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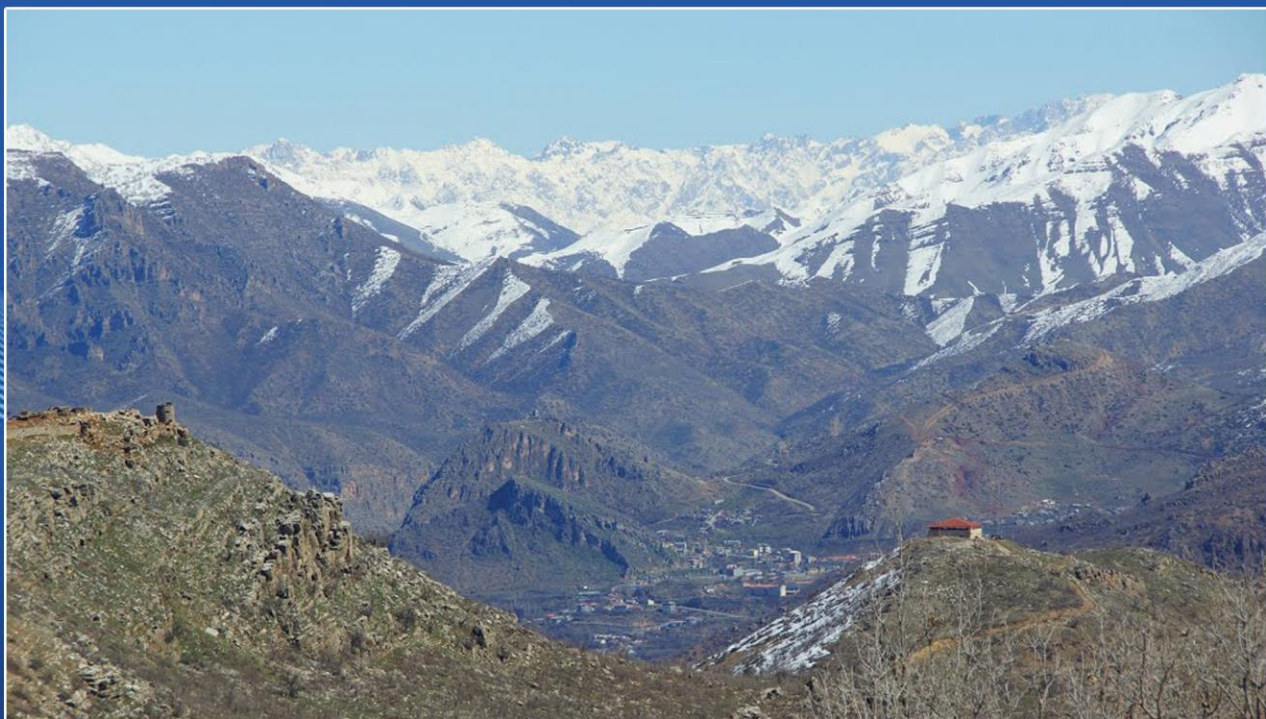
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Duhok Medical Journal

The Official Journal of Duhok College of Medicine



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RISK FACTORS OF CONVERSION DISORDER IN DUHOK GOVERNORATE/ IRAQI KURDISTAN

YOUSIF ALI YASEEN, MB, ChB, FIBMS*

Submitted 11 July 2016; accepted 31 December 2016

ABSTRACT

Background: Conversion disorder comprise neurologically unexplained symptoms with underlying psychiatric cause. The aim of the study was to assess the frequency and risk factors of Conversion disorder, its symptomatology and common stressors behind it.

Methods: This is a cross-sectional study involving all patients who attended every another day of out-patient psychiatric consultation in Azadi Teaching Hospital in Duhok City, from July 2008 to July 2009, they were 637 patients. Clinical diagnostic criteria from Diagnostic and Statistical Manual of Mental Disorders –IV (DSM-IV) were applied.

Results: The frequency of Conversion disorder was 18.2 % (116 cases). It was more common among females (80.25%), youngest age group of 18-25 years (64.7%), primary educational level (36.2%) and housewives (42.2%) with statistically significant association. Although it was more common among married (52.7%) and in urban areas (56%) but no significant association was found. Unresponsiveness was the commonest presentation (49.1%), followed by pseudoseizure (21.6%), fainting (10.3%), and abnormal movements (8.6%). The commonest stressor was domestic conflict (27.6%) in which all exposed cases were females, followed by love affair (17.2%), and illness (13.8%) which was the commonest stressor among males.

Conclusions: The frequency of Conversion disorder was high; risk factors included being a female, young, with low educational level and a housewife.

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Keywords: Conversion disorder, frequency, risk factors, stressors

In Conversion disorder, a psychosocial conflict is converted into dramatic physical symptoms that involve voluntary motor or sensory functioning.¹ It is possibly the commonest somatoform disorder, which suggests medical condition, but is judged to be caused by psychological stressors.^{2,3}

The disorder is referred to as hysteria, conversion reaction, or dissociative reaction, and is an ancient medical diagnosis described in both the Egyptian and Greek medical literature.^{3,4}

Sigmund Freud introduced the term conversion and hypothesized that the symptoms of conversion disorder reflect unconscious conflicts.³

Conversion symptoms function as a form of primary gain-anxiety avoidance, and the individual may derive secondary gain from his complaint, which reinforces the symptoms and supports the continuation of the condition.⁵

The term conversion implies etiology since it is derived from a hypothesized mechanism of converting psychological conflicts into somatic symptoms.⁶

The most common symptoms are sensory (like conversional blindness and numbness), motor deficits (like paralysis and mutism), and pseudoseizures. Abnormalities usually do not follow a normal anatomical distribution and the neurological exam is normal.⁷

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According to DSM-IV, Conversion disorder is diagnosed when the patient complains of symptoms affecting voluntary muscles, or deficits of sensory function that suggest a neurological or medical condition (Criterion A). The temporal relation of symptoms to a stressful event suggests association of psychological factors (Criterion B). The symptoms are not intentionally produced (Criterion C), not explained by an organic etiology (Criterion D), result in significant functional impairment (Criterion E) and not limited to pain or sexual dysfunction, and are not explained by another mental disorder (Criterion F).⁸

The aim of the study was to assess the frequency and risk factors of Conversion disorder, its symptomatology and common stressors behind it.

