنبات الحندقوق على مركبات التربينات والكومارينات والستيرويدات . [٥]

تعد حشرة الذبابة البيضاء من الحشرات الصغيرة يبلغ طولها حوالي من (٢-٣) ملم وهي تشبه الفراشات الصغيرة والحشرات الكاملة مجنحة سواء كانت ذكورا أم إناثا ولها زوجان من الأجنحة البيضاء وجسم أصفر وتطورها يختلف عن الكثير من أنواع الحشرات التابعة لرتبة متساوية الأجنحة [٦] الحشرات الكاملة تستطيع إن تطير بنشاط لمسافة ليست كبيرة ولكن بواسطة الرياح أو الوسائل الأخرى فإنها تنتقل لمسافة بعيدة ، في طور اليرقة والعذراء تستطيع ان تنتقل عن طريق الغراس والشتول وإنها قد عرفت بهذا الاسم نظرا لوجود طبقة بيضاء مزغبة على أجسام أنواع كثيرة منها والتي تفرز من الغدد البطنية بعد خروج الحشرة الكاملة . أن بعض الأنواع ليست بيضاء اللون فمثلا (Citrus Black fly) تمتلك أجنحة سوداء والنوع (Bemisia giffardi) ذوات أجنحة صفراء فاتحة اللون، والنوع الذي يتطفل على القهوة في جنوب نيجريا ذات أجنحة حمراء بينما هناك أنواع أخرى توجد على أجنحتها

نقط غامقة علما إن هذه النقط يمكن إن تظهر بعد عدة ساعات من خروج الحشرة الكاملة كما إن لبعضها رسومات معينة على أجنحتها [٧] [٨] [٩] والصورة (١) توضح شكل الذبابة البيضاء

صورة (١) توضح شكل الذبابة البيضاء

هدفت الدراسة الى بيان تأثير مستخلص مسحوق أجزاء نبات إكليل الملك (الاوراق والسيقان) كمبيد حشري لحشرة الذبابة البيضاء اذا استخدم المستخلص بتراكيز مختلفة للوصول الى التركيز الامثل الذي يعطي قدرة قتل عالية في مكافحة حشرة الذبابة البيضاء .

المواد وطرائق العمل

الأجهزة والمواد المستخدمة

الاجهزة	المنشأ
Digital sensitive balance	**Denver_ USA**
Fourier Transform Infrared spectroscopy (FTIR)	**Bruker _ Germany**
Magnetic stirrer	**Germany**
Oven	**Germany**
pH meter	**Hanna_ Rumania**
Ultraviolet visible (UV)	**Spanish**
Orbital Shaker	**Korea**
Sieve	**Retsch _ Germany**
Grinder	**China**
Ethanol	**BDH , England**
Eichhornia plant	**Iraq**
Filter paper(whatman.42)	**BDH , England**

جمع نبات إكليل الملك

جمع النبات من منـطقة الجادرية ومنطقة ابو غريب في بغداد، جففت في الظل وبدرجة حرارة الغرفة ضمن محيط جيد التهوية وطحنت باستعمال مطحنة كهربائية لغرض الحصول على مسحوق نبات إكليل الملك الذي يستعمل لاحقا لتحضير المستخلص الكحولي

تقدير الأس الهيدروجيني

اتبعت طريقة (Shihate-1951)[13] وذلك بخلط (٥) غم من مسحوق النموذج النباتي مع (٥٠) مل من الماء المقطر بواسطة خلاط كهربائي لمدة ١٥ دقيقة ثم رشح المحلول وقدر الأس الهيدروجيني باستعمال جهاز قياس الأس الهيدروجيني PH meter مع متابعة درجة الحرارة خلال القراءة .[١٦]

