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القواعد العامة وإجراءات النشر

أولاً: القواعد العامة:

- يُقبل نشر البحوث باللغتين العربية والإنجليزية، في مختلف فروع العلوم الإنسانية والتي تتوافر فيها الشروط الآتية:

(١) أن يكون البحث أصيلاً وتتوافر فيه شروط البحث العلمي المعتمد على المنهجية المتعارف عليها في كتابة البحوث العلمية.

(٢) أن يكون البحث مكتوباً بلغة سليمة مراعيًا دقة الحروف والأشكال ويخطوط متوافقة مع أجهزة (IBM) بينط(16) ويخط (Traditional Arabic) وألا يزيد عدد صفحات البحث عن (30) صفحة متضمنة الهوامش والمراجع .

(٣) أن تكون الجداول والأشكال والآيات القرآنية مدرجة بأماكنها الصحيحة وأن تشمل العناوين والبيانات الايضاحية الضرورية بدون استخدام أي برامج مساعده.

(٤) أن يكون البحث ملتزماً بدقة التوثيق وحسن استعمال المصادر والمراجع وتشبيتها كالاتي:

- عند استخدام الكتب بوصفها مراجع للبحث: يتم كتابة اسم المؤلف كاملاً، ثم يوضع تاريخ النشر بين (حاصرتين)، يلي ذلك عنوان الكتاب ويتم وضع تحته خط، ثم يذكر اسم دار النشر ومكان النشر ورقم الصفحة
- عند استخدام الدوريات (المجلات) باعتبارها بوصفها مراجع للبحث: يُذكر اسم صاحب المقالة، ثم يذكر اسم المجلة وتحت خط، ثم رقم المجلد، ثم رقم العدد ورقم الصفحات.

(٥) ألا يكون البحث قد سبق نشره أو قدم للنشر لأي جهة أخرى.

(٦) رسوم النشر تقدر بـ (15) خمسة عشر ألف ريال يماني لليمنيين، وبـ(100) مائة دولار أمريكي لغير اليمنيين ترسل الى حساب الجامعة عبر حواله بنكية عبر بنك التضامن الإسلامي الدولي (فرع حده) بحساب رقم (203) سويفت كود (TIBKYESA101)، او عبر تحويل المبلغ عن طريق شبكة (ويسترون يونيون) (Western Union).

ثانياً: إجراءات النشر:

- ترسل البحوث وجميع المراسلات المتعلقة بالمجلة الى عنوان المجلة عبر البريد، أو إرسال البحث بالبريد الالكتروني الخاص بالمجلة.
- يرفق بالبحث ملخص للبحث في حدود (١٠٠ - ١٥٠ كلمة) باللغة العربية وباللغة الإنجليزية.
- يرفق بالبحث سيرة ذاتية مع تحديد التخصص الدقيق الذي ينتمي إليه الباحث مع وضع العنوان بالتفصيل مع توضيح العناوين البريدية مع ارقام الهواتف الارضية والحوال والفاكس .
- في حالة قبول المبدئي للبحث يتم عرضه على محكمين من ذوي الاختصاص في مجال البحث، ويتم اختيارهم بسريه تامه، ولا يعرض عليهم اسم الباحث او بياناته، وذلك لأخذ آرائهم حول مدى اصاله البحث وقيمته العلمية، ومدى التزام الباحث بالمنهجية المتعارف عليها، والمحكم هو من يحدد مدى صلاحية البحث للنشر في المجلة من عدمه.
- يخطر الباحث بقرار صلاحية البحث للنشر من عدمه خلال شهرين على الأكثر من تاريخ استلام البحث، وبموعد النشر، ورقم العدد الذي سينشر فيه البحث.
- في حالة ورود ملاحظات من المحكمين ترسل الملاحظات إلى الباحث لإجراء التعديلات اللازمة، على أن تعاد خلال مدة أقصاها شهر.
- الابحاث التي لم تتم الموافقة على نشرها لاتعاد الى الباحثين.
- تحفظ المجلة بحقها في إخراج البحث وإبراز عناوينه بما يتناسب وأسلوبها في النشر.
- تلتزم المجلة بإرسال نسختين من العدد إلى صاحب البحث المنشور بعد طبع العدد.
- تؤول جميع حقوق النشر للمجلة.
- البحوث المنشورة في هذه المجلة تعبر عن آراء اصحابها ولا تعبر عن رأي المجلة أو الجامعة.

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**Pattern of Congenital Heart Disease (CHD) Among Children
Under Five Years Referred to Charitable Heart Foundation
At Hadhramout Governorate, Yemen ; 2010/2011**

**نمط امراض القلب الخلقية بين الاطفال تحت السنة الخامسة
بالاستناد لمؤسسة القلب الخيرية-حزرموت-اليمن ٢٠١١/٢٠١٠**

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Pattern of Congenital Heart Disease (CHD) Among Children Under Five Years Referred to Charitable Heart Foundation At Hadhramout Governorate, Yemen; 2010/2011

Abstract :

Background: Congenital Heart Disease (CHD) is the most common congenital anomaly in newborns and it is a leading cause of death during the first year of life with a prevalence of 1% in live births. **Aim:** To determine the pattern of Congenital Heart Disease (CHD) among Children under Five Years according to the registry of Charitable Heart Foundation in Hadhramout, Yemen; 2010 ~ 2011. **Subject and method:** A descriptive retrospective design was used with purposive sampling. The study sample included 130 live birth children registered in charitable heart foundation in Hadhramout governorate were screened and investigated for CHD from September 2010 ~ Sep 2011. Two types of tools were used for data collection: a questionnaire sheet was designed for data collection from patient records in charitable heart foundation, the second tool that performed by telephone interview with parents of the patients to understand the demographic factors such as age, sex, type of CHD and association with endogamy between parent, **Key Words:** Pattern, CHD, Charitable Heart Foundation, Hadhramout, Yemen.

and relation with presence of CHD in their child. **Result:** The results of the present study revealed that more than half of the studied sample (54.6%) was from the urban area and the prevalence of CHD among females was (50.8%) compared to (49.2%) among the males and VSD was the commonest lesion (30.8%) among the studied sample followed by ASD and PDA (15.4% and 14.6 %) respectively. The majority of children was affected by VSD, in the males (31.3%) compared to (30.1%) in the females. The endogamy between parent and relation with presence of disease were positive with (42.3%) of the study sample and negative with (57.7%) of them. **Recommendations:** Finding of this work highlight the need for increasing awareness of family and community in Hadhramout about CHD through health education programs which to provide them with information about CHD, types, early discover of the disease, and pre-marital counseling should be emphasized among susceptible families.

المخلص :

المصابين من المدينة ومعدل الاصابة بين الاناث كان (٥٠,٨%) مقارنة (٤٩,٢%) بين الذكور وقد وجد ان الفتحة بين البطينيين هو الاكثر انتشارا (٣٠,٨%) بين العينة تحت البحث يليها الفتحة بين الاذنيين ثم القناة الشريانية السالكة (١٥,٤% و ١٤,٦%) على التوالي. الاطفال المصابين بالفتحة بين البطينيين كانوا من الذكور (٣١,٣%) مقارنة (٣٠,١%) بين الاناث . وقد وجدت هذه الدراسة ان الزواج بين الاقارب بين الوالدين وعلاقتة بالحالات المرضية الحالية ايجابية بين (٤٢,٣%) من العينة بينما كانت سلبية بين (٥٧,٧%).

التوصيات: بناء على نتائج الدراسة نوصي بتسليط الضوء ورفع الوعي حول امراض القلب الخلقية بين الاطفال في حضرموت من خلال برامج التثقيف الصحي ورفع الوعي حول انواع ، واهمية اكتشاف امراض القلب الخلقية مبكرا واهمية المشورة قبل الزواج خاصة لدى العائلات الذين لديهم استعدادات للمرض. الكلمات المفتاحية: نمط امراض القلب الخلقية، مؤسسة امراض القلب الخيرية، حضرموت -اليمن.

الخلفية : امراض القلب الخلقية من اكثر التشوهات الخلقية شيوعا بين المواليد وهي من الاسباب الرئيسية للوفيات خلال السنة الاولى من العمر وبمعدل انتشار وصل الى ١% لكل ولادة حية. وقد هدفت هذه الدراسة الى تحديد نمط امراض القلب الخلقية حسب سجلات مؤسسة امراض القلب، حضرموت - اليمن خلال ٢٠١٠ - ٢٠١١م.

المنهجية: استخدم التصميم الوصفي الاستعدادي في هذه الدراسة. وقد تم اختيار ١٣٠ طفل حي مسجلين لدى مؤسسة القلب الخيرية بحضرموت بطريقة عمدية وقد تم الاستقصاء والفحص لنمط امراض القلب الخلقية خلال الفترة من سبتمبر ٢٠١٠ الى سبتمبر ٢٠١١. استخدمت وسيلتان لجمع المعلومات: الاستبانة لجمع المعلومات من السجلات الطبية لمؤسسة القلب الخيرية ، والوسيلة الثانية المقابلة بواسطة الاتصال بالتلفون لوالدي المرضى وذلك لفهم العوامل الديموغرافية كالعمر والجنس وطبيعة مرض القلب الخلقي وعلاقة ذلك بالقرابة بين الوالدين.

النتائج : اظهرت نتائج هذه الدراسة ان اكثر من نصف العينة (٥٤,٦%) من

Introduction :

Congenital Heart Disease (CHD) is the most common congenital anomaly in newborns and it is a leading cause of death during the first year of life with a prevalence of 1% in live births.^[1]

Congenital Heart Diseases (CHDs) are the conformation abnormalities of the heart or the blood vessels, formed during fetal life (3 to 6 weeks of pregnancy), i.e. when the heart or the major blood vessels of the heart cannot develop properly before birth. The abnormalities involving the arteries, the valves, the coronary and the major vessels of the heart can be either simple or complex.^[2]

Congenital heart diseases (CHDs) are relatively common with a prevalence ranging from 3.7 to 17.5 per 1000 live births^[1, 3]. In the United States about 40,000 infants are born with heart defects each year.^[4]

Etiology of congenital heart disease (CHD) is multi factorial & a large collection of environmental and genetic causes have a role in its pathogenesis.^[3]

Several previous reports suggest a changing pattern and incidence of congenital heart disease in various geographic locations^[5, 6] according to racial and ethnic factors.^[7, 8] Knowledge of the epidemiology of congenital heart disease is the basis on which investigative efforts will emerge to identify the causes of cardiac dimorph genesis and afford opportunities to prevent them.^[9]

Malformations of the cardiovascular system are also associated with significant medical morbidity, which requires use of costly medical facilities.^[7] Thus, determining the prevalence and pattern of CHD is necessary to recommend valuable changes in health policies.^[10] There is no information about the prevalence rate of Congenital Heart Disease (CHD) at Hadhramout governorate in Yemen therefore the objective of this study was to determine the pattern of Congenital Heart Disease (CHD) among Children under Five Years according to the registry of Charitable Heart Foundation in Hadhramout.

Subjects And Methods :

Research design: A descriptive retrospective design was used with purposive sampling

Setting: This study was conducted at Charitable Heart Foundation in Hadhramout Governorate, Yemen.

Sampling: The study sample included 130 live birth children under five years registered in Charitable Heart Foundation in Hadhramout were screened and investigated for Congenital Heart Disease (CHD) from September 2010 ~ Sep 2011.

Tools Of Data Collection :

Two types of tools were used for data collection: A questionnaire sheet was designed for data collection from patient records in Charitable Heart Foundation, the second tool that performed by telephone interview with parents of the patients to understand the demographic factors such as age, sex, type of Congenital Heart Disease (CHD) and association with endogamy between parent, and relation with presence of the disease in their child.

Administrative design :

The director of Charitable Heart Foundation was previously informed and authors get written permission to do research, because of an ethical board to institution.

Statistical Analysis :

For statistical analysis the SPSS 14.0 statistical package is used. From statistical parameters the following is used; frequency table with percentage.

Results :

The socio-demographic characteristics of the studied sample are summarized in **table 1**. It shows that the most affected age group (43.8%) was from birth to less than one year and the prevalence of Congenital Heart Disease (CHD) among females was (50.8%)

compared to (49.2%) among the males and more than half (54.6%) of the study sample coming from urban areas.

Table 2 displays the patterns of Congenital Heart Disease (CHD) among study sample according to the data registry in Charitable Heart Foundation. The table reveals that VSD was the commonest lesion (30.8%) among the study sample followed by ASD and PDA (15.4% and 14.6 %) respectively while, Complex CHD and TOF were found (13% and 8.5%) among the study sample.

Table 3 illustrated the pattern of Congenital Heart Disease (CHD) with endogamy between parents among the study sample. The table, shows that the endogamy between parent and relation with presence of CHD were positive with (42.3%) of the study sample and negative with (57.7%) of them. Also, the table reveals that VSD was positive endogamy between parents with (29.1%) of study sample compared to (32%) was negative endogamy, while ASD was positive endogamy with (12.7%) compared to (17.3%) was negative endogamy and PDA was present at the same percentage (14.5%) with positive and negative endogamy among the study sample. While, Complex CHD was positive endogamy with (14.5%) compared to (12%) was negative endogamy and TOF was positive endogamy with (7.3%) compared to (9.3%) was negative endogamy among the study sample.

Table 4 illustrated the pattern of Congenital Heart Disease (CHD) with sex (male & female) among the study sample. The table reveals that VSD was found (31.3%) among males compared to (30.3%) among female, while ASD was found (18.2%) among female compared to (12.5%) among male and PDA was found (18.2%) among female compared to (10.9%) among male but, the Complex CHD was found (14.1%) among male compared to (12.1%) female and TOF was found (9.4%) in male compared to (7.6%) female of the study sample.