PATIENTS AND METHODS

Through a cross-sectional study, 637 patients were selected, they were all patients who attended every another day of out-patient psychiatric clinic in Azadi Teaching Hospital in Duhok City-Kurdistan Region of Iraq, from 1st July 2008 to 2nd July 2009.

Patients 18 years old and older of both genders were included in the study. Clinical diagnostic criteria according to Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) were applied to diagnose patients with Conversion disorder.⁵

The socio-demographic data included the residence (urban and rural areas); in this study, the centers of the districts in Duhok Governorate were regarded as urban areas only (Duhok, Zakho, Semel, Amedi, Akhre and Shekhan).

Data analysis had been done using the Statistical Package for the Social Sciences version 21. Pearson Chi Square and Fisher's Exact tests were used to assess the association between two categorical variables. A P-value less than 0.05 was considered as statistically significant.

RESULTS

Among the 637 cases which consulted the outpatient psychiatric clinic, 116 cases (18.2%) were diagnosed as having Conversion disorder.

The association of socio-demographic characteristic with Conversion disorder (Table 1):

Most of the cases were females (80.2%), giving a female to male ratio of 4:1, with high significant statistical association between Conversion disorder and gender ($p < 0.001$).

About two thirds of the cases were 18-25 years old (64.7%), while only 0.3% were ≥ 50 years old, with a statistically high significant association with Conversion disorder ($p < 0.001$).

Concerning the educational background, 36.2% of the cases had primary school education, and 30.2% were illiterate. There was statistically significant association between Conversion disorder and educational level ($p = 0.014$).

About half of the cases were married (51.7%), while 46.6% were singles; just one case (0.9%) was widowed and one was divorced. The relationship of the disorder to marital status appeared statistically not significant ($p = 0.859$).

Regarding occupation, 49 (42.2%) patients were housewives and 31 (26.7%) were students, while just one case was retired (0.9%). The results showed statistically significant association between

Conversion disorder and occupation ($p = 0.007$).

Concerning the residence, 65 cases (56%) were from urban areas, while 51 cases (44%) were from rural areas. Statistically the relationship between Conversion disorder and residence appeared not to be significant ($p = 0.603$).

Table 1: Socio-demographic characteristics and their association with Conversion disorder

Variables	Conversion disorder			
	Positive No. (%)	Negative No. (%)	P- value	
Gender				
Female	93(80.2)	265(50.9)	<0.001*	
Male	23(19.8)	256(49.1)		
Age (Years)				
18-25	75(64.7)	245(47)	<0.001**	
26-33	18(15.5)	139(26.7)		
34-41	18(15.5)	57(10.9)		
42-49	3(2.6)	35(6.7)		
≥ 50	2(1.7)	45(8.6)		
Educational level				
Illiterate (0 years)	35(30.2)	203(39)	0.014**	
Primary (1-6 years)	42(36.2)	133(25.5)		
Secondary (7-12 years)	33(28.4)	124(23.8)	0.859**	
Higher (≥13 years)	6(5.2)	61(11.7)		
Marital status				
Married	60(51.7)	248(47.6)	0.007**	
Single	54(46.6)	261(50.1)		
Widow	1(0.9)	7(1.3)		
Divorced	1(0.9)	5(1)		
Occupation				
Housewife	49(42.2)	146(28)	0.603*	
Student	31(26.7)	112(21.5)		
Unemployed	15(12.9)	123(23.6)		
Employed	14(12.1)	82(15.7)		
Self-employed	6(5.2)	53(10.2)		
Retired	1(0.9)	5(1)	0.603*	
Residence				
Urban	65(56)	307(58.9)		
Rural	51(44)	214(41.1)		
Total	116(100)	521(100)		

* Fisher's Exact Test

**Pearson Chi – Square

Common presenting symptoms (Table 2): The most common presenting symptom among patients with Conversion disorder was unresponsiveness (49.1%), and it was the commonest complaint among both females and males (40.5% and 8.6%, respectively).

The second commonest presenting symptom was pseudoseizure (21.6%) followed by fainting attacks (10.3%). Ten cases (8.6%) presented with abnormal movements, five cases (4.3%)

with mutism (all were females), and three cases (2.6%) with paralysis and weakness

(all were females). There was only one case (0.9%) presented with each of the following symptoms: paresthesia (was a male), blindness, aphonia and globus hystericus (they were females).

Table 2: Presenting symptoms of Conversion disorder

Symptoms	Both sexes No. (%)	Females No. (%)	Males No. (%)
Unresponsiveness	57 (49.1)	47 (40.5)	10 (8.6)
Pseudoseizure	25 (21.6)	18 (15.5)	7 (6)
Fainting	12 (10.3)	10 (8.6)	2 (1.7)
Abnormal movements	10 (8.6)	7 (6)	3 (2.6)
Mutism	5 (4.3)	5 (4.3)	0 (0)
Paralysis or limb weakness	3 (2.6)	3 (2.6)	0 (0)
Aphonia	1 (0.9)		1 (0.9)
Paresthesia	1 (0.9)		0 (0)
Blindness	1 (0.9)		1 (0.9)
Globus hystericus	1 (0.9)		1 (0.9)
Total	116 (100)	93 (80.2)	23 (19.8)

Common stressors (Table 3):

Domestic conflict was the commonest stressor (27.6%); all cases were females, followed by love affair (17.2), which was the second stressor among females and third among males. Physical illness (of the

patients or their relatives) comprised the third common stressor (13.8%) and was the commonest stressor among males. Social and interpersonal relationship problems comprised the fourth stressors (10.3%). Financial problem came in the fifth rank (9.5%), and it was the second presenting stressor among males, followed by study and academic problem (8.6%), death of relatives (6.9%), and experiencing or witnessing traumatic accident (6%) respectively.