تقدير الرطوبة

اتبعت طريقة AACC2000[14] لتقدير الرطوبة النسبية وذلك باخذ (٢) غم من النموذج ووضعة في جفنة خزفية داخل فرن كهربائي بدرجة حرارة (١٢٠) درجة مئوية لمدة ساعة واحدة ، بعدها وضع النموذج في مجفف زجاجي Desicater حاوي على مادة السليكا Silica gel يوزن النموذج وبعد الوزن اعيد الى الفرن الكهربائي لساعة اخرى يعاد بعدها وضعه في المجفف الزجاجي ، وزن النموذج واخذ معدل الوزنين للحصول على الوزن الثابت وحسبت النسبة المئوية للرطوبة على أساس الوزن الجاف . [١٧]

تحضير المستخلص الكحولي

وضع (١٠٠) غم من المسحوق الجاف لنبات إكليل الملك (الأوراق-السيقان) في دورق مخروطي سعة (١) لتر وأضيف إليه (٤٠٠) ملتر من كحول الايثانول (٧٠%) وترك النقيع في الحاضنه الهزازة لمدة (٤٨) ساعة رشح المحلول بجهاز بخنر باستخدام ورق (whatman no.42) ، بخر ٩٠% من المحلول باستخدام المبخر الدوار المفرغ هوائيا بدرجة حرارة (٤٥مْ) جفف المحلول المتبقي في أطباق بتري في فرن كهربائي مفرغ هوائيا بدرجة حرارة (٤٥ مْ)، قشط مسحوق مستخلص اكليل الملك وجفف في أوعية زجاجية نظيفة محكمة الغلق بدرجة حرارة الغرفة ، بلغ وزن المستخلص الكحولي حوالي (١٧) غم من المسحوق الجاف . حضرت ثلاث تراكيز (٠.٥ ،١، ١،٥) % لغرض تجربة تاثيرها القاتل

مختبريا تجاه حشرة الذبابة البيضاء .

تم تقييم المستخلص النباتي لنبات إكليل الملك على حوريات الذبابة البيضاء مختبريا باستعمال برج الرش Spray tower. حيث هيئت أطباق بتري عدد (١٠) بقطر ٩ سم وضع في كل طبق قطن طبي ثم رطب بالماء المقطر ،عملت أقراص من أوراق الخروع المصابة بحوريات الذبابة البيضاء بقطر 1.5 انج في كل طبق يحوي على (٨) حوريات، هذه حيث تم اختبار ثلاث تراكيز هما (٠،٥-١-١،٥) % مع إضافة المادة اللاصقة والناشرة وحسب النسبة الموصى بها ،رشت كافة الإطباق بالتراكيز المبينه ،اما بالنسبة الى معاملة المقارنة فقد

رشت بنفس الكمية من الماء وبعد الرش وضعت هذه الإطباق في حاضنه على درجة حرارة 27 ± 6 م° ، تم عد الحوريات المبينة بعد فترات (٢٤-٤٨-٧٢) ساعة من الرش . حسبت نسبة القتل تم حساب معادلة ابوت (ابوت ١٩٢٥)

عدد الحشرات الحية قبل المعاملة – عدد الحشرات الحية بعد المعاملة

النسبة المئوية للقتل = ـــــــــــــــــــــــــــــــ × ١٠٠

عدد الحشرات الحية قبل المعاملة

الكشف الكيمياوي التمهيدي لبعض المكونات الكيمياوية لنبات إكليل الملك

١: الكشف عن القلويدات :-

غلي (١٠) غرام من المستخلص لاوراق وسيقان نبات اكليل الملك في(٥٠) مليلتر من ماء مقطر محمض بقطرات من حامض الهيدروكلوريك) HCl بتركيز (٤)%، برد المحلول ،ثم رشح .أجريت عملية الكشف باستخدام الكواشف الآتية:

كاشف دارجندروف للكشف عن القلويدات راسب(+) ، – كاشف واكنر للكشف عن القلويدات الراسب بني (+) ،– كاشف ماير للكشف عن القلويدات الراسب ابيض (+) [١٨]

٢: الكشف عن الصابونيات :-

اعتمدت الطريقتان اللتان اعتمدها كلمن:

الطريقة الأولى : يمتزج المستخلص الكحولي بشدة مع الماء،ظهور رغوة كثيرة تبقى لفترة طويلة هي نتيجة موجبة للكشف.