Table 5 shows the pattern of Congenital Heart Disease (CHD) with residence (urban & rural) among the study sample. The table reveals that VSD was found (35.2%) in urban area compared to (25.4%) in rural area among study sample, while ASD was found

(15.5%) in urban area compared to (15.3%) in rural area and PDA was found (23.7%) in rural area compared to (7%) in urban area but, the Complex CHD was found (12.7%) in urban area compared to (13.6%) in rural area and TOF was found (11.3%) in urban area compared to (5.1%) in rural area among the study sample.

Table (1) Distribution of the study sample by their Socio - demographic characteristics according the data referred to Charitable Heart Foundation during 2010-2011

Socio- demographic characteristics	Frequency	%
Age:		
Birth -< 1 Year	57	43.8
1 - < 2 Y	31	23.8
2 - < 3 Y	12	9.2
3 - < 4 Y	5	3.8
4 - 5 Y	25	19.2
Sex:		
Male	64	49.2
Female	66	50.8
Residence:		
Urban	71	54.6
Rural	59	45.4
Family history to CHD:		
Positive	9	6.9
Negative	121	93.1
Endogamy between parents:		
Positive	55	42.3
Negative	75	57.7

CHD: Congenital Heart Disease

Table (2) Patterns of Congenital heart disease (CHD) among the study sample according to the data registry in Charitable Heart Foundation during 2010~2011

Pattern of CHD according the diagnosis	Frequency	%
PDA	19	14.6
ASD	20	15.4
VSD	40	30.8
TOF	11	8.5

PS	6	4.6
Complex CHD (CCHD)	17	13
PDA- ASD-VSD	2	1.5
PDA- VSD	5	3.8
PDA- PS	2	1.5
ASD-VSD	5	3.8
VSD- PS	2	1.5
VSD- Complex CHD	1	0.8
Total	130	100

PDA:Patent Ducts Arteriosis, ASD:Atrial Septal Defect, VSD:Ventricular Septal Defect, TOF:Tetralogy Of Fallot, PS:Pulmonary Stenosis, , CCHD:Complex Congenital Heart Disease, CHD:Congenital Heart Disease.

Table (3) Pattern distribution of Congenital Heart Disease (CHD) with endogamy between parents among the study sample referred to Charitable Heart Foundation

Pattern of CHD according the diagnosis	Endogamy between parents			
	Positive		Negative	
	Frequency	%	Frequency	%
PDA	8	14.5	11	14.7
ASD	7	12.7	13	17.3
VSD	16	29.1	24	32
TOF	4	7.3	7	9.3
PS	2	3.6	4	5.3
Complex CHD	8	14.5	9	12
PDA- ASD-VSD	0	0	2	2.7
PDA- VSD	3	5.5	2	2.7
PDA- PS	1	1.8	1	1.3
ASD-VSD	3	5.5	2	2.7
VSD- PS	2	3.6	0	0
VSD- Complex CHD	1	1.8	0	0
Total	55	100	75	100

PDA:Patent Ducts Arteriosis, ASD:Atrial Septal Defect, VSD:Ventricular Septal Defect, TOF:Tetralogy Of Fallot, PS:Pulmonary Stenosis , CCHD:Complex Congenital Heart Disease, CHD:Congenital Heart Disease.

Table (4) Pattern distribution of Congenital Heart Disease (CHD) with the sex of studied sample referred to Charitable Heart Foundation

Pattern of CHD according the diagnosis	Sex			
	Male		Female	
	Frequency	%	Frequency	%
PDA	7	10.9	12	18.2
ASD	8	12.5	12	18.2
VSD	20	31.3	20	30.3
TOF	6	9.4	5	7.6
PS	3	4.7	3	4.5
Complex CHD	9	14.1	8	12.1
PDA- ASD-VSD	1	1.6	1	1.5
PDA- VSD	3	4.7	2	3
PDA- PS	1	1.6	1	1.5
ASD-VSD	3	4.7	2	3
VSD- PS	2	3.1	0	0
VSD- Complex CHD	1	1.6	0	0
Total	64	100	66	100

PDA:Patent Ducts Arteriosis, ASD:Atrial Septal Defect, VSD:Ventricular Septal Defect, TOF:Tetralogy Of Fallot, PS: Pulmonary Stenosis, CCHD:Complex Congenital Heart Disease, CHD:Congenital Heart Disease.

Table (5) Pattern distribution of Congenital Heart Disease (CHD) with the residence of studied sample referred to Charitable Heart Foundation

Pattern of CHD According The Diagnosis	Residence			
	Urban		Rural	
	Frequency	%	Frequency	%
PDA	5	7	14	23.7
ASD	11	15.5	9	15.3
VSD	25	35.2	15	25.4
TOF	8	11.3	3	5.1
PS	5	7	1	1.7
Complex CHD	9	12.7	8	13.6
PDA- ASD-VSD	1	1.4	1	1.7

PDA- VSD	4	5.6	1	1.7
PDA- PS	1	1.4	1	1.7
ASD-VSD	2	2.8	3	5.1
VSD- PS	0	0	2	3.4
VSD- Complex CHD	0	0	1	1.7
Total	71	100	59	100

PDA:Patent Ducts Arteriosis, ASD:Atrial Septal Defect, VSD:Ventricular Septal Defect, TOF:Tetralogy Of Fallot, PS:Pulmonary Stenosis, CCHD:Complex Congenital Heart Disease, CHD:Congenital Heart Disease.

Discussion :

Congenital heart diseases are an important group of disease that cause great morbidity and mortality in children.^[9] Early recognition of such lesions has great implications on prognosis.

The present study revealed the most affected age group (43.8%) was from birth to less than one year and the prevalence of Congenital Heart Disease (CHD) among females was (50.8%) compared to (49.2%) among the males and more than half (54.6%) of the study sample coming from urban areas. This finding disagree with the study in **Iran**^[11] who found that CHD was more common in male births and also, this finding is not similar to that reported in Saudi Arabia^[12], and Iceland^[13] where the frequency was the same for males and females while this finding in line with study in Nigeria^[14] CHD was found to be more common in female births.

The current study revealed that VSD was the commonest lesion (30.8%) among the study sample followed by ASD and PDA (15.4% and 14.6 %) respectively while, Complex CHD and TOF were found (13% and 8.5%) among the study sample , these results agrees with the findings of the study formed by **Sheikh et al., 2012**^[15] who found that the most frequent type of congenital heart disease was found to be ventricular septal defect (VSD) (33.45%), followed by atrial septal defect (ASD) (13.6%), and patent ductus arteriosus (PDA) (10.6%). And also in line with **Aburawi, 2006**^[16] who mentioned that Worldwide ventricular septal defect (VSD) is the most common acyanotic CHD accounting 25-30% of all CHD

[16]. This may be explained by the difference in genetic makeup & ethnicity. Atrial septal defect (ASD) ranked second in frequency accounting for 13.6% . Patent ductus arteriosus (PDA) was seen in 10% of cases.

The most frequent type of CHD was found to be ASD which is in accordance with another study in **Iran** [17] while in other studies [9, 18, 19, 20-13] the most frequent type of CHD was VSD. This could be due to the severity of defects which might have led to the death of patients before accessing the medical facilities. This might also be due to racial and genetic factors in different populations.

The finding of the present study showed that VSD was found among males (31.3%) compared to (30.3%) among female, while ASD was found (18.2%) among female compared to (12.5%) among male and PDA was found (18.2%) among female compared to (10.9%) among male. These results in line with **Sheikh et al., 2012** [15] in the finding of the rate of VSD in males & females were 1.27:1. The rate of ASD in males was 1.17:1. And disagree of the result PDA was found to be more common in male than female. Parents of (6.25%) babies were related. None of the affected children had a positive family history of birth defects, hypertension, diabetes, thyroid disorder. History of still birth were found in 1% of mother – was Down syndrome. This finding agree with study by [21] (**Khan et al., 2011**) who reported that eight cases of the studied sample had a family history of CHD. The finding of this study revealed VSD was found (25.4%) in rural area among study sample, and PDA was found (23.7%) in rural area, these results disagree with study performed in rural area by [21] (**Khan et al., 2011**) who reported that Atrial septal defect was the commonest lesion with a prevalence of 9.6 per 1000 followed by ventricular septal defect with a prevalence of 5.8 per 1000 children

Conclusion :

In the light with the main study findings, it might be concluded that the pattern of Congenital Heart Disease (CHD) among females was (50.8%) compared to (49.2%) among the males and the most affected age group (43.8%) was from birth to less than one year and 54.6% of the sample coming from urban areas. VSD was the commonest lesion (30.8%) among the study sample followed by ASD and PDA (15.4% and 14.6 %) respectively. The majority of children was affected by VSD, in the males (31.3%) compared to (30.3%) in the females. The endogamy between parent and relation with presence of disease were positive with (42.3%) of the study sample and negative with (57.7%) of them

Acknowledgment :

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Synthesis of Fe₃O₄ nanoparticles from Ferric Nitrate by Sol-Gel Method

تخليق جزئيات النانوية
لأكسيد الحديد المغناطيسي "Fe₃O₄"
من نترات الحديد بواسطة طريقة محلول - غروي

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Synthesis of Fe₃O₄ nanoparticles from Ferric Nitrate by Sol-Gel Method

Abstract :

Fe₃O₄ nanoparticles were synthesized from Ferric Nitrate by Sol-Gel method with annealing under vacuum. The phase structures, morphologies, particle sizes, chemical composition, and magnetic properties of Fe₃O₄ nanoparticles were characterized by TEM ,U.V and XRD .

The results indicated that the size, the corresponding saturation magnetization value and coercivity value of Fe₃O₄ nanoparticles increase with the increase of temperature . Fe₃O₄ nanoparticles was studied under different atmospheres and temperatures.

Keywords: Ferric Nitrate , Fe₃O₄ nanoparticles , properties and characterization.

الملخص :

الحساسية بزيادة جزيئات النانوية لأكسيد الحديد المغناطيسي "Fe₃O₄" مع زيادة درجة الحرارة . جزيئات النانوية لأكسيد الحديد المغناطيسي "Fe₃O₄" درست تحت درجات حرارة مختلفة وتحت ضغط .
الأشياء الرئيسية: نترات الحديد ، جزيئات النانوية لأكسيد المغناطيسي "Fe₃O₄" والخواص و التحليل.

خلقت جزيئات النانوية لأكسيد الحديد المغناطيسي من نترات الحديد بواسطة محلول -غروي مع درجة الحرارة العالية وتحت ضغط. التراكيب الطوري، المرفولوجيات والاحجام الجزيئية تركيب الكيميائي ، الصفات المغناطيسية من جزيئات النانوية الأكسيد الحديد المغناطيسي "Fe₃O₄" دراسة التحليل بواسطة اجهزة TEM, XRD and U.V. والنتائج تشير إلى الحجم والقيم المغناطيسية لمواضع الارتباط والقيم

Introduction :

In the past decade, a variety of methods have been developed to form highly structure-controlled materials of functionalized metals, semiconductors and copolymer nanoparticles on the nano- or microscale. As a versatile kind of material, magnetite has attracted much attention in recent years.

Ferrite iron (Fe₃O₄) is a traditional magnetic material used in magnetic storage media, solar energy transformation, electronics, ferrofluids, biomedicine and catalysis [1-4]. During the last decade, significant research has been done in the field of nanosized magnetic particles, due to their potential for biomedical applications, such as improving the quality of Magnetic Resonance Imaging (MRI) , and drug delivery systems [5 – 6].

Fe₃O₄ nanoparticles have been the subject of intense interest because of their potential applications in several advance technological areas due to their promising physical and chemical properties. Generally, these properties depend on the size and structure of particles . Fe₃O₄ nanoparticles find wide applications in the field of biomedical, as anticancer agent and corrosion protective pigments in paints and coatings [7- 9]. The magnetic atoms or ions in such solid materials are arranged in a periodic lattice and their magnetic moments collectively interact through molecular exchange fields, which give rise to a long-range magnetic ordering.

Among all iron oxide nanoparticles, Fe₃O₄ represent the most interesting properties due to of its unique structure i.e. the presence of iron cations in two valence states, Fe²⁺ , Fe³⁺ on tetrahedral and octahedral sites with an inverse cubic spinel structure. The coercivity and remenance values for the super paramagnetic nano Fe₃O₄ nanoparticles have been found to be zero by the earlier reported methods [10-13]. Presently, cell labelling strategies find application of superparamagnetic ferrite either through conjugating the magnetic nanoparticles to the cellular surface of the stem cell or by internalization of the particles into the cell. Superparamagnetic ferrite can work in both of these ways, since the potential to manipulate their surface chemistry is plentiful and their sizes along

with other attributes promote their successful uptake into cells. The superparamagnetic nano ferrites also interface well with MRI technology.

The use of superparamagnetic particles play a crucial role in the diagnostic imaging modality technique finds application in the study of stem cell [14-15].

In this paper Fe₃O₄ nanoparticles were synthesized by heating to 40⁰C at 2 hours and at 80⁰C for 2 hours to obtained Sol Gel followed by drying for 6 hours at 120⁰C and then annealing at 200⁰C and 400⁰C in oven under vacuum to obtain Fe₃O₄ powder .

Experimental Materials :

Ferric nitrate (Fe(NO₃)₃.9 H₂O) and ethylene glycol (C₂H₆O₂) of analytical grade were obtained from Sinopharm Chemical Reagent Co ,Ltd ,China. The reagents were used without further purification.

Physical parameters of Ferric nitrate (Fe (NO₃)₃. 9 H₂O) and Glycol (C₂H₆O₂) are reported in table 1 and 2 respectively.