Table 3: Common stressors in Conversion disorder

Stressors	Both sexes	Females	Males
	No. (%)	No. (%)	No. (%)
Domestic conflict	32 (27.6)	32 (27.6)	0 (0)
Love affair	20 (17.2)	16 (13.8)	4 (3.4)
Illness	16 (13.8)	9 (7.8)	7 (6)
Social problem	12 (10.3)	10 (8.6)	2 (1.7)
Financial	11 (9.5)	5 (4.3)	6 (5.2)
Study problem	10 (8.6)	9 (7.8)	1 (0.9)
Death	8 (6.9)	7 (6)	1 (0.9)
Traumatic accident	7 (6)	5 (4.3)	2 (1.7)
Total	116 (100)	93 (80.2)	23 (19.8)

DISCUSSION

The estimated frequency of Conversion disorder in the current study (18.2%) is higher than what is indicated by Sadock et al. (5-15%), (Kay and Tasman) (nearly 10%) and Okasha (11.2%).^{3,6,9} The percentage appeared much higher than what is reported by Hahn et al., Azzam et al. (up to 3% in both) and (Treece and Barnhill) (0.01–0.02%).^{7,10,11} The vastly different estimates of frequency of Conversion disorder may be attributed to methodological differences from study to study, including the changing definition of conversion disorder, ascertainment

procedures and populations studied. In addition, higher percentages reported in developing countries (in comparison to developed), as countries develop, there may be a declining incidence, which may relate to increasing levels of education, and medical and psychological sophistication.⁶ The higher prevalence of the disorder among females (female to male ratio of about 4:1), is compatible with Kay and Tasman, Azzam et al. (2-10 times more

common in women), Syed et al. study (female to male ratio was 3:1), Chaudhry et al., Borowski and also Cody (female regarded as risk factor).^{6,10,12,13,14,15}

The high prevalence of Conversion disorder among the young age group of

18-25 years, agrees with Sadock et al., who stated that “the onset is generally from late childhood to early adulthood and is rarely seen before 10 years of age or after 35 years of age” and Deveci et al.^{5,16}

Although the disorder was more prevalent

among the married, but this was

statistically not significant. This is in agreement with Sadock et al., (Kay and Tasman), Chaudhry et al., Borowski and also Cody (in which marital status is not included within the risk factors).^{3,6,13,14,15}

The disorder seemed more prevalent among the illiterate and those with only primary educational level. This agrees with Sadock et al. and Azzam et al. who indicated that Conversion disorder is more common in less educated populations.^{3,10} Most of the cases were housewives (42.2%), followed by students and unemployed, showing significant association of Conversion disorder with the occupation. Although the occupation is not regarded as risk factor for developing

Conversion disorder according to Sadock et al, (Kay and Tasman) and Cody^{3,6,15}, but in this study, housewives are considered a risk group which could be explained by family problems, social pressure and excessive demands on them in our culture with low opportunity for leisure.

The disorder appeared more prevalent in the present study among patients from urban areas (56% and statistically not significant), in contrast to both Sadock et al. and Azzam et al. who mentioned that Conversion disorder is more common in rural populations.^{3,10} This difference could be attributed to the way of defining urban areas in this study as it only included the centers of the districts, in addition to the similarity (to a degree) of living standards and social communication patterns between the center of districts and sub- districts and villages in Duhok Governorate.

Generally, there was similarity between females and males regarding the presenting symptoms with the commonest symptom being unresponsiveness (49.1%) (This term is used in this study to describe falling attacks with prolonged loss of consciousness not associated with abnormal movements), followed by pseudoseizure (falling attacks with short period of loss of consciousness associated with abnormal movements) and fainting attacks (falling attacks with short period of loss of consciousness not associated with abnormal movements). This result carries some similarity with the results of Khan et al. and Syed et al. studies in which the unresponsiveness was the commonest presenting symptom.^{11,12} It is also similar to Kuloglu et al. study where the commonest presentation was non-epileptic

seizure and to Najim et al study in which the pseudo-fits was the most frequent presentation.^{17,18} But it does not go with Sar et al. who revealed that dizziness and fainting were the most prevalent conversion symptoms, while non-epileptic seizures was the tenth presenting symptom.¹⁹ This results contradicts Sadock et al. who stated that paralysis, blindness, and mutism are the most common presenting symptoms in Conversion disorder and Mousavi et al study in which aphonia was the commonest presenting symptom followed by paresia.^{3,20}

This could be explained by methodological differences between the studies, especially the populations studied, in addition to the fact that Conversion disorder presents differently in different cultures and is affected by prevalent traditional beliefs.¹²

Domestic conflict was the commonest stressor in this study (27.6%) and all the cases were females, followed by love affair, illness which was the commonest presentation among males, social problem, and financial problem which was the second commonest presentation among males. Generally, there was agreement between the result of this study and Khan et al. study in which domestic conflict was the commonest stressor followed by death in the family and financial problem.²¹ But the results does not go with Kuloglu et al. study in which traumatic event was the most prominent problem. The difference could be explained by methodological differences between studies and the influences of different cultures.¹⁷

CONCLUSIONS

The prevalence of Conversion disorder appeared relatively high compared to other

studies (even in developing countries); the risk groups included females, young age group, low educational level and housewives.

The disorder needs psycho-education regarding the nature of the disorder, cultural impacts on its presentation and underlying stressors, and involvement of specific psychosocial programs in the management and prevention.

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دەرد ئەنجام: تېكچوونا شەگۈھىزەر (ھىستېريا) گە، لەك يا بەربە لاقە، و ھۆكاريين مەترسىيە ئەفانە شەدگىريت: رەگەزى مى، وگەنج، وئاستى خۋاندنىي بىي كىم و لاواز، و ژنن بەر مال.

الخلاصة

عوامل الاختطار للاضطراب التحويلي في محافظة دهوك/ كردستان العراق

الخلفية والأهداف: يمتاز الاضطراب التحويلي بوجود اعراض متعلّقة بالجهاز العصبي غير مفسرة مع وجود اسباب نفسية وراثية، الهدف من البحث كان لبيان نسبة انتشار الاضطراب التحويلي ، وعوامل الاختطار ، اضافة الى الاعراض الرئيسية المنتشرة بين المرضى والضغوطات النفسية التي وراثها.

طرق البحث: من خلال دراسة مقطعية تم اختيار (٦٣٧) مريض من الذين كانوا يراجعون استشارية الامراض النفسية بين يوم وآخر في مستشفى ازادي التعليمي في مدينة دهوك للفترة من تموز ٢٠٠٨ الى تموز ٢٠٠٩. تم الاعتماد على الدليل التشخيصي والاحصائي الرابع للاضطرابات النفسية المعروف ب (DSM-IV) لتشخيص حالات الاضطراب التحويلي، وقد تم معالجة البيانات احصائيا باستخدام برنامج (SPSS).