الطريقة الثانية : إضافة (٠،٥) مليلترمن كلوريد الزئبقيك إلى (١،٥)مليلتر من المستخلص الكحولي وظهور راسب ابيض دلالة على الكشف الموجب [١١]

٣: الكشف عن المواد القابضة

غلي(٥) غرام من الورق النباتي ب (٥٠) مليلتر من الماء المقطر.رشح المحلول الناتج وترك يبرد قسم الراشح إلى قسمين،أضيف للقسم الأول خلات الرصاص بتركيز ١%يظهر راسب هلامي القوام يدل على أن الكشف موجب .بينما أضيف للقسم الثاني كلوريد ألحديديك بتركيز ١% ويظهر لون اخضر مزرق يدل على إن الكشف موجب ووجود المواد القابضة[١٩]

٤: الكشف عن (Glycosides) :-

اتبعت الطريقة التي ذكرها (Evan-(1999) [17] بمزج حجوم متساوية من كاشف فهلنك المحضر انياً مع مستخلص مسحوق اكليل الملك ثم ترك المزيج في حمام مائي يغمي لمدة (١٠) دقائق فكانت النتيجة ايجابيه ظهور راسب احمر كدليل على وجود السكريات وكعملية تأكيدية أخرى أضيف (١مل) من المستخلص الى (٥) مل من كاشف بندكت (Bendict test) حيث يدل ظهور الراسب على وجود السكريات [٢٠]

٥: الكشف عن الكومارينات :

أضيف (١٠) مليلترمن الكحول الاثيلي (CH_3CH_2OH) بتركيز (٩٥%) إلى (١) غرام وزن جاف من الورق النباتي وترك ليغلي في حمام مائي (١٠٠) م° لمدة دقيقتين . رشح المحلول وأضيف للراشح (٢٠) مليلتر من ماء مقطر محمض بقطرات من حامض

الهيدروكلوريك في المحلول (بتركيز ٤%) ظهور العكرة (Turbidity) دلالة على أن الكشف موجب . [٢١]

٦: الكشف عن الراتنجات

اتبعت الطريقة الواردة في Shihata-1951 [13] اضيف (٥) غم من المسحوق الى (٢٥) ملتر من الكحول الاثيلي ٩٥% ثم ترك بحمام مائي بدرجة (٧٠) م° لمدة(٢) دقيقة ثم أضف ماء مقطر (٧٥) ملتر الى الراشح المحمض ب ٤% (حامض الهيدروليك) حيث يستدل على وجود المواد الراتنجية بظهور تضبب [١٠]

٧: الكشف عن الفلافونيدات:

اتبعت الطريقة الواردة في: Geissman -1962 [19]

أ – اذيب (٥)غم من مسحوق نبات اكليل الملك في(٢٥) ملتر من كحول الايثانول بتركيز ٩٥ % ثم نرشح المحمول.

ب – اضف (١٠) ملتر من الكحول الاثيلي (Ethanol) بتركيز ٥% الى (١٠) ملتر من محلول بيدروكسيد البوتاسيوم (٥٠) % حيث يتم مزج كميات متساوية من كلا المحلولين حيث يدل اللون الاصفر على وجود الفلافونيدات [٢٢]

٨: الكشف عن الفينولات

تم الكشف بمزج (٣) ملتر من المستخلص الكحولي لنبات اكليل الملك مع (٢) ملتر من كلوريد الحديديك ١% ،أن ظهور اللون الاخضر المزرق الداكن يدل على ايجابية الفحص . [١٨]

٩: الكشف عن الترينيات والستيرويدات

تم اجراء الكشف بمزج (١) ملتر من المستخلص الكحولي (الاوراق والسيقان) مع ٢ ملتر من الكلوروفورم وتم إضافة قطرة من حامض الخليك وقطرة من حامض الكبريتيك المركز

يدل ظهور حلقة ذات لون بني فاتح على ايجابية الفحص للتربينيات بينما يدل ظهور الحلقة ذات اللون الازرق الغامق بعد ترك المزيج لمدة (١٢) ساعة على ايجابية الفحص للستيرويدات [٢٤]