Table 1. General Characteristics of Ferric nitrate (Fe (NO₃)₃. 9 H₂O)

Molecular formula	Ferric nitrate (Fe (NO ₃) ₃ . 9 H ₂ O) ≥ 98.5 %
Appearance	White Powder
Molecular weight	404
Company	Sinopharm chemical reagent Co ,Ltd ,China

Table 2. General Characteristics of Ethylene Glycol (C₂H₆O₂)

Molecular formula	Ethylene Glycol (C ₂ H ₆ O ₂) ≥ 99 %
Appearance	liquid
Molecular weight	62.07
density	1.111- 1.115
Company	Sinopharm chemical reagent Co ,Ltd ,China

Preparation of Magnetite Nanoparticles :

The procedure of synthesizing magnetite nanoparticles [16-19] is described as follows:

20.2 gram ferric nitrate was first dissolved in 25 mL ethylene glycol with vigorous stirring speed 500r.p.m in 100 mL three necked flask glass with out cover for 2 hours at 40 °C, and then the solution was heated to 80 °C and kept at the temperature to obtain brown gel. The gel was obtained after 2 hours and then dried at 120 °C for about 4 hours in petri dish . After drying, the xerogel was annealed at temperature range 200 and 400 °C under vacuum. Finally, different size magnetite nanoparticles were obtained.

Transmission Electron Microscope (TEM) Test :

For TEM Test , a small amount of sample was dissolved in 3mL of deionized water in test tube and the solution was stirred by ultra-sonication . Then 10 µ L sample was transferred to clean Copper Grid and kept for drying for TEM test. The TEM micrographs of samples were observed by CM 12 Philips Transmission Electron Microscope .

Results and Discussion :

Plate 1,2,3 ,4,5,6 ,7 and 8 (TEM) at at 200 0C and plate 9,10,11,12,13,14,15,16,17,18 and 19 (TEM) at at 400 0C shows the top-view TEM images of the Fe₃O₄ Nanoparticle plate (TEM) 1 The size of the Fe₃O₄ nanoparticle is clear from the TEM. The surface of Fe₃O₄ nanoparticle shows several large meandering wrinkles. The size of Fe₃O₄ nanoparticle can be clear from TEM image . Fig (1 and 2) X-ray diffraction shown the graph all of Magnetite and Fe₃O₄ nanoparticle. Fig (3and 4) U.V shown the graph all of Magnetite and Fe₃O₄ nanoparticle respectively dispersed in chloroform.

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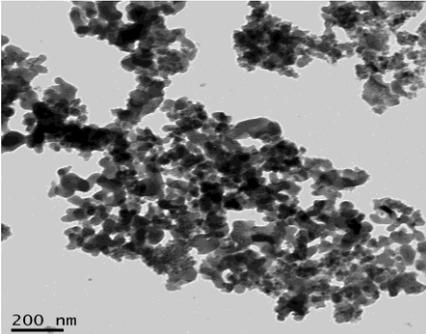