النتائج: اظهرت النتائج ان نسبة انتشار الاضطراب التحويلي قد بلغ ١٨.٢% (١١٦ حالة). وكان متشرا اكثر بين الاناث (٨٠.٢٥%)، والفئة العمرية الشابة بين ١٨ الى ٢٥ سنة (٦٤.٧%). والمستوى التعليمي الابتدائي (٣٦.٢%) وريات البيوت (٤٢.٢%). مع وجود علاقة احصائية ايجابية معنوية بين الاضطراب والتغيرات المذكورة. وعلى الرغم بانه كان منتشر اكثر بين المتزوجين (٥٢.٧%) وضمن المناطق الحضرية (٥٦%) ولكن العلاقة كانت غير مهمة احصائيا. كان العرض الاكثر انتشارا هو عدم الاستجابة (٤٩.١%) (نوبات سقوط مع فقدان الوعي لفترات طويلة) ، تلاه نوبات الصرع الكاذب (٢١.٦%) (نوبات سقوط قصيرة مع حركات غير منتظمة)، ونوبات الاغماء (١٠.٣%) ، ثم الحركات الغير طبيعية (٨.٦%). كان الصراع المنزلي هو الضغط النفسي الاكثر انتشارا (٢٧.٦%) وكانت جميع الحالات اناثا ، تلاه العلاقة الغرامية (١٧.٢%) ثم المرض (١٣.٨%) والذي كان الضغط النفسي الاكثر انتشارا بين الذكور.

الاستنتاجات: نسبة انتشار الاضطراب التحويلي كان مرتفعا، وشملت عوامل الاختطار كل من الاناث، والفئات العمرية الشابة، والمستوى العلمي المنخفض، اضافة الى ريات البيوت.

METABOLIC SYNDROME AND COLORECTAL CANCER IN DUHOK,
KURDISTAN – IRAQ

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ABSTRACT

Background: Increasing evidence arguing the association between metabolic syndrome and colorectal cancer in general population is in progress. Since there is a lack of information about this issue in Duhok population, the present study was conducted to investigate the association between metabolic syndrome and its components in patients with colorectal cancer.

Methods: A case control study was conducted on 158 subjects, 79 patients with histologically diagnosed colorectal cancer and 79 apparently healthy subjects. Demographic information was collected for all subjects through an interview. Components of metabolic syndrome including abdominal waist circumference (WC), blood pressure (BP), fasting serum glucose (FSG), triglyceride (TG) and high density lipoprotein-cholesterol (HDL-ch) were measured.

Results: Of the seventy nine patients with colorectal cancer, 23 (29.1%) had metabolic syndrome as compared to 20 (25.3%) of the healthy subjects, with rates of 20.2% and 7.6% for males and 8.9% and 17.7% for females, respectively. Patients with age group ≥ 60 years exhibited a significantly higher prevalence of metabolic syndrome than did the healthy subjects (odds ratio= 2.08, $p= 0.024$).

Conclusion: Patients with colorectal cancer may be associated with increased risk of metabolic syndrome in a Duhok population, particularly among males and older age group.

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Keywords: Metabolic syndrome, colorectal cancer

Colorectal cancer (CRC), one of leading causes of the cancer death, ranks the second cancer prevalent worldwide⁽¹⁾. Many Asian and European countries, including Iraq and other Arab countries, China, Japan, South Korea, Singapore, India, US, England, and Sweden, have experienced an increase in the incidence of colorectal cancer during the past few decades^(2,3,4). In Iraq, the frequency of CRC is 5.26% of all cancers⁽⁵⁾. In Kurdistan-Iraq, this cancer forms 7.3% and 6.5% of male and female cancers respectively⁽⁶⁾. Virtually almost all

CRC are adenocarcinomas. Hence whenever the term colorectal cancer “CRC” is used it refers to the colorectal adenocarcinoma^(3,7,8). In order to reduce its incidence, it is crucial to identify the risk factors that are associated with the development of colorectal neoplasia⁽⁹⁾. Metabolic syndrome “or insulin resistance syndrome” has been evolving for many years and is becoming a major global health problem all over the world⁽¹⁰⁾. This syndrome affects about 25% of the population in developing countries⁽¹¹⁾. Metabolic syndrome has been reported to

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be associated with an increased risk of cancer and most of the components of metabolic syndrome have also been linked individually to the development of cancer, including obesity, dyslipidemia, hypertension and hyperglycemia⁽¹²⁾. The exact link between metabolic syndrome components and colorectal cancer is not yet consistent. Some reports demonstrated increased incidence while others observed a weak, or even deny any possible association between the two conditions^(13,14,15). To the best of our knowledge there is a lack of information between metabolic syndrome components and CRC among Kurd population. The present study therefore was conducted to investigate the association between metabolic syndrome and colorectal cancer in a sample of patients from Duhok Governorate.

METHODS

Our case-controlled study included 79 patients with histologically diagnosed colorectal cancer and 79 healthy control subjects from the geographic region of Kurdistan. Patients were referred between 2014 and 2016 to the Central Laboratory, Duhok, Kurdistan Region/Iraq, for histopathology. The mean (SD) age was 55.16 (13.39) years with 47 men and 32 women. The specimens sent included colonic segment resection (n= 56) and small endoscopic biopsies (n= 23). Three mm thick tissue sections were taken from the large specimen-tumor mass while the small specimens were embedded totally. Tissues were fixed in 10% formalin overnight at room temperature, processed and then embedded in paraffin wax. Four μ m tissue sections were cut using manual

microtome, deparaffinized and stained with Hematoxylin and Eosin (H&E) stains to confirm the diagnosis and for grading. Tumors were graded according to the modified WHO classification criteria into low grade (well and moderately differentiated) and high grade (poorly differentiated and undifferentiated) colorectal adenocarcinoma as described previously (16). Sixty two cases were low graded and the diagnosis was given by the routine H&E stains. The remaining 17 cases were high graded (poorly differentiated/anaplastic) tumors and required immunohistochemistry (IHC) to confirm the diagnosis and exclude mimics. The IHC technique applied was Streptavidin-biotin method on paraffin sections using monoclonal or polyclonal antibodies and kits manufactured by DAKO Corporation (Dako Denmark A/S) and Ventana Corporation (Ventana, Rocklin, Calif). 3-3'-diaminobenzidine tetrahydrochloride (DAB) was used as a chromogen and a standard DAB detection kits. Representative tumor sections, with little or no necrosis, were selected from the formalin-fixed, paraffin-embedded blocks. Three μ m sections were cut by manual microtome and mounted on poly-L-lysine-coated slides. Sections were placed in oven at 56-60 C° overnight and deparaffinized in xylene. The next procedure performed depended on the kit available and hence slides were stained manually (Dako Denmark A/S) or with the fully automated immunostaining instrument (Ventana Medical System Inc., Cell Margue, Ventana, Rocklin, Calif.-Ventana Benchmark) according to instructions supplied by the manufacturer's and as described by previous studies performed in