النتائج والمناقشة

بينت النتائج بان تأثير المستخلص الكحولي لنبات اكليل الملك في الاداء الحياتي لحشرة الذبابة البيضاء الى ارتفاع نسبة هلاك حوريات الذبابة البيضاء كلما يزداد التركيز والزمن و الجدول رقم (١) يبين أن أكثر الفترات التي حصل بها تأثيرا قاتلا لمستخلص اكليل الملك بالتراكيز المستخدمة (٠،٥ – ١ – ١،٥) % على حورية الذبابة البيضاء هي الفترات (٢٤ ، ٤٨ ، ٧٢) ساعة من المكافحة اذ بلغت نسب القتل (٣٣،٣ – ٤٣،٣ ، ٥٣،٦) % عند استخدام تركيز ٠،٥ % بينما كانت نسبة القتل لتركيز ١% تراوح بين (٧،٥٠ ، ٦٧،٣ ، ٨٨،٣) % فيما كانت النسبة تتراوح بين (٨٤،٨ – ٩٣،٩ – ١٠٠)% بعد مرور ٢٤ – ٤٨ – ٧٢ ساعة على التوالي عند استخدام تركيز (١،٥%)

الجدول رقم (١) يبين أكثر الفترات التي حصل بها تأثيرا قاتلا لمستخلص اكليل الملك على حوريات الذبابة البيضاء

المعاملات	عدد الحوريات قبل الرش	كفاءة القتل النسبية (%) على حوريات الذبابة البيضاء بالساعات		
		٢٤ ساعة	٤٨ ساعة	٧٢ ساعة
مستخلص ٠،٥%	٨٠	٣٣،٣	٤٣،٣	٥٣،٦
مستخلص ١%	٨٠	٥٠،٨	٦٧،٣	٨٨،٣
مستخلص ١,٥%	٨٠	٨٤،٨	٩٣،٩	١٠٠

يعزى التاثير الايجابي لمستخلص اكليل الملك في هلاك حوريات الذبابة البيضاء الى احتواءه على الكثير من المركبات الفعالة السامة لتلك الحوريات والجدول رقم (٢) يوضح نتائج تحليل الكيمياوي لمستخلص اكليل الملك ، أشرت النتائج إلى احتواءه على العديد من المركبات الكيمياوية التي تشمل على القلويدات والتانينات والصابونيين والفلافونيدات والكاربوهيدرات ومواد فعالة أخرى كما هو موضح في الجدول رقم (٢) .

الجدول رقم (٢) يوضح نتائج تحليل الكيمياوي لمستخلص لاوراق وسيقان نبات اكليل الملك

ت	نوع الكشف	النتيجه
١	كشف العفصيات	+
٢	كشف الكاربوهيدرات	+
٣	كشف الكلاكوسيدات	+
٤	كشف الفينولات	+
٥	كشف الراتنجات	+
٦	كشف الفلافونيدات	+
٧	كشف الصابونيين	+
٨	كشف القلويدات	+
١٠	كشف الكومارينات	+
١١	كشف التانينات	+