Plate1: Fe₃O₄ 200 °C

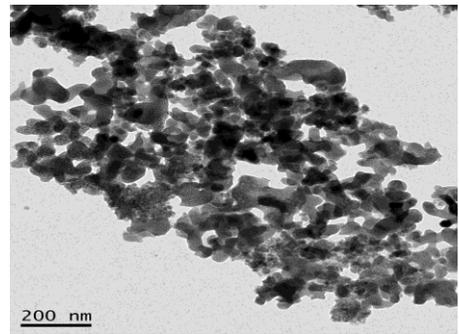


Plate2: Fe₃O₄ 200 °C

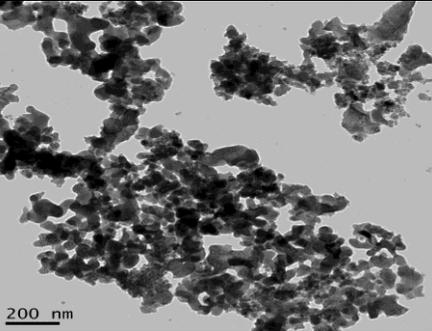


Plate3: Fe₃O₄ 200 °C

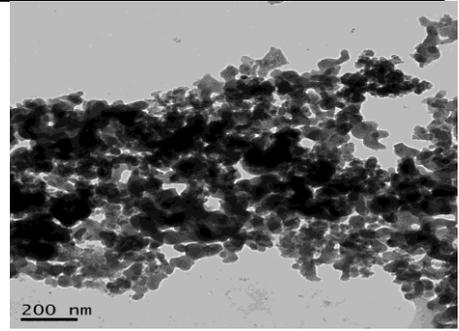


Plate4: Fe₃O₄ 200 °C

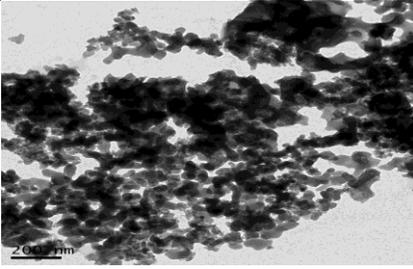


Plate 5: Fe₃O₄ 200 °C

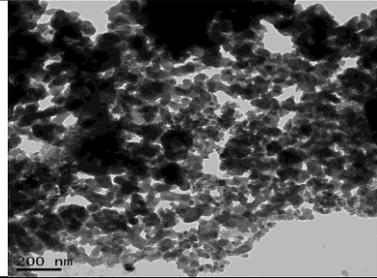


Plate 6: Fe₃O₄ 200 °C

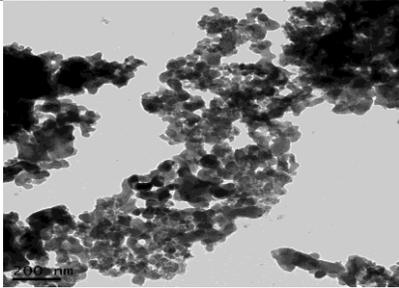


Plate 7: Fe₃O₄ 200 °C

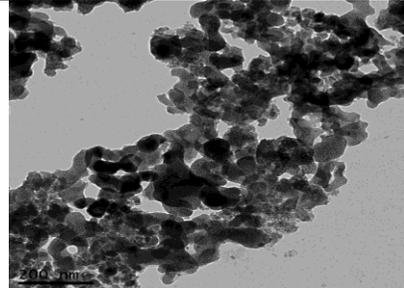


Plate 8: Fe₃O₄ 200 °C

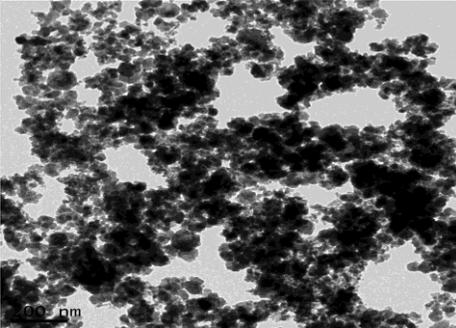


Plate 9: Fe₃O₄ 400 °C

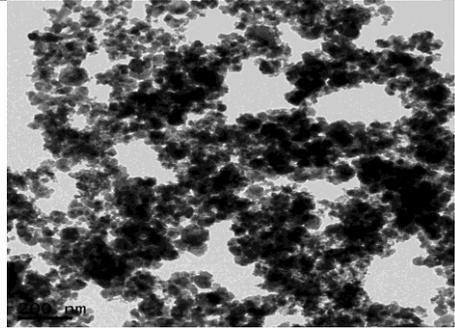


Plate 10: Fe₃O₄ 400 °C

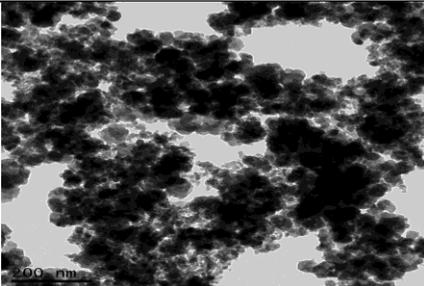


Plate 11: Fe₃O₄ 400 °C

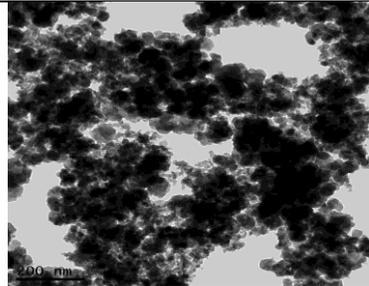


Plate 12: Fe₃O₄ 400 °C

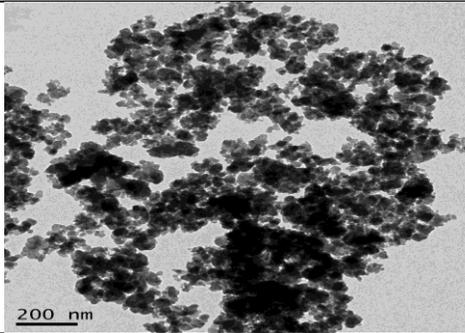


Plate 13: Fe₃O₄ 400 °C

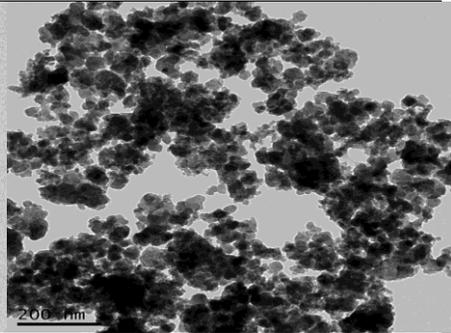


Plate 14: Fe₃O₄ 400 °C

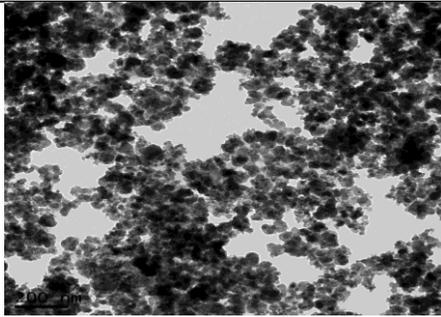


Plate 15: Fe₃O₄ 400 °C

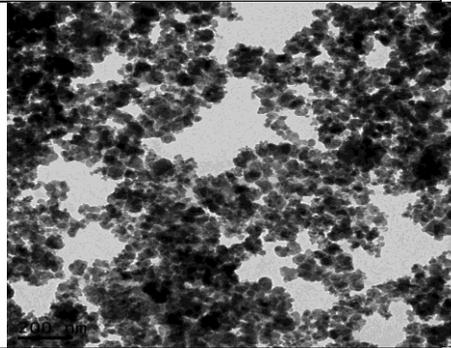


Plate 16: Fe₃O₄ 400 °C

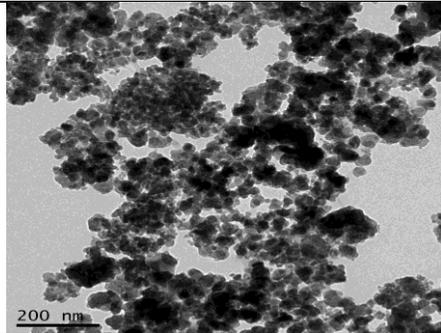


Plate 17: Fe₃O₄ 400 °C

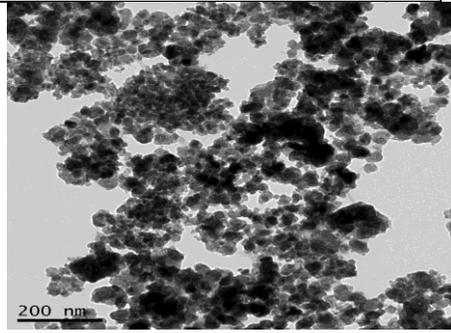


Plate 18: Fe₃O₄ 400 °C

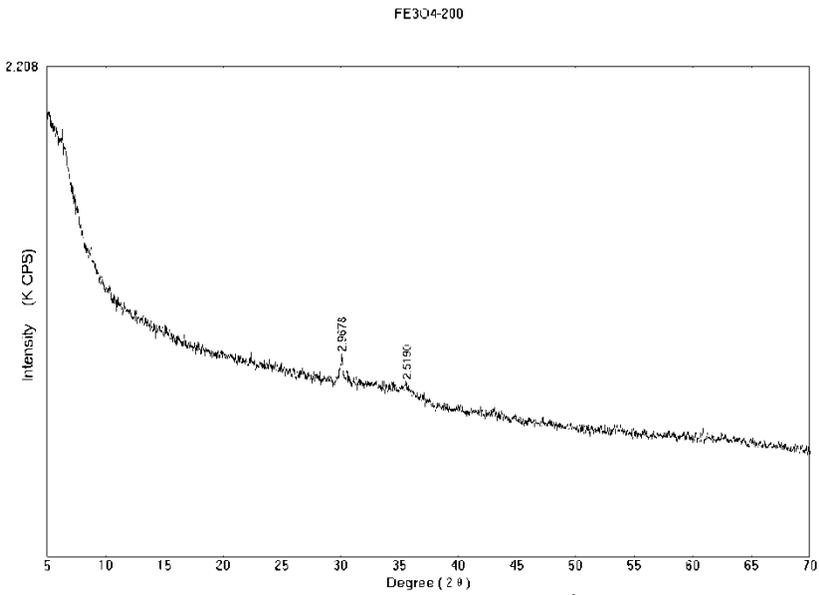


Fig .1: XRD for Fe₃O₄ Nanoparticle at 200 °C

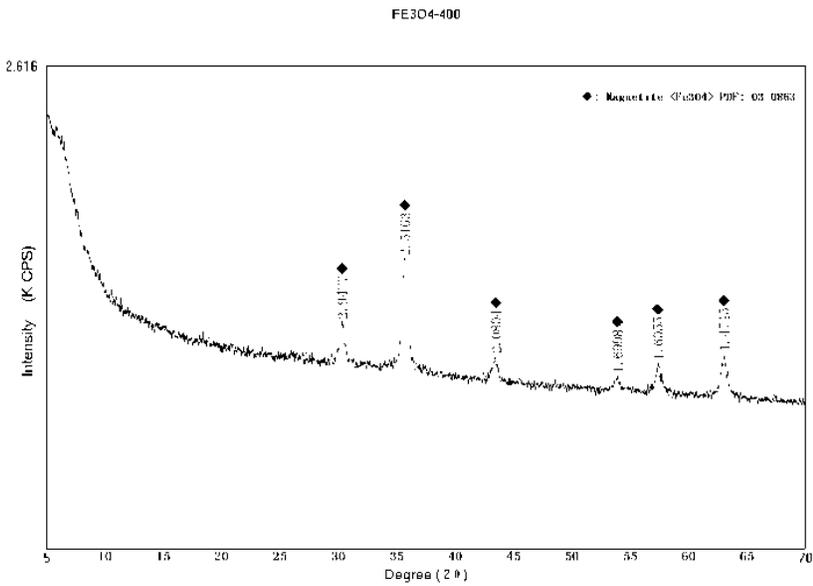


Fig .2: XRD for Fe₃O₄ Nanoparticle at 400 °C

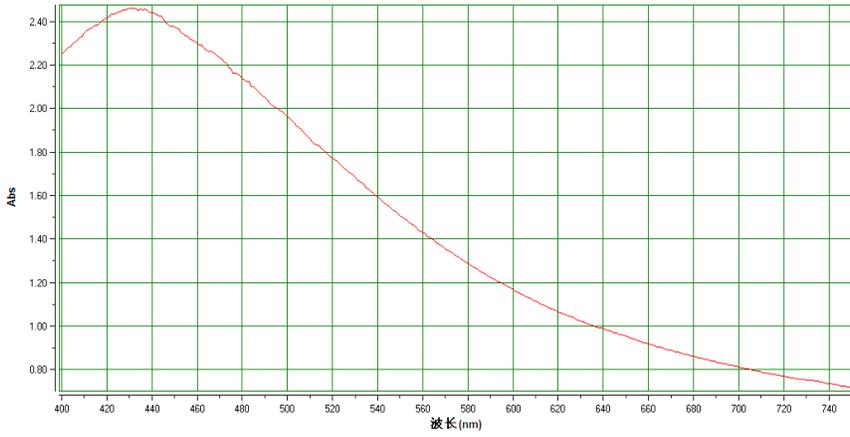


Fig.3 : U.V of Fe₃O₄ 200 °C

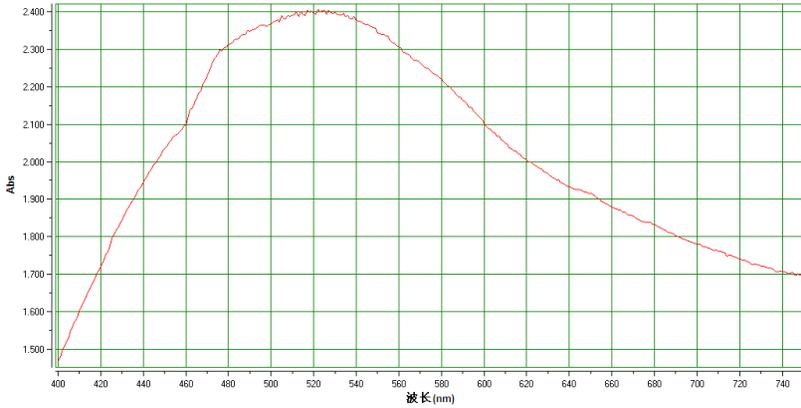


Fig. 4 : U.V of Fe₃O₄ 400 °C

Echocardiographic Patterns of Rheumatic Heart Disease. A study from A Specialized Heart Clinic

**أنماط تخطيط صدى القلب لأعراض القلب الروماتيزمية
دراسة من عيادة القلب المتخصصة**

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Echocardiographic Patterns of Rheumatic Heart Disease. A study from A Specialized Heart Clinic

Abstract :

Background: Rheumatic heart disease (RHD) is an important contributor to cardiovascular disease in children and adults in Yemen. Rheumatic heart disease (RHD) continues to cause gross distortions of the heart and the associated complications of heart failure and thromboembolic phenomena in this age. Different valvular damages can cause real health problems for the affected persons by the disease.

Aims: To describe the presenting features of Rheumatic Heart Disease patients attended specialized heart clinic.

Methods: Echocardiographic data of patients attended this specialized clinic during the period of 3 years from January, 2009 to December, 2012 were analyzed. Two hundred and five patients who satisfied the inclusion criteria for RHD were found.

Results: Of the total 205 patients with RHD females were found to be more common than

males (63.4%, vs. 36.6%). The study shows that RHD was found more common in the age group 20-30 years. According to the valve lesions mitral valve is mostly affected(65.4%), followed by mixed valve lesions (22.9%).Mitral stenosis was found to be more common (47.8%).

Conclusion: A significant proportion of RHD patients present to hospital with severe disease associated with severe complications of advanced heart failure, pulmonary hypertension, infective endocarditis and atrial fibrillation. Valve replacement done for some patients. There is a need to improve awareness of the disease among the population, and clinical suspicion in primary health workers, so that early referral to specialist management can be done before severe damage to the heart ensues.

Key words: Rheumatic Heart Disease. Echocardiography.

المخلص :

الروماتيزية المترددين لعيادة القلب المتخصصة.
نتائج البحث: تم العثور على مجموع ٢٠٥ من المرضى يعانون من أمراض القلب الروماتيزية، معظمهم من الإناث مقارنة بالذكور (٦٣,٤٪ مقابل ٣٦,٦٪)، وتظهر الدراسة أن أمراض القلب الروماتيزية أكثر شيوعاً في الفئة العمرية ٢٠ - ٣٠ سنة. وفقاً لآفات الصمامات فإن الصمام التاجي الأكثر إصابة حيث يمثل حوالي (٦٥,٤٪)، يليها آفات الصمام المختلطة (٢٢,٩٪). ووجد أن تضيق الصمامات التاجية هو الأكثر شيوعاً (٤٧,٨٪).
الاستنتاج: إن نسبة كبيرة من المرضى المصابين بروماتيزية القلب يأتون إلى المستشفى وهم يعانون من أمراض شديدة مرتبطة بمضاعفات شديدة كفشل القلب المتقدم وارتفاع ضغط الدم الرئوي، والتهاب شغاف القلب الرجفان الأذيني. وتم استبدال صمام لبعض هؤلاء المرضى. وهنا كحاجة إلى تحسين الوعي لهذا المرض بين السكان ينبغي الإحالة المبكرة إلى عيادة متخصصة يمكن أن تفيد المريض قبل حدوث أضرار فادحة في القلب.

تعد أمراض القلب الروماتيزية (RHD) من أهم الأسباب المؤدية إلى إصابة الأطفال والكبار بأمراض القلب والأوعية الدموية في اليمن.
أمراض القلب الروماتيزية (RHD) لاتزال تتسبب في تشوهات جسيمة في القلب، ومضاعفات مصاحبة كفشل القلب وانسداد الأوعية الدموية. إن أضرار الصمامات المختلفة قد تسبب مشاكل صحية حقيقية للأشخاص المتضررين من هذه الأمراض.
هدف الدراسة: تهدف الدراسة لوصف العلامات والملاحح الظاهرة للمرضى بأمراض القلب الروماتيزية المترددين لعيادة القلب المتخصصة.
منهجية البحث: تم استخراج بيانات الرسم الصدوي للقلب للمرضى المترددين لعيادة المتخصصة بالقلب خلال فترة ٣ سنوات من يناير ٢٠٠٩ إلى ديسمبر ٢٠١٢، وتم تحليلها، تم العثور على مائتين وخمسة مرضى استوفوا معايير التشخيص لمرض القلب الروماتيزية.
تهدف الدراسة لوصف العلامات والملاحح الظاهرة لمرض أمراض القلب

Introduction :

Rheumatic Heart Disease is a condition when permanent damage of the heart valves occur as a result of previous rheumatic fever. The heart valves are damaged by disease process that generally begins with a strep throat caused by streptococcus A bacteria of beta hemolytic group, which may cause rheumatic fever. Rheumatic fever is an inflammatory disease, can affect many connective tissues, especially in the heart, joints, skin or the brain. As many as 39% of patients with acute rheumatic fever may develop varying degrees of pancarditis with associated valve insufficiency, heart failure, pericarditis and even death¹.

A study from Malawy reported that out of the 3908 new Malawian patients included in the 5-y period register, 34% had valvular heart disease (mainly rheumatic heart disease – RHD)², that reflects its high magnitude. In another study from Nigeria, five hundred and fifty eight (19.8%) of the 2875 medical admissions were patients with cardiovascular disease. And out these 6% were RHD patients³.

In a world health trial, a total of 1,433,710 school children were screened and 3135 cases of rheumatic fever/rheumatic heart disease were found, giving a prevalence of 2.2 per 1000 (higher in the African and Eastern Mediterranean regions)⁴. Rheumatic Heart Disease remains one of the most prevalent diseases in Yemen. In a study done among school-children in Aden, the prevalence of RHD was 36.5/1000 school-children, which is one of the highest reported among school echocardiography surveys in the world⁵. Females are more prone to rheumatic heart disease than males. Socioeconomic status has a direct impact on the occurrence of rheumatic heart disease⁶.

Rheumatic heart disease remains one of the main health problems in Yemen. It is probably the most common CVD diseases among children and young adults.

Present study was designed to determine the frequency of rheumatic heart disease in a specialized heart clinic in Aden. Yemen.

Methods :

This study was done in a specialized heart clinic in Aden city. Patients enrolled in the study are coming from different governorates of the southern part Yemen. All clinically suspected cases of RHD underwent Transthoracic Echocardiography examination was performed using color Doppler echo machine, with the different modalities for the B-mode, M-mode, and the Doppler studies for determination of valvular regurgitation, valvular stenosis⁷, assessment of the severity of these pathologic findings⁸. All the investigations were done in accordance to the criteria of World Heart Federation for the diagnosis of rheumatic heart disease⁹.

Echocardiography was used as a tool for diagnosis of different types of valvular lesions with the assessment of severity of the valve damage. It gives more accurate estimation for the severity of stenosis or regurgitation, and for the quantification of the degree of pulmonary hypertension¹⁰.

The collected data was downloaded to the computer for analysis. Patients were grouped to 4 groups (according to their ages). Patients with complications like atrial fibrillation were noted in their records and those who had done valve replacement also were recorded. Because of small number of the study cases, these were not grouped isolately.

Statistical analysis done using the Excel simple package. Age groups were expressed by percentages and averages (mean+ standard deviation).

Results :

The total number of patients was 205. These were grouped into four groups according the ages (Group I from 10 to 20 years, Group II from 21 to 30y, Group III from 31 to 40 y, Group >40y.). The age group II represents the most affected group by RHD

(40.98%), followed by group III (31.7%). The younger age group and those above 40 years were less affected & found to be with similar prevalence (13.17% & 14.15% respectively).

Table 1: Distribution of RHD cases according to age

Age (Years)	10-20	21- 30	31- 40	40	Total
No of cases	27	84	65	29	205
%	13.17%	40.98	31.71%	14.15%	100%

In relation to the sex distribution of the RHD in our patients, we found that female patients are more prone to develop the disease 63% vs 37%.

To look for valve involvement we found that the prevalence of mitral valve disease is more prominent than other valves affected – 65.37% for mitral valve disease, followed by mixed valve affection 22.93% and the least affection was for aortic valve (11.27%).

Table 2: Distribution of RHD cases according to valve type

Valvular lesion	Mitral valve	Aortic valve	Mixed valve	Total
No of cases	134	24	47	205
%	65.37%	11.71%	22.73%	100%

Table 3: show the distribution of the cases in relation to mitral valve lesions. Mitral stenosis was found to be more common than other forms. 64 cases (47.8%) were found to have isolated mitral stenosis. Followed by mitral regurge which accounts for 31.3%. Mixed mitral disease was observed in 28 cases, which comprises 20.9%.

Table 3: Distribution of RHD cases in relation to Mitral Valve Lesion

Valvular lesions	Mitral Stenosis	Mitral Regurge	Mixed Mitral Disease	Total
No. of Cases	64	42	28	134
%	47.76%	31.34%	20.90%	100%

As seen in table 4 which demonstrates different forms of aortic valve affection in this study. As it is seen the total number of patients with aortic valve lesions were only 24 patients. Aortic regurg comprises 17 cases (70.83%) and cases with aortic stenosis were discovered in 7 patients (29.17%).

Table 4: Distribution of RHD cases regarding Aortic Valve Lesion

Valvular lesions	Aortic stenosis	Aortic regurg.	Total
No. of cases	7	17	24
%	29.17%	70.83%	100%

As seen in table 5 Frequency distribution of specific valvular lesions, of the total number of echocardiography records of our patients with RHD demonstrates, that mitral stenosis (MS) is most common type of the rheumatic valvular disease. It was detected in 64 cases (31.22%). Combined valve disease (Mitral + Aortic) was found in 47 cases, which comprises 22.93%, followed by mitral regurge (MR) 42 cases (20.49%).