the same laboratory^(17,18,19,20,21,22,23,24,25). The first panel of primary antibodies applied comprised Cytokeratin AE1/AE3, Vimentin, S-100 protein and CD45. After excluding the diagnosis of sarcomas, melanoma and lymphoma ascertaining the epithelial histogenesis of the tumor, additional antibodies were applied to confirm the diagnosis of primary colorectal adenocarcinoma. These antibodies included monoclonal carcinoembryonic antigen, CDX2, CK7, CK20, MUC-1 and MUC-2. Age and sex matched control healthy individuals were chosen from relatives of patients attending Emergency Teaching Hospital in Duhok. The control mean (SD) age was 54.56 (11.28) with 43 men and 36 women.

The definition of metabolic syndrome was coined based on the already known criteria “2001 revised criteria of the National Cholesterol Education Program/Adult Treatment Panel III (NCEP/ATPIII)” which include a constellation of waist circumference > 102 cm in men and > 88 cm in women, serum triglyceride levels > 150mg/dL, serum high density lipoprotein-cholesterol (HDL-C) levels < 40 mg/dL in men and < 50 mg/dL in women, blood pressure > 140/90 mmHg and lastly fasting serum glucose levels >100 mg/dL. The metabolic syndrome is diagnosed in the presence of three or more of its diagnostic criteria⁽²⁶⁾.

After an overnight fast, blood samples were obtained using sterile disposable syringe. All participants underwent anthropometric measurements, and completed questionnaires about age and gender. Systolic and diastolic blood pressures were measured at baseline by

trained personnel. Two readings were performed on the right arm in a sitting position after an initial resting time of at least 5 minutes by the use of a standard mercury manometer. The waist circumference was measured at the plane between the anterior superior iliac spines and the lower costal margins at the narrow part of the waistline while the patient was standing and during slight expiration. Biochemical blood measurements (high density lipoprotein- cholesterol, glucose and triglyceride) were determined by a standard laboratory procedure using Cobas 6000, Roche/Hitachi.

Data were analyzed using the statistical package for social sciences (SPSS version 21.0). Independent t-test was used to assess differences in serum analyte among groups. Categorical variables were analyzed by Chi-square tests.

RESULTS

The mean values of metabolic syndrome components including WC, FSG, TG were significantly higher in patients with colorectal cancer compared with the healthy subjects ($p=0.0001$) for all parameters, whereas the mean values of HDL-C was significantly lower in the patient group ($p=0.001$). Among the 79 Patients with colorectal cancer, 23 (29.1%) had metabolic syndrome as compared to 20/79 (25.3%) of the healthy subjects. However, the difference was not statistically significant (Table 1).

The association between metabolic syndrome with age and gender in patients with CRC and healthy subjects is demonstrated in Table 2. The highest prevalence of metabolic syndrome was in male patients (20.2%) compared to the

7.6% healthy males (odds= 3.09, p=0.015). Male patients also had a higher prevalence of metabolic syndrome than females (P=0.01). Patients with age group of ≥ 60 years exhibited significantly higher prevalence of metabolic syndrome, 16/79

(19.0%) than did the healthy age group 8/79 (10.1%) with (odds ratio = 2.08, p = 0.024).

Table 1 Characteristics of patients with colorectal cancer and healthy subjects

Variable	Patients	Healthy subjects	p value
Number	79	79	-----
Age (years)	55.16 $\pm$ 13.39	54.56 $\pm$ 11.28	0.43
WC (cm)	83.74 $\pm$ 16.48	72.66 $\pm$ 16.51	0.0001
SBP (mmHg)	122.65 $\pm$ 21.41	161.70 $\pm$ 8.80	0.0001
DBP (mmHg)	75.93 $\pm$ 12.12	95.84 $\pm$ 15.76	0.0001
FSG (mg/dL)	148.92 $\pm$ 66.01	100.64 $\pm$ 18.92	0.0001
TG (mg/dL)	155.82 $\pm$ 86.51	104.39 $\pm$ 38.01	0.0001
HDL-C (mg/dL)	34.25 $\pm$ 11.26	48.39 $\pm$ 09.11	0.0001
Prevalence of MS {n (%)}	23 (29.1)	20 (25.1)	0.128

WC: Waist circumference, SBP: Systolic blood pressure, DBP: Diastolic blood pressure, FSG: Fasting serum glucose, TG: Triglyceride, HDL-C: High density lipoprotein cholesterol.

Table 2 Metabolic syndrome according to age and gender in patients with colorectal cancer and healthy subjects

	Patients	Healthy subjects	Odd ratio	p value
Number	79	79	---	---
Age (years) N (%)				
< 29	0.0 (0.0)	0.0 (0.0)	0.62	0.45
30-39	1 (1.3)	3 (3.8)	---	---
40-49	1 (1.3%)	7 (8.9)	---	---
50 -59	5(6.3%)	2(2.5)	---	---
≥ 60	16(19.0%)	8(10.1)	2.08	0.024
Gender N (%)				
Male *	16 (20.2)	6 (7.6)	3.09	0.015
Female	7 (8.9)	14 (17.7)	0.55	0.72

* Male patients vs. female patients, p=0.01

Table 3 shows the prevalence of metabolic syndrome components among patients with CRC and healthy subjects. The highest prevalence of metabolic syndrome components in the patient group was dyslipidemia (50.6%) compared to the hyperglycemia (26.6%), abdominal obesity (21.5%) and hypertension (20.3%).