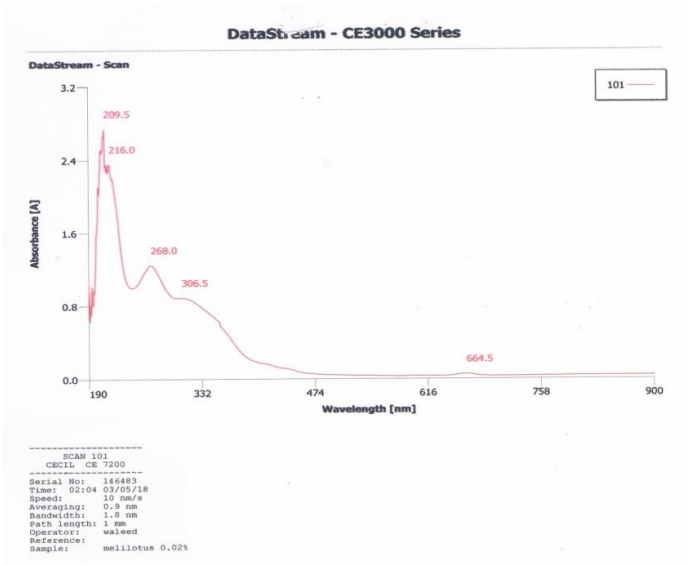
اما الشكل رقم (١) يبين مطيافية الأشعة تحت الحمراء لمستخلص نبات اكليل الملك إذ يبين عدة امتصاصات مميزة والتي يتم فيها الاستدلال على المواقع الفعالة الموجودة في نبات اكليل الملك والتي تعود بالاصل الى التركيب الكيمياوي للمكونات الأساسية منها الكاربوهيدات ومشتقاتها وقد لوحظ تقارب في قيم الامتصاص للبعض منها وظهور مواقع فعالة لحزم الامتصاص متمثلة بالتركيب (OH) والتي تعود الى الكحولات او الماء ومجاميع (C=O) التي تعود إلى الحوامض الكاربوكسيلية أو الاسترات والالديهايدات والكيتونات

ومجموعة (C=C) التي تعود إلى التراكيب الاليفاتية او الاروماتية الموجودة في المستخلص .

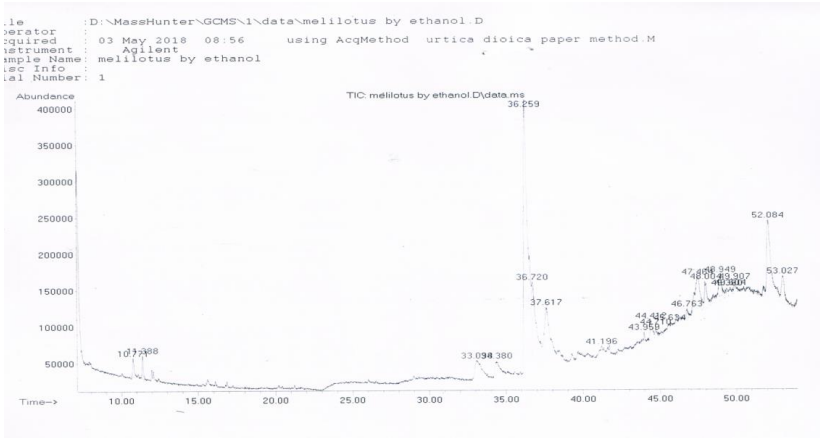
الشكل رقم (١) يبين مطيافية الأشعة تحت الحمراء لمستخلص إكليل الملك

يبين الشكل رقم (٢) نتائج فحص مستخلص اكليل الملك باستخدام تقنية (UV spectrum) إذ أشرت النتائج إلى ظهور اربع قمم متميزة عند الأطوال الموجيه ٢٠٩،٥ – ٢١٦–٢٦٨–٣٠٦ كذلك تم تشخيص مركبات مستخلص اكليل الملك الكحولي باستخدام تقنية Gc massإذ

أشرت النتائج إلى ظهور العديد من المركبات والتي تصل عددها إلى حوالي (٢١) مركب والشكل (٣) يوضح هذه المركبات



الشكل رقم (٢) يبين نتائج فحص مستخلص إكليل الملك باستخدام تقنية (UV spectrum)



الشكل رقم (٣) يبين نتائج فحص مستخلص إكليل الملك باستخدام تقنية (GC Mass)

الاستنتاجات والتوصيات

أظهرت نتائج الدراسة أن للمستخلص الكحولي لنبات اكليل الملك تأثيرا واضحا في قتل حوريات الذبابة البيضاء ومن المستحسن أجراء المزيد من الدراسات المختبرية على تراكيز مختلفة من المستخلص الكحولي والمائي والمقارنة بينهما للوصول إلى طريقة الاستخلاص والتراكيز المثلى لمكافحة تلك الحشرات لما لها من تأثير ضارة على المحاصيل الزراعية .

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