Table 5: Distribution of RHD cases according to Specific Valvular Lesion

Valve lesions	MS	MR	Mixed MD	Combined valve D	AS	AR	Total
No.	64	42	28	47	7	17	205
%	31.22%	20.49%	13.66%	22.93%	3.41%	8.29%	100%

Table 6 shows that 78 cases (38%) of our patients had underwent intervention wether Balloon Valvotomy (BMVT), or others of them underwent open heart surgery. Of the 78 cases 34 cases (16.95%) had underwent Mitral valve replacement by metallic valve (MVR). 25 patients (12.20%) had been operated for double valve replacement (DVR). Balloon valvotomy was performed for 12 patients (5.85%). Aortic valve replacement was found only in 7 cases (3.41%).

Table6: Distribution of RHD cases according to the type of Surgical intervention

	Non Operated	BMVT	MVR	AVR	DVR	Total
No of Cases	127	12	34	7	25	205
%	61.95%	5.85%	16.95%	3.41%	12.20%	100%

Table 7 shows the distribution of the patients with RHD according to their area of residency. Majority of our patients came from Aden governorate 72 cases (35.12%). Patients from Abyan governorate takes the second place – 63 (30.73%). Where patients from Lahej governorate comprises 16.10% of the total number. Other governorates of southern parts of Yemen show less figures.

Table 7: Distribution of RHD cases according to Residency

Residency	Aden	Abyan	Lahej	Aldhalae	Shabwa	Others	Total
No.	72	63	33	11	16	10	205
%	35.12%	30.73%	16.10%	5.37%	7.8%	4.88%	100%

Discussion :

Several studies had been about RHD in Yemen, whether hospital based data, or screening among school children^{5,12,13}. To our knowledge this the first study from a private specialized heart clinic.

Rheumatic heart is still a prevailing disease among Yemeni population and it is surprisingly having higher prevalence among school children

Our results show that rheumatic heart disease affecting females than males (63.4% vs 36.6%), which is coincident with the findings of Essien IO¹³ in the study done at Enugu, Nigeria, with Hamzullah Khan from Pakistan¹⁴. And it in contrast to the study done by H.K.Saleh¹² which showed almost equal frequency among both male & female. Our study show that mitral valve affection is the most common than other valves (65.37%) from the total number of studied group, which correlates with other studies^{5,14}. We found that mitral stenosis is more common than mitral regurge which in

contradiction with other studies done by H.K.Saleh, may because our study included only adult patients. While those studies including children are more prevalent mitral regurge or equal in frequency. Some of the patients were found to be in advanced stage of rheumatic heart disease. And these patients had underwent surgical correction of the valves or done for them transcuteaneous balloon valvotomy(38% of the cases). Of the studied group 12 patiens had done BMVT 2 of them during pregnancy. 34 cases underwent MVR.

Although nowadays some of these patients could get surgical correction, but still the problem of rheumatic heart disease is a great burden for Yemeni health situation. Further actions should be done among the children and young adult population to eradicate the cause of rheumatic fever, which consequently leads to rheumatic valvular disease.

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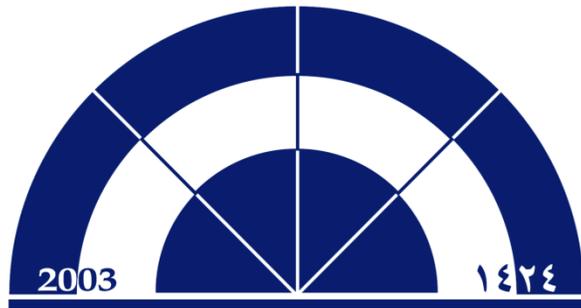
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Pattern Of Heart Disease In Socotra Island

أنماط أمراض القلب في جزيرة سقطرى

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Pattern of Heart Disease in Socotra Island

Abstract :

Socotra is a small archipelago in Yemen located in Indian Ocean and consists of the main island of Socotra and three smaller islands. The healthy service in this island is rare and there is lack of medical facilities in this island .There is no studies were done regarding the pattern of heart disease in this island, so the aim of this studt to high light the cardiovascular problem among SOCOTRIAN people and show its pattern which reflects the magnitude of problem.

Aim : The aim of our study is to estimate the pattern of heart disease in Socotra Island.

Methods : During March 2013 while out reach program which is organized by non-governmental organizations which was held in Khalifa Bin Zayed Al Nahyan hospital – Hadibu district (the capital of the island), 123 patients were consulting and subjected to clinical examination and suspected cases were referred to ECG and echocardiography beside the routine laboratory and

chest X-ray. The data collected and subjected to statistical analysis and main abnormality was left ventricular hypertrophy.6 patients were diagnosed as congenital heart disease mainly non cyanotic .9 patients had rheumatic heart disease mainly double valve disease. 14 patients were found to have arterial hypertension, and 11 patients needs cardiac intervention (coronary angiography, valve replacement, percutaneous mitral and pulmonary valvulopalsty).

Recommendations:Cardiovascular disease represents a big problem in SOCOTRA Island. Rheumatic heart disease and arterial hypertension was more common cardiovascular disease and health and health organizations with ministry of health should interfere to tackle this health problem either by preventive of curative program.

Keyword: rheumatic heart disease, Socotra Island, arterial hypertension.

المخلص :

جمعتها تم تحليلها إحصائياً. أظهرت الدراسة أن معظم المرضى يعانون من تضخم في البطين الأيسر. وتم تشخيص ستة (6) مرضى يعانون من أمراض القلب الخلقية خاصة العيوب غير المصاحبة بالازرقاق. وتسعة (9) من المرضى يعانون من الإصابة بأمراض القلب الروماتيزمية وخاصة آفة الصمامات المختلطة. وتم تشخيص أربعة عشرة (14) مريضاً لديهم ارتفاع ضغط الدم الشرياني، وأحد عشر (11) مريضاً يحتاجون لتدخل علاجي للقلب.

التوصيات: تمثل أمراض القلب والأوعية الدموية مشكلة كبيرة في جزيرة سقطرى. وأمراض القلب الروماتيزمية وأمراض القلب الشرايين وارتفاع ضغط الدم الشرياني أكثر شيوعاً، والمنظمات الصحية مع وزارة الصحة يجب أن تتدخل لمعالجة هذه المشكلة الصحية إما عن طريق الوقائية أو برنامج علاجي.

سقطرى محافظة يمنية، وهي عبارة عن أرخبيل يقع في المحيط الهندي، ويتكون من سقطرى الجزيرة الرئيسة، وثلاث جزر أصغر. الخدمة الصحية في هذه الجزيرة هي نادرة، وهناك نقص في المرافق الطبية في هذه الجزيرة. لا توجد هناك أي دراسات حول نمط الإصابة بأمراض القلب في هذه الجزيرة.

الهدف: الهدف من دراستنا هو تقدير نمط الإصابة بأمراض القلب في جزيرة سقطرى. منهجية البحث: خلال مارس 2013 بينما برنامج أيادي الخير التي تنظمها المنظمات غير الحكومية الذي عقد في مستشفى خليفة بن زايد آل نهيان - بمنطقة حديبو (عاصمة الجزيرة)، تم معاينة مائة وثلاثة وعشرين (123) مريضاً، وخضعوا للفحص السريري وتمت إحالة الحالات المشتبه منهم لعمل تخطيط للقلب وعمل الرسم الصدوي للقلب، إلى جانب الفحص المخبري الروتيني والأشعة السينية للصدر. البيانات التي تم

Introduction :

Socotra, also spelled Soqotra, is a small archipelago. The archipelago in Indian Ocean and consists of the main island of Socotra (3,665 km²), the three smaller islands of Abd Al Kuri, Samhah and Darsa and small rock outcrops like Ka'l Fir'awn and Sābūnīyah that are uninhabitable by humans but important for seabirds (1) .It lies some 240 kilometres east of the Horn of Africa and 380 kilometres south of the Arabian Peninsula (2). The island measures 132 kilometres in length and 49.7 kilometres in width. (3)

Almost all inhabitants of Socotra, numbering nearly 50,000, live on the homonymous main island of the archipelago. The archipelago forms two districts of the Hadhramout Governorate:

- the district of Hadibu , with a population of 32,285 and a district seat at Hadibu, consists of the eastern two-thirds of the main island of Socotra;
- The district of Qulansiyah wa 'Abd-al-Kuri, with a population of 10,557 and a district seat at Qulansiyah, consists of the minor islands (the island of 'Abd-al-Kūrī chief among them) and the western third of the main island.(4)

The health service in SOCOTRA is very basic. The island is so isolated from the mainland that the cost if even the most basic daily food requirement is exorbitant; the health system is poor and consequently there are high rates of morbidity and mortality.

The first public clinic on SOCOTRA was built in the 1950s with the British help. By 2009, the health infrastructure consisted of one district general hospital in Hadibo, the capital town of Socotra; one health centre in Qalansiyah district; and around 15 primary health units all over the island more than half were non functioning as well as some private clinic and pharmacies.

Regarding the health problems in Socotra, there were no available statistic, but research was done focusing on health

problems in 2009 reveals main problems are in respiratory and gastro-intestinal but no data regarding cardiovascular diseases in Socotra.

The aim of our study is to estimate the pattern of heart disease in Socotra Island.

Patients and Methods :

During march 2013 in Khalifa Bin Zayed Al Nahyan hospital – Hadibu district (the capital of the island), The Hospital built with funding from Khalifa bin Zayed Al Nahyan Humanitarian Foundation. 123 patients were screened by team consist of 6 cardiologist, 2 of them are specialist in pediatric cardiology in out patient clinic. Each patient was subjected to careful full history taken, detect risk factors for ischemic heart disease, all medications taken and any intervention was done to the patient followed by complete clinical examination stressing on cardiac auscultation, lower limb, head and neck and chest examination with blood pressure measurement.12 leads standard electrocardiogram (ECG) was done to most of patients.

For the first time of the history of the island an echocardiography machine was introduced and echocardiography was requested according to the clinical condition of the patient for diagnosis of heart disease or follow up.

All these data were collected in questionnaire prepared, coded, revised and entered into personal computer and analyzed using SPSS program version 10.

Results :

One hundred and twenty three patients screened for presence or absence of cardiovascular disease, 62 of them were male (50.4%), and 61 (49.6%) were female with age range from 5-80 years with mean age 38.27 ± 17.77 . 26 patients (21.1%) were hypertensive ,4 patients(3.3%) were known cases of diabetes mellitus under treatment and 3 patients were smokers(2.4%) as shown in table 1.

Regarding complains of patients (table 2); 47 patients (38.2%) were complaining of shortness of breath, while 17 patients (13.8%) complain of palpitation and 16 patients (13%) complain of chest pain. Major of patients 25 of them (20.3%) had non specific complain (multiple complain) while 17 patients (14.7%) had other complains (abdominal pain, chest tightness, Dizziness, general weakness, and headache).

ECG was done to 114 patients, 42 patients (34.1%) had abnormal ECG in form of left ventricle hypertrophy, ischemic heart disease, tall R in V1 and bundle branch block

Echocardiography was done to 60 patients and the results as follows (table 3): 19 of them (15.4%) were normal echocardiography, 6 patients (4.8%) had congenital heart disease, and 9 patients (7.2%) had rheumatic heart disease, 5 patients (4%) with diagnosis of ischemic heart disease, while 14 patients (11.3%) had hypertensive heart disease by echo. The age of patients proved with diagnosis of rheumatic heart disease by echocardiography range between 7 to 40 years.

Eleven patients need intervention as follows: 4 patients needs diagnostic coronary angiography, 2 patients need mitral valve replacement, one patient need double valve replacement, 2 patients needs percutaneous pulmonary valvuloplasty, while one patient need percutaneous mitral valvuloplasty and one patient need closed follow up and trans-esophageal echo.

Table (1): basic criteria of patients

Male	62 /123(50.4%)
Female	61 /123(49.6%)
Hypertension	26 /123(21.1%)
Diabetes mellitus	4/123 (3.3%)
Smoker	3/123 (2.4%)

Table (2): distribution of patients and percentage according to complain

Complain	Number of patients	Percentage
Shortness of breath	47	38.2%
Chest pain	16	13%
Palpitation	17	13.8%
Non specific	25	20.3%
Dizziness	5	4.1%
Follow up	6	4.9%
Headache	2	1.6%
Chest tightness	1	0.8%
Abdominal pain	1	0.8%
Limb weakness	1	0.8%
Heart burn	1	0.8%
General weakness	1	0.8%

Table (3): numbers of patients and percentage diagnosed by echocardiography. CHD; congenital heart disease. IHD; ischemic heart disease

Echo diagnosis	Number of patients (total 60)	Percentage
CHD	6	4.8%
Rheumatic heart disease	9	7.2%
Normal	19	15.4%
Hypertension	14	11.3%
Pure Hypertension	10	8.1%
Hypertension +	2	1.6%
IHD	2	1.6%
Hypertension + valvular		
IHD	5	4%
Mitral valve prolapsed	2	1.6%
Diastolic Heart failure	2	1.6%
Systolic heart failure	1	0.8%
Valvular heart disease	2	1.6%

Discussion :

There was no studies done in Socotra regarding the prevalence of heart disease but we seen some patients who can afford to come to Mukalla (capital of Hadramout government) or to Sana`a , so this study is considered the first one regarding the pattern of cardiovascular disease in Socotra island.

Rheumatic fever (RF) is a febrile disease affecting connective tissue, particularly in the heart and joints, initiated by infection of the throat by group A beta-hemolytic streptococci. It often leads to RHD which is a crippling illness (5). A study by Carpentis et al estimated that up to 15.6 million people are affected by RHD worldwide (6). Each year, there are approximately 470,000 new cases diagnosed and 233,000 deaths attributed to RHD (7). *Al. Munibari et al.* studied 5000 school children in Sana`a schools during period between October 1997to march 1998, they found the prevalence of rheumatic heart disease 3.6per 1000 which was higher than that reported from neighboring countries (8). In our study, 9 patients of 120 patients were diagnosed by echocardiography to have rheumatic heart disease inspite of low number of sampling and we did not focus the school children as this age is common in rheumatic fever and rheumatic heart disease, as age of study by Al-Munibari between 5-18 years while in our study between 7-40 years.