However, when the associations between the frequency of metabolic syndrome components and colorectal cancer were analyzed, patients with WC > 88.0 cm had a higher percentage of abdominal obesity as compared to healthy subjects (Fig 1)

Table 3 Frequency of metabolic syndrome components in patients with colorectal cancer and healthy subjects

Components	Patients	Healthy subjects	Odd ratio	p value
	N (%)	N (%)		
Dyslipidemia	40 (50.6)	38 (48.1)	1.0	0.92
Hyperglycemia	21 (26.6)	19 (24.0)	1.0	0.91
Hypertension	16 (20.3)	19 (24.0)	0.8	0.87
Abdominal obesity	17 (21.5)	6 (7.6)	2.4	0.013

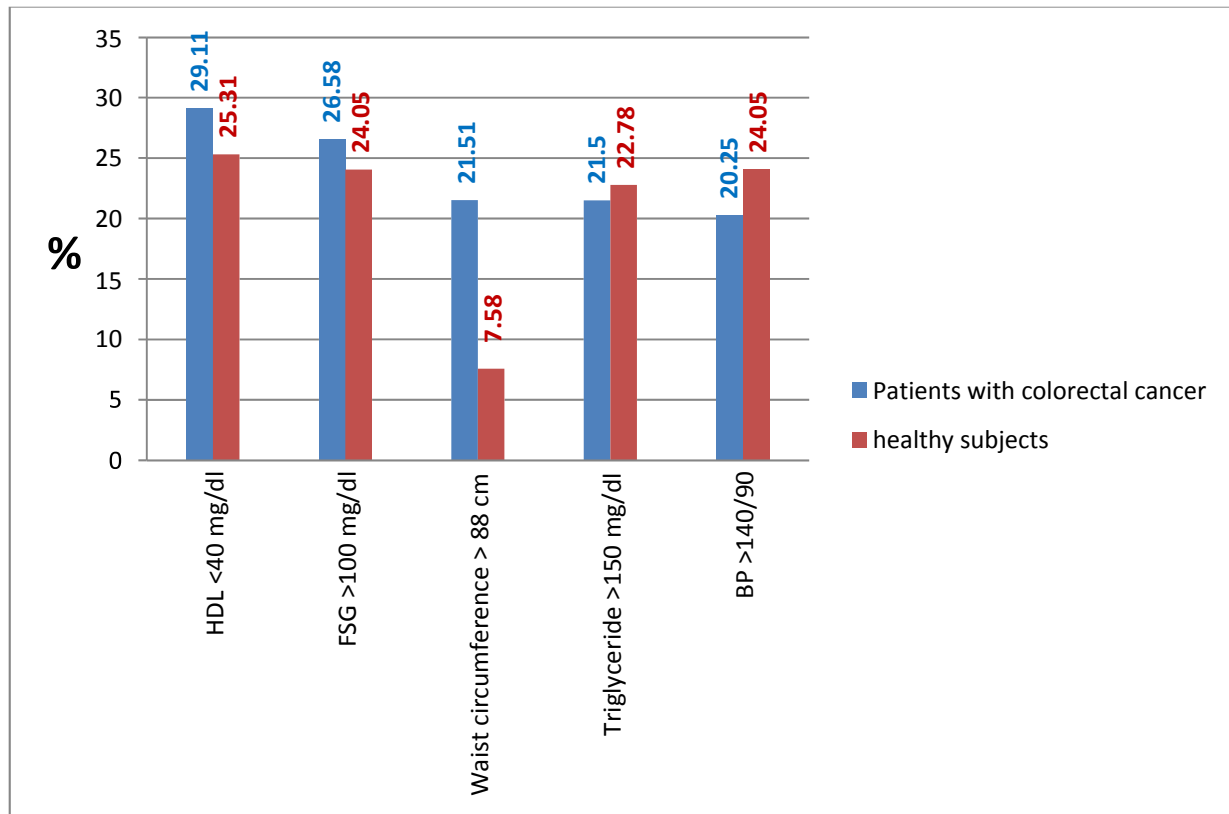


Figure 1 Frequency of metabolic syndrome components in patients and healthy subjects

HDL: High density lipoprotein, FSG: Fasting serum glucose, BP: Blood pressure.

DISCUSSION

The frequency of metabolic syndrome appears to be highly prevalent among patients with colorectal cancer (29.1%) compared with the healthy subjects (25.3%). It is therefore, such a high frequency of metabolic syndrome in our patients is especially noteworthy because several risk factors are known to increase

the incidence of colorectal cancer (27). A lower frequency (17.0%) has been reported by Kim et al among Korean patients with colorectal adenoma (28), Such a lower value reported by Kim et al who worked on adenoma rather than carcinoma is explained by the fact that adenoma, which may be considered as precancerous in colon, usually needs additional risk factors whether environmental and/or genetic, other than metabolic syndrome to undergo malignant transformation. However, another study done in Iran has reported a higher frequency of metabolic syndrome in

patients with colorectal cancer (36%) than ours (29).

Regarding healthy subjects, the frequency of metabolic syndrome in USA adults was 34% among both sexes (15). In eastern India, a very high prevalence rate of metabolic syndrome was reported (43.2 %) with a particular significance among females (52.2%), and 14.95% in Pakistan (30,31). A recent report from a Sweden study revealed that significantly higher incidence rate of CRC among diabetics compared with non-diabetic subjects (32). The association of CRC with individual metabolic syndrome components, other than insulin resistance, has not been studied extensively. The best association among our series was with the abdominal obesity. Such association has been observed by Kim et al who considered the abdominal obesity as an independent risk factor for colorectal adenoma (28). Stocks T. et al reported a strong positive association of diabetes, abdominal obesity and dyslipidemia with colorectal cancer (33). Ahmed et al suggest an overall association between insulin resistance syndrome (≥ 3 components) and colorectal cancer, but a weak individual components association, suggesting that not only that the sum of the metabolic syndrome components may represent a milieu that promotes CRC but also other tumor-promoting effects may be enhanced by the presence of more components of the metabolic syndrome (15). A study performed in this particular locality by Al-Timimi et al, who demonstrated an alarmingly high prevalence of metabolic syndrome components among our residents, indicated that the high incidence rate of colorectal cancer (40 patients per

year) reported here appears to be associated, at least in part with metabolically unhealthy status (34).

Considering the differences in risk factors across countries, patients with colorectal cancer have significantly higher mean age and waist circumference values compared with healthy subjects. Moreover, they had higher means of blood glucose and triglycerides. These observations reinforce the concept of close association between metabolic syndrome and risk of colorectal cancer (15).

Authors reported hazard ratios of CRC for age groups and both genders, some demonstrated an association between male sex with incidence of colorectal cancer (15,35), and between advancing age, particularly among males older than 64 years of age and CRC (35). In the present study, 20.2% of male CRC patients had metabolic syndrome and most of them (69.67%) were at older than 60 years. This finding is in agreement with results reported by Stock et.al who had observed a difference in the frequency of metabolic syndrome between patients with colorectal cancer and healthy controls selected from Sweden population (36).

CONCLUSION

To our knowledge, ours is the first study to examine the association metabolic syndrome and its components with colorectal cancer among Duhok province. As expected, the findings of present study indicated that the prevalence of metabolic syndrome in CRC patients is relatively high, seen in one third of patients, particularly among males and older age group. The frequent association was the abdominal obesity in patients with

colorectal cancer. The results strengthen the concept that abdominal obesity may play a crucial role, at least partially, as a promoter effect of colorectal cancer. Such finding may have clinical implications due to increased risk of future metabolic disease. A large prospective study is needed to confirm our observation and if this association is confirmed, metabolic syndrome patients, particularly those with abdominal obesity, should be considered seriously in CRC screening programs.

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پوخته

کومنه ساخییا میتابولیک و په نجه شیرا رویفیکین ستویر ل دهوکی، هه ریم کوردستانا عیراقی

پیشه کی: گه نکه شا به لگه یی لدر هه قبه ندییا دناقه را کومنه ساخییا میتابولیک و په نجه شیرا رویفیکین ستویر دناقه خه لکی دا به رده زنده بوونی یه، و ژبه نه بوونا پیزانینا لدر قی بابته لیجشاک دهوکی ئە فقه کولینه هاته ئە جامدان ژبو دیارکرنا هه قبه ندییا کومنه ساخییا میتابولیک و پارچه یین وئ لدهف نه خوشین په نجه شیرا رویفیکین ستویر هه ی.

رێکین فقه کولینی: جوړی فقه کولینا نه ساخ دگه ل ساخله ما هاته پکارئینانا و ۱۵۸ کس تیدا به شدا بوون، ژوان ۷۹ نه خوشین په نجه شیرا رویفیکین ستویر هه بوو و ۷۹ کسین ب چا ف ساخله م بوون. پیزانینین کسه یه تی ژوان هاتنه وەرگرتن بریکا دیاداری دگه ل و پارچه یین کومنه ساخییا میتابولیک هاتنه پیقان کو ئە و ژبی پیکهاتینه ژ که مره نا فته نگی، فشارا خوینی، شکر دخوینی دا به خیرینی، روینین سیانی و کولیسترولی جوړی باش.

ئه نجام: دناقه هه ۷۹ نه خوشین په نجه شیر هه ی ۲۲ (٪۲۹،۱) ژوان کومنه ساخییا میتابولیک هه بوو ب به راوردی دگه ل ۲۰ (٪۲۵،۲) لدهف کسین ساخله م، وریزه یین نیر و می یا بشی شیوه ی بوون: ۲۰،۲٪ و ۷،۶٪ لدهف زه لاما و ۸،۹٪ و ۱۷،۷٪ لدهف ئافره تان لدریف ئیک. ئە و نه خوشین ژبی وان شیتست سال و پتر بشیوه کی به رچا ف پتر نه ساخی لدهف هه بوو ب به راوردی دگه ل کسین ساخله م.

دهرئه نجام: دبیت نه خوشین په نجه شیرا رویفیکین ستویر هه ی لدهوکی په یوه ندی هه بیت دگه ل کومنه ساخییا میتابولیک بتایه تی ره گه ژبی نیر و دانعه مران.

الخلاصة

متلازمة الأيض وسرطان القولون والمستقيم في دهوك، كردستان - العراق

الهدف: هناك زيادة في الأدلة حول العلاقة بين متلازمة الأيض وسرطان القولون والمستقيم في عموم السكان، وبسبب نقص المعلومات حول هذه المشكلة لدى سكان دهوك أجريت هذه الدراسة بهدف تحليل العلاقة بين متلازمة الأيض ومكوناته لدى المرضى الذين يعانون من سرطان القولون والمستقيم.

طرق البحث: أجريت الدراسة من نمط الحالات والشواهد على ١٥٨ شخص، ٧٩ منهم مريض بسرطان القولون والمستقيم تم تشخيصهم بالفحص النسيجي و ٧٩ أشخاص أصحاء. تم جمع المعلومات السكانية لجميعهم من خلال المقابلة المباشرة مع قياس مكونات متلازمة الأيض بما في ذلك محيط الخصر، ضغط الدم، نسبة غلوكوز الدم، الشحوم الثلاثية والكوليسترول من نوع البروتين الدهني العالي الكثافة.

النتائج: من مجموع التسعة وسبعين مريض بسرطان القولون والمستقيم، ٢٣ (٢٩.١٪) منهم كانت لديهم متلازمة الأيض بالمقارنة مع ٢٠ (٢٥.٣٪) من الأصحاء، مع معدلات ٢٠.٢٪ و ٧.٦٪ للذكور و ٨.٩٪ و ١٧.٧٪ للإناث، على التوالي. تبين بأن المرضى من الفئة العمرية ستون سنة فأكثر يعانون من متلازمة الأيض بمعدلات أعلى بكثير من الأصحاء (نسبة الأرجحية = ٢.٠٨، $P = ٠.٠٢٤$).

الاستنتاج: قد تكون زيادة خطر الإصابة بمتلازمة الأيض مرتبطة بمرضى سرطان القولون والمستقيم لدى سكان محافظة دهوك، وخاصة بين الذكور وكبار السن.

INTERNET USE AND ADDICTION AMONG STUDENTS OF UNIVERSITY OF DUHOK

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ABSTRACT

Background: Internet has in few years changed the pattern of modern life. Internet addiction is regarded as a new disorder which might disrupt individual's mental health. The objectives were to assess prevalence of internet addiction of various severity levels and to study its relationship to socio-demographic data among the students of university of Duhok.

Methods: This study has a cross-sectional design in which addiction on internet was assessed among Duhok University students for the academic year 2014- 2015. The participants were 1077 students selected randomly during the period between 1st of December 2014 through 30th of March 2015. The 20 items Internet Addiction scale was used.

Results: Among the university students, 98.4% were internet users and 82.3% were addicts. Among them 71.8% have mild internet addiction, 24.3% have moderate and 3.9% can be classified as having severe addiction. While the internet addiction was significantly more prevalent among male gender and urban community group, the severe level appeared to be more common in males and students from humanity fields. Students mostly used the internet for academic/pleasure purpose.