Saleh H. studied pattern of RHD in Aden between January 1999 to December2003, he found 805 patients had RHD, and the age of patients ranged between 4 - 70 years but 90% of patients were under 50 years of age (9).

Regarding prevalence of rheumatic heart disease in near countries, screening of 9904 Omani school children from different regions in Oman gave a prevalence rate of rheumatic heart disease of 8/10.000 with no significant difference by sex or level of education (10).

Congenital heart disease is a structural or functional abnormality of heart or great vessels that is present at birth (11, 12).The

incidence of congenital heart disease reported in different countries is about 9/1000 (13), and the official census data in southern Yemeni governorates reports 27,200 live births per year (14).

Nine hundred and eighty seven child referred for echocardiography assessment, during the period between January 2001 to December 2005 in Aden, *Hussein K.Saleh* found 393 of 987 patients was congenital heart disease and the age of patients was from birth to 15 years (15), while in our study; we detect 6 patients of 123 were congenital heart disease and age range between 5-25 years as 2 cases had congenital pulmonary stenosis.

There was high prevalence of hypertensive patients in the island 14 patients of 123; which needs further study to know the cause. Using data from the 2nd Gulf Registry of Acute Coronary Events (Gulf RACE-2) in 2008–09 which investigated the in-hospital complications and 1-year outcome of acute coronary syndrome (ACS) in patients with systemic hypertension from 6 Gulf countries. Of 7847 consecutive patients admitted with ACS, 3746 (47.7%) had hypertension. Hypertension was more prevalent in women, in Arabs than non-Arabs and in older age groups(16).

The major limitation of this study is short time stay in the island and small sample size of patients. We recommend a big survey to detect the accurate prevalence of heart disease in the island and general practical doctors, pediatrician, nutritional specialist must included to the team and survey included all districts of the island and school children. Health organization and ministry of health should interfere to tackle the cardiovascular disease in Socotra island either by preventive or curative programs

Acknowledgment :

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Generating Functions For Quadruple Hyper geometric Function

اشتقاق بعض من الدوال المولدة للدوال الفوق هندسية
الرباعية

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Generating Functions For Quadruple Hypergeometric Functions

Abstract :

The aim of this paper is to derive some of *Generating Functions* for the quadruple *Hypergeometric* functions ($K_3, K_{10}, K_{13}, K_{16}$ and K_{18}).

The results are derived with the help of Laplace integral. A number of *Generating Functions* of such other types

of hypergeometric functions are also derived as special cases of our main results.

Key words: Quadruple hypergeometric functions, *generating functions*, Laplace integral, hypergeometric functions

الملخص :

الدوال الفوق هندسية وذلك كحالات خاصة لنتائج البحث الرئيسية .
الكلمات المفتاحية : الدوال الفوق هندسية الرباعية ، الدوال المولدة ، تكامل لابلاس ، الدوال الفوق هندسية .

هدف بحثنا هذا اشتقاق بعض من الدوال المولدة للدوال الفوق هندسية الرباعية ($K_{18}, K_{16}, K_{13}, K_{10}, K_3$)
تم الحصول على هذه النتائج بمساعدة تكاملات لابلاس ، أيضاً تم عرض العديد من المولدات لأنواع أخرى من

1. Introduction :

The following are the definitions and the Laplace integral representations of the quadruple hypergeometric functions K_i ($i=3, 10, 13, 16$ and 18) [1; p, 78-83] :

$$K_3(a, a, a, a; b_1, b_1, b_2, b_2; c_1, c_2, c_2, c_1; x, y, z, t) = \sum_{p, q, r, s=0}^{\infty} \frac{(a)_{p+q+r+s} (b_1)_{p+q} (b_2)_{r+s} x^p y^q z^r t^s}{(c_1)_{p+s} (c_2)_{q+r} p! q! r! s!} \quad (1.1)$$

$$= \frac{1}{\Gamma(b_1)\Gamma(b_2)} \int_0^{\infty} \int_0^{\infty} e^{-u-v} u^{b_1-1} v^{b_2-1} \Psi_2(a; c_1, c_2; xu + tv, yu + zv) du dv, \quad (1.2)$$

$$K_{10}(a, a, a, a; b, b, c_1, c_2; d_1, d_2, d_3, d_4; x, y, z, t) = \sum_{m, n, p, q=0}^{\infty} \frac{(a)_{m+n+p+q} (b)_{m+n} (c_1)_p (c_2)_q x^m y^n z^p t^q}{(d_1)_m (d_2)_n (d_3)_p (d_4)_q m! n! p! q!} \quad (1.3)$$

$$= \frac{1}{\Gamma(a)} \int_0^{\infty} e^{-u} u^{a-1} \Psi_2(b; d_1, d_2; xu, yu) {}_1F_1(c_1; d_3; zu) {}_1F_1(c_2; d_4; tu) du \quad (1.4)$$

$$K_{13}(a, a, a, a; b_1, b_2, b_3, b_4; c, c, d_1, d_2; x, y, z, t) = \sum_{m, n, p, q=0}^{\infty} \frac{(a)_{m+n+p+q} (b_1)_m (b_2)_n (b_3)_p (b_4)_q x^m y^n z^p t^q}{(c)_{m+n} (d_1)_p (d_2)_q m! n! p! q!} \quad (1.5)$$

$$= \frac{1}{\Gamma(a)} \int_0^{\infty} e^{-u} u^{a-1} \Phi_2(b_1, b_2; c; xu, yu) {}_1F_1(b_3; d_1; zu) {}_1F_1(b_4; d_2; tu) du \quad (1.6)$$

$$K_{16}(a_1, a_2, a_3, a_4; b; x, y, z, t) = \sum_{m, n, p, q=0}^{\infty} \frac{(a_1)_{m+n} (a_2)_{m+p} (a_3)_{n+q} (a_4)_{p+q} x^m y^n z^p t^q}{(b)_{m+n+p+q} m! n! p! q!} \quad (1.7)$$

$$= \frac{1}{\Gamma(a_2)\Gamma(a_3)} \int_0^{\infty} \int_0^{\infty} e^{-u-v} u^{a_2-1} v^{a_3-1} \Phi_2(a_1, a_4; b; xu + yv, zu + tv) du dv$$

$$\begin{aligned}
 & \cdot (1.8) K_{18} (a_1, a_2, a_3, b_1, b_2; c; x, y, z, t) \\
 & = \sum_{m,n,p,q=0}^{\infty} \frac{(a_1)_{m+n} (a_2)_{m+q} (a_3)_{n+p} (b_1)_p (b_2)_q x^m y^n z^p t^q}{(c)_{m+n+p+q} m!n!p!q!} \quad (1.9)
 \end{aligned}$$

$$= \frac{1}{\Gamma(a_1)\Gamma(b_1)\Gamma(b_2)} \int_0^{\infty} \int_0^{\infty} \int_0^{\infty} e^{-u-v-w} u^{a_1-1} v^{b_1-1} w^{b_2-1}$$

$$\Phi_2(a_2, a_3; c; xu + tw, yu + zv) dudvdw \cdot (1.10)$$

2. Generating functions

In this section we have established the following Generating relations :

$$\begin{aligned}
 & \sum_{n=0}^{\infty} \frac{(b_1)_n (b_2)_n w^n}{(d)_n n!} K_3 \\
 & (a, a, a, a; b_1 + n, b_1 + n, b_2 + n, b_2 + n; c_1, c_2, c_2, c_1; x, x, z, z) \\
 & = F^{(3)} \left[\begin{matrix} - :: a, \frac{1}{2}(c_1 + c_2), \frac{1}{2}(c_1 + c_2 - 1); b_2; b_1 : -; -; -; \\ - :: c_1, c_2, c_1 + c_2 - 1 ; -; -; -; -; d; \end{matrix} ; 4x, 4z, w \right], (2.1)
 \end{aligned}$$

$$\begin{aligned}
 & \sum_{n=0}^{\infty} \frac{(a)_n w^n}{n!} K_3 (a + n, a + n, a + n, a + n; b_1, b_1, b_2, b_2; c_1, c_2, c_2, c_1; x, x, y, y) \\
 & = F^{(3)} \left[\begin{matrix} a :: \frac{1}{2}(c_1 + c_2), \frac{1}{2}(c_1 + c_2 - 1); -; -; b_1; b_2; -; \\ - :: c_1, c_2, c_1 + c_2 - 1 ; -; -; -; -; -; \end{matrix} ; 4x, 4y, w \right], (2.2)
 \end{aligned}$$

$$\begin{aligned}
 & \sum_{n=0}^{\infty} \frac{(a_2)_n (a_3)_n w^n}{n!} K_{16} (a_1, a_2 + n, a_3 + n, b_1 - a_1; b_1; x, y, z, t) \\
 & = (1-z)^{-a_2} (1-t)^{-a_3} F^{(3)} \left[\begin{matrix} - :: a_1; a_3; a_2 : -; -; -; x-z, y-t, w \\ - :: b_1; -; -; -; -; -; 1-z, 1-t, (1-z)(1-t) \end{matrix} \right], (2.3)
 \end{aligned}$$

$$\sum_{n=0}^{\infty} \frac{(a_2)_n (a_3)_n w^n}{(b_2)_n n!} K_{16} (a_1, a_2 + n, a_3 + n, b_1 - a_1; b_1; x, y, z, t)$$

$$\left[= (1-z)^{-a_2} (1-t)^{-a_3} H_A \left[a_3, a_2, a_1; b_2, b_1; \frac{w}{(1-z)(1-t)}, \frac{x-z}{1-z}, \frac{y-t}{1-t} \right] \right], (2.4)$$

$$\sum_{n=0}^{\infty} \frac{(a_1)_n (a_2)_n w^n}{(b_1)_n n!} K_{16} (a, a_1+n, a_2+n, a_3; b_1+n; x, y, x, y) \\ = H_C [a_1, a+a_3, a_2; b_1; x, y, w], (2.5)$$

$$\sum_{n=0}^{\infty} \frac{(b_1)_n (b_2)_n w^n}{n!} K_{18} (a_1+n, a_2, c_1-a_2, b_1+n, b_2+n; c_1; x, x, z, t) \\ = (1-x)^{-a_1} (1-z)^{-b_1} F^{(3)} \left[\begin{matrix} -:: a_2; b_1; b_2; -; -; -; \\ -:: c_1; -; -; -; -; -; \end{matrix} ; t, \frac{-z}{1-z}, \frac{w}{(1-x)(1-z)} \right], (2.6)$$

$$\sum_{n=0}^{\infty} \frac{(b_1)_n (b_2)_n w^n}{(c_2)_n n!} K_{18} (a_1+n, a_2, c_1-a_2, b_1+n, b_2+n; c_1; x, x, z, t) \\ = (1-x)^{-a_1} (1-z)^{-b_1} H_A \left[b_1, b_2, a_2; c_2, c_1; \frac{w}{(1-x)(1-z)}, t, \frac{-z}{1-z} \right], (2.7)$$

$$\sum_{n=0}^{\infty} \frac{(b_1)_n (b_2)_n w^n}{(c_1)_n n!} K_{18} (a_1+n, a_2, c_1-a_2+n, b_1+n, b_2+n; c_1+n; x, x, z, t) \\ = (1-x)^{-a_1} (1-z)^{-b_1} H_C \left[b_2, a_2, b_1; c_1; t, \frac{z}{z-1}, \frac{w}{(1-x)(1-z)} \right], (2.8)$$

$$\sum_{n=0}^{\infty} \frac{(a)_n (b)_n w^n}{(c)_n n!} K_{10} (a+n, a+n, a+n, a+n; b_1, b_1, c_1, c_2; b_1, b_1, 2c_1, 2c_2; x, y, 2z, 2t) \\ = A^{-a} {}^{(3)}H_4^{(4)} \left[a, b; b_1, c_1 + \frac{1}{2}, c_2 + \frac{1}{2}, c; \frac{xy}{A^2}, \frac{z^2}{4A^2}, \frac{t^2}{4A^2}, \frac{w}{A} \right], (2.9)$$

$$\sum_{n=0}^{\infty} \frac{(a/2)_n ((a+1)/2)_n w^n}{(d)_n n!} K_{10} (a+2n, a+2n, a+2n, a+2n; b_1, b_1, c_1, c_2; b_1, b_1, 2c_1, 2c_2; x, y, 2z, 2t)$$

$$= A^{-a} F_C^{(4)} \left[\frac{a}{2}, \frac{a+1}{2}; b_1, c_1 + \frac{1}{2}, c_2 + \frac{1}{2}, d; \frac{4xy}{A^2}, \frac{z^2}{A^2}, \frac{t^2}{A^2}, \frac{w}{A^2} \right], \quad (2.10)$$

$$\sum_{n=0}^{\infty} \frac{(a)_n (b)_n w^n}{(c)_n n!} K_{13} (a+n, a+n, a+n, a+n; b_1, b_1, c_1, c_2; 2b_1, 2b_1, 2c_1, 2c_2; 2x, 2y, 2z, 2t)$$

$$= A^{-a} {}^{(3)}H_4^{(4)} \left[a, b; b_1 + \frac{1}{2}, c_1 + \frac{1}{2}, c_2 + \frac{1}{2}, c; \frac{(x-y)^2}{4A^2}, \frac{z^2}{4A^2}, \frac{t^2}{4A^2}, \frac{w}{A} \right] \quad (2.11)$$

and

$$\sum_{n=0}^{\infty} \frac{(a/2)_n ((a+1)/2)_n w^n}{(d)_n n!}$$

$$K_{13} (a+2n, a+2n, a+2n, a+2n; b_1, b_1, c_1, c_2; 2b_1, 2b_1, 2c_1, 2c_2; 2x, 2y, 2z, 2t)$$

$$= A^{-a} F_C^{(4)} \left[\frac{a}{2}, \frac{a+1}{2}; b_1 + \frac{1}{2}, c_1 + \frac{1}{2}, c_2 + \frac{1}{2}, d; \frac{(x-y)^2}{A^2}, \frac{z^2}{A^2}, \frac{t^2}{A^2}, \frac{w}{A^2} \right], \quad (2.12)$$

where $F^{(3)}$ is the General Triple *Hypergeometric Series* [3; p.44], H_A and H_C are the *Srivastava's triple series* [3;p.43], $F_C^{(4)}$ is the *Lauricella's Function* of four variables [3;p.33], ${}^{(3)}H_4^{(4)}$ is the *Generalized Horn's Function* [1;p.97] and $A = (1 - x - y - z - t)$.

3. Results Required

The following results will be required in our present investigations (c.f.[2] and [3]) :

$$\Psi_2 [a; c, c'; x, x] = {}_3F_3 \left[a, \frac{c+c'}{2}, \frac{c+c'-1}{2}; c, c', c+c'-1; 4x \right] \quad (3.1)$$

$${}_pF_q [p; 0; 0; (a_p): -; -; x, y] = {}_pF_q \left[(a_p); (b_q); x+y \right] \quad (3.2)$$

$$\Psi_2 [a; a, a; x, y] = e^{x+y} {}_0F_1 [-; a; xy] \quad (3.3)$$

$$\Phi_2 [a, b-a; b; x, y] = e^y {}_1F_1 [a; b; x-y] \quad (3.4)$$

$${}_1F_1 \left[\begin{matrix} a \\ 2a \end{matrix} ; x \right] = e^{\frac{x}{2}} {}_0F_1 \left[-; a + \frac{1}{2}; \frac{x^2}{16} \right] \quad (3.5)$$

$$\int_0^{\infty} e^{-su} u^{a-1} du = \frac{\Gamma(a)}{s^a} \quad (3.6)$$

$$\int_0^{\infty} e^{-su} u^{a-1} {}_0F_1(-; d_1; xu^2) {}_0F_1(-; d_2; yu^2) du$$

$$= \frac{\Gamma(a)}{s^a} F_4 \left[\begin{matrix} a, a+1 \\ 2, 2 \end{matrix} ; d_1, d_2; \frac{4x}{s^2}, \frac{4y}{s^2} \right] \quad (3.7)$$

$$(\lambda)_{2n} = 2^{2n} \left(\frac{1}{2}\lambda\right)_n \left(\frac{1}{2}\lambda + \frac{1}{2}\right)_n, \quad n=0,1,2,\dots \quad (3.8)$$

where the Functions ${}_pF_q$ is the *Generalized Hypergeometric Function*, F_4 is *Appell's Function*, Φ_2 and Ψ_2 are the *confluent Hypergeometric Function* of two variables and $F_{l;m;n}^{p;q;k}$ the *Kampé de Fériet Function* of two variables (c.f.[4]).

4. Proof of the results :

To prove (2.1), we proceed as follows :

Let us denote the left hand side of (2.1) by I and using (1.2), we get

$$I = \sum_{n=0}^{\infty} \frac{(b_1)_n (b_2)_n w^n}{(d)_n n!}$$

$$\frac{1}{\Gamma(b_1+n)\Gamma(b_2+n)} \int_0^{\infty} \int_0^{\infty} e^{-u-v} u^{b_1+n-1} v^{b_2+n-1} \Psi_2(a; c_1, c_2; xu+zv, xu+zv) du dv$$

Now, using (3.1) and (3.2), we get

$$I = \sum_{n=0}^{\infty} \frac{(b_1)_n (b_2)_n w^n}{(d)_n \Gamma(b_1+n)\Gamma(b_2+n)n!}$$

$$\int_0^{\infty} \int_0^{\infty} e^{-u-v} u^{b_1+n-1} v^{b_2+n-1}$$

$$F_{3:0;0}^{3:0;0} \left[\begin{matrix} a, \frac{1}{2}(c_1+c_2), \frac{1}{2}(c_1+c_2-1) \\ c_1, c_2, c_1+c_2-1 \end{matrix} ; -; -; 4xu, 4yv \right] du dv$$

Expressing the Kampé de Fériet function as double series and using (3.6), we have

$$I = \sum_{n=0}^{\infty} \frac{(b_1)_n (b_2)_n w^n}{(d)_n \Gamma(b_1 + n) \Gamma(b_2 + n) n!}$$

$$\sum_{r=0}^{\infty} \sum_{s=0}^{\infty} \frac{(a)_{r+s} (\frac{1}{2}(c_1 + c_2))_{r+s} (\frac{1}{2}(c_1 + c_2 - 1))_{r+s} (4x)^r (4z)^s \Gamma(b_1 + n + r) \Gamma(b_2 + n + s)}{r! s! (c_1)_{r+s} (c_2)_{r+s} (c_1 + c_2 - 1)_{r+s}}$$

$$I = F^{(3)} \left[\begin{matrix} -:: a, \frac{1}{2}(c_1 + c_2), \frac{1}{2}(c_1 + c_2 - 1); b_2; b_1 : -; -; -; \\ -:: c_1, c_2, c_1 + c_2 - 1; -; -; -; -; d; \end{matrix} \middle| 4x, 4z, w \right]$$

This completes the proof of (2.1), the proofs of (2.2)-(2.8) are similarly.

To prove (2.9), we proceed as follows :

Let us denote the left hand side of (2.9) by I, using (1.4) ,(3.3) and (3.5) , we get

$$I = \sum_{n=0}^{\infty} \frac{(a)_n (b)_n w^n}{(c)_n n! \Gamma(a + n)}$$

$$\int_0^{\infty} e^{-(1-x-y-z-t)u} u^{a+n-1} {}_0F_1(-; b_1; x y u^2) {}_0F_1(-; c_1 + \frac{1}{2}; \frac{z^2}{16} u^2) {}_0F_1(-; c_2 + \frac{1}{2}; \frac{t^2}{16} u^2) du$$

Now, expressing the first ${}_0F_1$ into power series and using (3.7), we get

$$I = \sum_{n,m=0}^{\infty} \frac{(a)_n (b)_n w^n (xy)^m \Gamma(a + n + 2m)}{(c)_n (b_1)_m n! m! \Gamma(a + n) A^{a+n+2m}}$$

$$F_4 \left[\frac{a + n + 2m}{2}, \frac{a + n + 2m + 1}{2}; c_1 + \frac{1}{2}, c_2 + \frac{1}{2}; \frac{z^2}{A^2}, \frac{t^2}{A^2} \right].$$

Expressing Appell's Function F_4 as double series and using (3.8), we will get the right hand side of (2.9), which complete the proof of (2.9). The proofs of (2.10) - (2.12) are similarly.

5. Particular Cases :

In this section ,we shall mention some interesting generating relations as particular cases of our main results.

In (2.1), if we put $a = c_1 = c_2$, then we get

$$\sum_{n=0}^{\infty} \frac{(b_1)_n (b_2)_n w^n}{(d)_n n!} K_3(a, a, a, a; b_1 + n, b_1 + n, b_2 + n, b_2 + n; a, a, a, a; x, x, z, z) = H_A \left(b_2, b_1, a - \frac{1}{2}; d, 2a - 1; w, 4x, 4z \right) \quad (5.1)$$

On taking $t = 0$ in (2.3) , (2.4) , (2.7) and (2.8) respectively ,we get the following results :

$$\sum_{n=0}^{\infty} \frac{(a_2)_n (a_3)_n w^n}{n!} F_T(b_1 - a_1, a_1, a_1; a_2 + n, a_3 + n, a_2 + n; b_1, b_1, b_1; z, y, x) = (1 - z)^{-a_2} F^{(3)} \left[- :: a_1; a_3; a_2 : -; -; -; \frac{x - z}{1 - z}, y, \frac{w}{(1 - z)} \right] \quad (5.2)$$

$$\sum_{n=0}^{\infty} \frac{(a_2)_n (a_3)_n w^n}{(b_2)_n n!} F_T(b_1 - a_1, a_1, a_1; a_2 + n, a_3 + n, a_2 + n; b_1, b_1, b_1; z, y, x) = (1 - z)^{-a_2} H_A \left[a_3, a_2, a_1; b_2, b_1; \frac{w}{(1 - z)}, \frac{x - z}{1 - z}, y \right] \quad (5.3)$$

$$\sum_{n=0}^{\infty} \frac{(b_1)_n (b_2)_n w^n}{(c_2)_n n!} F_T(a_2, c_1 - a_2, c_1 - a_2, a_1 + n, b_1 + n, a_1 + n; c_1, c_1, c_1; x, z, x) = (1 - x)^{-a_1} (1 - z)^{-b_1} F_2 \left[b_1, a_2, b_2; c_1, c_2; \frac{-z}{1 - z}, \frac{w}{(1 - x)(1 - z)} \right] \quad (5.4)$$

and

$$\sum_{n=0}^{\infty} \frac{(b_1)_n (b_2)_n w^n}{(c_1)_n n!} F_T(b_1 + n, a_1 + n, a_1 + n, c_1 - a_2 + n, a_2, c_1 - a_2 + n; c_1 + n, c_1 + n, c_1 + n; z, x, x)$$

$$= (1-x)^{-a_1} (1-z)^{-b_1} F_1 \left[b_1, a_2, b_2; c_1; \frac{z}{z-1}, \frac{w}{(1-x)(1-z)} \right] \quad (5.5)$$

respectively, where F_1 and F_2 are Appell's Functions [4;p.53] and F_T is Saran's Function [4;p. 67].

In (2.6), if we put $b = c$ and $x = y = \frac{1}{2}v$, then we get

$$\begin{aligned} \sum_{n=0}^{\infty} \frac{(a)_n w^n}{n!} K_{10} \left(a+n, a+n, a+n, a+n; b_1, b_1, c_1, c_2; b_1, b_1, 2c_1, 2c_2; \frac{1}{2}v, \frac{1}{2}v, 2z, 2t \right) \\ = K^{-a} F_C^{(3)} \left[\frac{a}{2}, \frac{a+1}{2}; b_1, c_1 + \frac{1}{2}, c_2 + \frac{1}{2}; \frac{v^2}{K^2}, \frac{z^2}{K^2}, \frac{t^2}{K^2} \right] \quad (5.6) \end{aligned}$$

In (2.7), if we put $b = c$, then we get

$$\begin{aligned} \sum_{n=0}^{\infty} \frac{(a)_n w^n}{n!} K_{13} \left(a+n, a+n, a+n, a+n; b_1, b_1, c_1, c_2; 2b_1, 2b_1, 2c_1, 2c_2; 2x, 2y, 2z, 2t \right) \\ = K^{-a} F_C^{(3)} \left[\frac{a}{2}, \frac{a+1}{2}; b_1 + \frac{1}{2}, c_1 + \frac{1}{2}, c_2 + \frac{1}{2}; \frac{(x-y)^2}{K^2}, \frac{z^2}{K^2}, \frac{t^2}{K^2} \right], \quad (5.7) \end{aligned}$$

where $F_C^{(3)}$ the Lauricella's Function of three variables [4; p.60] and $K = (1-x-y-z-t-w)$.

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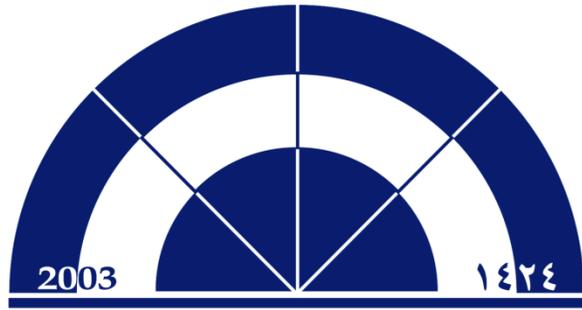
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A Study Of Wound Healing By Local Injection of Insulin

دراسة عن التئام الجروح بحقنة أنسولين موضعية

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A Study Of Wound Healing By Local Injection of Insulin

Abstract :

Objectives: In this prospective study we aim to demonstrate the effect of small doses of topical long acting insulin (zink insulin) application in wound healing.

Methods: Thirty eight patients were studied in our private out-patient clinic between the years 2009 to 2011 , long acting insulin (zinc insulin) was used to avoid the hypoglycemic effect of insulin .

Results: From a total of 38 patients, 20(52.6%) were males and 18(47.4%) were females. The median age was 49 years with a mean age of 35.11 ± 11.543 years. There were different causes of the wounds, 21(55.3%) patients had previous operations leading to the wound, 9(23.7%) developed chronic wounds after burns, and 8(21.0%) had a wound due to trauma. The wounds were distributed in different sites of the body. In the trunk 24(63.2%) patients, in the extremities 11(28.9%) patients and in the breast 3(7.9%). All the wounds were previously dressed with saline. The sizes of the wounds varied, minimum wound size was 1cm and maximum was 16cm

with a mean of 6.32 ± 4.319 cm. 13(34.2%) of the wounds were infected, 18(47.4%) had allergy to stitches , 4(10.5%) had unhealthy granulation tissue and 3(7.9%) were covered with tough fibrin. These wounds were prepared prior to the study by giving antibiotic, removing the stitches, excising bad granulation tissue and removing fibrin. Soluble Insulin injection was prepared at a concentration of 1-Unit/10ml distilled water, then injected superficially in the inside of the wounds of the patient, and the effect was observed. The time range of saline-insulin treated wound closure was 15 days with a mean of 7.13 ± 4.461 days. All patients had an excellent outcome and their wounds closed in a short time without any complications.

Conclusion: Topical insulin application leads to acceleration of wound healing. The duration of wound healing and outcomes in our study were excellent. This depends on many factors also which should be taken seriously like wound infection of the wound and size.

Keywords: Insulin, diabetes, topical insulin, neutrophils, MIP-2, anti-neutrophil antibodies, wound healing,

Objectives: To study the effects of small doses of long acting (zinc insulin) injected locally in wound healing.

الملخص :

بنسبة (٢١.٠%)، وفي الجسد بنسبة (٦٣.٢%)، وفي الأطراف بنسبة (٢٨.٩%) . وفي الثدي بنسبة (٧.٩%) . جميع هذه الجروح كانت تضمد بماء الملح واليود. وتفاوتت فترات التضميد بين يومين إلى ١١٣ يوماً. حجم أصغر جرح كان ١ سم، وحجم أكبر جرح ١٦ سم . (٣٤.٢%) (١٣ من هذه الجروح كانت ملتهبة، و(٤٧.٤%) كانت مصابة بتحسس من الخيوط الجراحية، و(١٠.٥%) كان فيها تضخم نسيجي، و(٧.٩%) كانت مغطاة بطبقة فيبرين. تم حقن الجروح بحقنة الأنسولين بتركيز ١ وحدة من الأنسولين مذاب في ١٠ سم مكعب ماء مقطر. استغرق التئام الجروح الفترة ما بين يوم واحد إلى ١٦ يوماً، التأم جميع الجروح في فترات بسيطة دون أي مضاعفات.

الأهداف: أهداف هذا البحث هي شرح كيفية عملية سرعة التئام الجروح باستعمال حقنة أنسولين طويل الأمد موضعية على الجرح .

المنهجية: أجري هذا البحث على ٣٨ مريضاً يزورون عيادتنا الخاصة خلال الأعوام ٢٠٠٩ إلى ٢٠١١. وقبل البدء بحقن الأنسولين قمنا بتهيئة الجروح، وذلك بعلاج الالتهابات والتحسس وغيرها من مشاكل الجروح. أستعمل أنسولين طويل الأمد وذلك تجنباً لهبوط مفاجئ للسكر .

النتائج: تم حقن مادة أنسولين طويل الأمد موضعياً داخل الجروح لـ ٣٨ مريضاً، منهم ٢٠ ذكراً و ١٨ أنثى. تفاوتت أعمارهم بين ١٧ و ٦٦ عاماً. كان (٥٥.٣%) جرحاً نتيجة عمليات جراحية سابقة، ونتيجة حروق كانت بنسبة (٢٣.٧%)، ونتيجة حوادث

الكلمات المفتاحية: أنسولين طويل الأمد، مرض السكري، أنسولين موضعي، نوتروفيل، أم أي بي ٢-، أجسام ضد النوتروفيل، التئام الجروح .

Introduction :

In the early 20th century, insulin was first used to treat diseases other than diabetes.^(1;2) various animal models showed that systemic insulin treatment accelerated healing from fractures, skin cuts, and skin ulcers.^(3;4;5;6) Low-dose topical insulin stimulated migration of keratinocytes and vascular endothelial cells through the insulin receptor-mediated pi3k-akt-*rac1* signal pathway. These events promoted re-epithelialization and wound healing.^(7;8)

It has been reported that insulin regulates systemic inflammatory responses, the cellular functions of neutrophils in the wound area. Low-dose topical insulin application decreases wound neutrophil infiltration and advanced wound neutrophil attenuation,

Neutrophils are the main type of cells that are involved in the inflammatory response. They clean exogenous pathogens through phagocytosis and release enzymes and Reactive Oxygen Species (ROS) to kill bacteria and other intruders. Macrophages also have the function of phagocytosis , therefore neutrophils are not essential to wound healing, since it has been shown that anti-neutrophil antibodies do not interfere with healing.⁽⁹⁾ On the contrary, depletion of neutrophils facilitates wound healing and improves the quality of recovery.⁽¹⁰⁾ Additionally, prolonged neutrophil infiltration may contribute to impaired wound healing. ⁽¹¹⁾

MIP-2, a member of the CXC chemokines family, strongly induces neutrophil chemotaxis.⁽¹²⁾ With topical insulin application, traumatic MIP-2 expression significantly decreases. Similarly with the change of MIP-2, wound neutrophils notably decreases. These observations suggest that topical insulin regulates the inflammatory response in the wounded area by restraining wound neutrophil infiltration through inhibition of chemokine MIP-2 expression. Vascular permeability also regulates inflammatory cell recruitment. Despite regulating MIP-2 expression, insulin stabilizes vessel endothelial barrier function.⁽¹³⁾

It has been reported that diabetic wounds have elevated neutrophils and prolonged neutrophil infiltration.⁽¹³⁾ Conversely, neutrophils in wounds of patients with diabetes are dysfunctional in

terms of phagocytosis, migration, and bactericidal actions.⁽¹⁴⁾The present findings of insulin-induced stimulation of neutrophil functions may help advance the clinical treatment of chronic, nonhealing diabetic wounds.

Patients and Methods :

Thirty eight patients suffering from acute and chronic wounds as a result of various types of trauma (surgical and accidental) were collected from our private out-patient clinic during the years 2009-2011. They were randomly selected to receive local insulin injection directly in to the wounds during their wound dressings. The chronic wounds could not close inspite of the previous dressings. Acute wounds which were recently acquired were taken into the study too. Patients with diabetes mellitus were excluded for fear of interference with their normal regimen, otherwise all other types of patients were accepted.

Each patient was dealt with independently. A clinical record was created for each patient. Full history was taken and physical examination was performed and the wounds were carefully inspected and all positive findings were recorded. Any pathological conditions in the wounds were treated and the wounds were prepared in advance before the commencement of the study. Infections were treated by appropriate antibiotics, allergic surgical stitches were extracted, unhealthy granulation tissue was excised and fibrin was removed.

To all these patients a peripheral IV line was established for emergency purposes and they were asked to take a heavy meal before comming. Just before starting the study a series of procedures were performed.

- 1- A concentrated glucose solution (40%) was injected intravenously.
- 2- The wounds were cleaned with physiological solution.
- 3- Long acting insulin (zinc insulin) was used for this study (soluble insulin was not used to avoid sudden hypoglycemia).

Insulin solution was prepared at a concentration of 1.0-Unit of insulin dissolved in 10cc distilled water. 4-This solution was injected evenly throughout the inside of the wound, and this concentration was maintained for all patients throughout the study. 5-A sterile dry gauze was applied 6-and the wounds were dressed. These steps were done daily for each patient.

Results :

The study was done on 38 patients 20(52.6%) were males and 18(47.4%) females.(Table 1).

Table 1: Patients distribution according to sex

Sex	No.	%
Females	18	47.4
Males	20	52.6
Total	38	100.0

The ages of the patients were between 17 years and 66 years, with a mean age of 35.11 ± 11.543 . median was 49.

Wounds due to operations accounted for more than 50% of the patients, i.e. 21(55.3%) while burns and trauma accounted for 9(23.7%) and 8(21.0%) respectively. (Table2).

Table 2: Distribution of the patients according to the causes of the wounds

Causes of the wounds	No.	%
Operations	21	55.3
Burn	9	23.7
Trauma	8	21.0
Total	38	100

Most of the wounds were in the trunk 24(63.2%) patients, followed by the extremities 11(28.9%) patients, then in the breast 3(7.9%).(Table3).

Table 3: Distribution of the patients according to the sites affected

Sites of the wounds	No.	%
Trunk	24	63.2
Extremities	11	28.9
Breast	3	7.9
Total	38	100

All patients were managed previously i.e. after their first insult, by the usual classical dressings with saline and iodine, some of the patients were submitted to various surgical interventions on the same area of the wound.

The wounds varied in size. between 1 to 16 cm. With a mean size of 6.32 ± 4.319 cm. The smallest wound was as a result of deep burns and grossly thick fibrosis was impairing its closure.

Nearly half of the patients 18(47.4%) had stitch allergy while 13(34.2%) of the wounds were infected. The infected wounds had been treated for a long time with local antibiotics without improvement. On examination they were covered by thick fibrosis wall. 4(10.5%) had unhealthy hypergranulation tissue preventing tissue advance and 3(7.9%) had tough fibrin covering the wound and hindering it from closure. (Table5).

Table5: Distribution of the patients according to the clinical condition of the wounds

Type of wound	No.	%
Infected	13	34.2
Stitch allergy	18	47.4
Granulation tissue	4	10.5
Tough fibrin	3	7.9
Total	38	100

The stitches were causing distortion of the wound and even after stitch removal the wound was still distorted and deprived of blood supply which was hindering their proper closure.

A solution of 1.0-Unit of soluble insulin dissolved in 10cc of distilled water was used as local injections. The average time of wound closure treated with saline and insulin was 15 days, with a range of 1 day and to 16 days and a mean of 7.13 ± 4.461 days (Table6).

Table 6: Time of closure

Statistical discription	No.	Average	Minimum	Maximum	Mean	Std.Deviation
Age of patients	38	49	17	66	35.11	11.543
Size of wounds	38	15	1	16	6.32	4.319
Closure time in days for saline-insulin treated	38	15	1	16	7.13	4.461

The prognosis of all the 38 patients was excellent, they showed accelerated and healthy closure of the wounds (Table 7).

Table 7 : Prognosis

Prognosis	No.	%
Excellent	38	100
Bad	0	0
Total	38	100

Discussion :

Insulin is a hormone known primarily for regulating sugar levels in the blood but recently researchers at the University of California, Riverside, found that applying insulin directly to skin wounds significantly enhanced the healing process.

Wound healing is divided into 3 sequential, overlapping, phases: inflammatory, proliferation, and remodeling. In the early 20th century, insulin was first used to treat diseases other than diabetes.⁽¹⁵⁾

It has been reported that insulin regulates systemic inflammatory responses, whereas the regulation of traumatic inflammation by topical insulin has not been studied.⁽¹⁶⁾ Liu Y and Zhang XJ, et al. reported in their study that low-dose topical insulin application also promoted healing of thermal traumas in rats and incision wounds in rabbits.^(17,18) Local injection of small dose of insulin may accelerate burn wound healing due to its role in promoting the proliferation and division of the repairing cells⁽¹⁹⁾

Low-dose topical insulin stimulates migration of keratinocytes and vascular endothelial cells through the insulin receptor-mediated PI3K-Akt-Rac1 signal pathway. These molecular events could trigger re-epithelialization and angiogenesis, and hence, promote wound healing.^(20,21)

The present study showed that low-dose topical insulin application increased the rate of wound healing among the studied patients.

The age range our patients was wide from 17 years to 66 years, but no age group showed more rapid wound healing over the other. Both sexes and all ages showed equally accelerated healings.

The most common cause of the wounds in our study was post-operative. Wound infection coupled with allergy to suture materials used in our hospitals. The other cause was burns secondary to gas explosion which is common in our set up. Wounds secondary to trauma were few. (Table2).

Some wounds were acute and others chronic. The periods of the previous dressings in the patients in our study were variable, starting from two days after the primary insult- in patients with trauma - up to more than 3.5 months in patients with operations and burns. "Xuelian Chen, MD, et al. " published a study on topical use of insulin to accelerate wound healing on recent self made wounds on mice.⁽²²⁾

All patients in our study got primarily the same usual classical dressing i.e. saline and iodine dressings, before arriving to our care.

Our patients showed varying sizes of the wounds. From 1cm. to 16cm. with a mean size of 6.32 ± 4.319 cm.

At the examination of the wounds, nearly half of the wounds had allergy to the nonabsorbed suture material with stitch infection. This was true in 18(47.4%) patients who were operated previously. This may be attributed to the high affinity that our patients exhibit towards developing allergy to surgical sutures. A great number of our patients had postoperative wound infection 13(34.2%), which reflects the high rate of postoperative infections. Unhealthy granulation tissue occupied the third place among the causes of open wounds in our patients 4(10.5%), a fact commonly seen in our

practice due to the improper management of the wounds and neglect of therapy in most patients, while 3(7.5%) had tough fibrin, probably due to insufficient wound care in the patients. The last two arrest the skin from progressing. All these were important factors that kept the wounds open.

In the year 2012 in Fudan University (Shanghai, China), Xuelian Chen, MD, et al. used 0.03-U insulin dissolved in 20- μ L saline to inject mice for the purpose of their wound healing.⁽²²⁾ In another study on animals in (1983), Hanam SR, Singleton CE, et al. have reported that insulin at a concentration of 0.5 U/100g gives best effect on wound healing.⁽²³⁾ In our study we used 1.0-Unit of soluble insulin diluted in 10cc. distilled water. This is a concentration little higher than that reported in studies in other countries, but it did give us excellent results without complications. To avoid any hypoglycemic effect we injected the patients with 40% glucose solution prior to insulin injection each day.

Xuelian Chen, MD, et al. ⁽²²⁾ recorded a mean time of wound closure of 6.67 ± 0.52 days, which was significantly shorter than that of the saline treated wounds 8.17 ± 0.75 days in their study; and a $P < 0.05$. In our patients the wounds had a mean time of closure of 7.13 ± 4.461 days.

All patients who were treated with insulin got complete and accelerated wound healing.

Conclusion :

Topical insulin application leads to acceleration of wound healing. The duration of wound healing and outcomes in our study were excellent. This depends on many factors also which should be taken seriously like wound infection of the wound and size.

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