Conclusions: Internet addiction appeared to be common among students of University of Duhok specially males, urban residents and those from humanity fields. Clinical psychologists and psychiatrists should be aware to suggest the necessary therapeutic interventions in time.

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Keywords: Internet use, Addiction, University students

In the recent years, the new information and communication technology, such as mobile phones and the internet have gone through a very rapid growth and availability all over the world specially mobile phone with internet. Compared to 2000, the use of internet has been doubled by 2011.¹ The Internet has revolutionized the computer and other tools of communication all over the world.² It has been increased specially among the young ages.³ Internet addiction can have effect on people with different frequencies and

severity levels and can impact negatively on the academic, social, financial, and occupational domains of the individual^{1,4,5} Many other disadvantages can be attributed to the highly use like theft of personal information, virus threats, pornography easy access, social disconnection between people, legal activities like unaccepted adults communication with children.⁶⁻⁸ Many disorders can complicate abnormal internet use, like 'internet addiction disorder', 'pathological or problematic internet use'.⁹ Until now, addiction on the

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internet has not been listed as a disorder in the diagnostic and statistical manual of mental disorders (DSM), but it has been recognized formally by the American Psychological Association. It is defined as abnormal use of online resources to the degree that it affects the persons' daily activities and social relationships.¹⁰ It is regarded as a newly emergent disorder and is described first in 1996 by the psychologist Kimberly Young.⁹ It is regarded as a kind of impulse control disorder same as other forms of addiction.¹¹

Young made a questionnaire for diagnosis of morbid internet use and addiction.¹² According to him, any patient having 5 or more of eight symptoms of the following: preoccupation, tolerance, withdrawal, failure to control, use longer than intended, functional impairment, lying, and escape will be considered as internet addict.

Grohol described three phases of internet addiction. At first, internet use may be accompanied by obsession and enchantment. In the second phase, disillusionment happens with internet sets and avoidance of online activities. In the third phase balancing of the first two phases and then a new pattern of internet use develops.¹³

The etiology of internet addiction is not clear yet, but several factors may contribute to the development of internet addiction which may have neurological, psychological, and/ or social origins.¹⁴ These etiological factors can act together to increase the risk of developing Internet Addiction: personality vulnerability to addiction, shyness and social anxiety, depression, peer influences, brain

biochemical responses, escapism, and instant gratification.¹⁵

It becomes a big problem among U.S. adolescents and South Korea youths.¹⁶ They may even need psychotropic medications, or sometimes hospitalization.^{17,18} The prevalence found by Scherer (1997) was 14% among the college-based population.^{3,19} The observable varying prevalence rates estimated for internet addiction disorder (between 0.3% and 38%) may be caused by the fact that criteria of diagnosis and evaluation instruments vary between countries and studies commonly use surveys on selective samples community.¹⁴ Adding to that, different countries may have different accessibility to, different definitions of internet addiction and diagnostic tools.²⁰

The young adults are more commonly going online than the other groups of population. About 92% of 18-24 year olds who do not attend college are internet users.²¹ Commonly used fields among internet addicts are cybersex, cyber-relationships and online gambling.²²

It has been reported that persons with problematic internet use have high rates of psychological symptoms.²³ May physical and psycho-social effects may complicate internet addiction. Sleep problems, worries and anxieties, major depressive disorder, social phobic disorder, agitation, hostility, preoccupations, loss of control, dysfunctions, reduced decision-making capacities can happen as negative impact of internet addiction.^{24,4,20,25}

In 2005 Yang and colleagues reported that excessive Internet use has led to higher levels of psychiatric symptoms on the

Symptom Checklist-90- Revision in Korea.²⁶

The objectives of this study were to find out the prevalence of internet use; internet addiction, and addiction severity levels among Duhok University students. The other purpose of the study was to find whether the age, sex, field of study, residence, community types, or previous psychiatric diagnosis can be related to the excessive internet use and/or addiction.

METHODS

Study setting and design: This cross-sectional study was done among students in the University of Duhok/ Zanko Complex in Malta/ Duhok city, Sumail and Akre towns in Kurdistan Region of Iraq. Multistage random sampling was used to select 1077 university students. The study has been conducted during a period of four months from 1st of December 2014 until 30th of March 2015. Data were collected by the researchers using self-reported questionnaires that were distributed to the included students. Approvals were taken from the scientific and ethics committees related to University of Duhok and the Directorate of Health in Duhok. Written consents were obtained from each participant after giving necessary information.

Study sample: The study population consists of students in all 11 faculties of the University of Duhok. Twenty schools and classes were chosen by multistage cluster sampling. The sample was selected in two stages: first stage simple random sampling to choose two schools from each faculty and in the second stage same procedure used to select one class from the schools chosen. 1094 undergraduate

students participated in this study; they were from different grades in each faculty. Seventeen of participants were excluded from the study and 1077 students were included.

The sample was selected according to the following inclusion criteria: age of the students should be between 18 to 26 years, both genders, and the required school or department should be in the morning time. Exclusion criteria: students of the department of computer in both faculties (Engineer and Science) in the University of Duhok.

Study instruments

1. Socio-demographic Data

The researchers made an information form and it is designed according to the aims of the study. It is composed of 8 questions which included socio-demographic features like age, sex, field of the study, residence, community types, previous diagnosis of any psychiatric disorder, internet use and purpose of internet use.

2. Internet Addiction Scale (IAS)

Internet Addiction Scale was developed by Young in 1996.²⁴ The measure contains 20 items and it can assess the symptoms of internet addiction. It is a self-report with 5 degree Likert which scored from 0 (do not apply) to 5 (always). Any person has a score range between 0-19 means non-addiction and in addiction, the minimal score is 20 and maximal is 100. Higher scorers indicate more dependency on the internet, based on the DSM-IV diagnostic criteria for compulsive gambling and alcoholism. It contains questions that reflect the behaviors of addiction.

IAS includes the following items: obsessive behavior related to internet or chatting, withdrawal symptoms, tolerance,

slump in school performance, negligence of family and school life, personal relationship problems, behavioral problems, health trouble and emotional problems.²⁷ The addiction severity was also classified to: a) score points between 20 and 39 classified as an average online user who can have complete control over his/her usage, b) a score between 40 and 79 expresses frequent problems due to Internet usage or possible to addict, and c) a score of 80-100 means that the person has Internet addiction or Internet is causing significant problems.²⁸

Validity and reliability of the IAS:

The content validity of the instrument was established through a panel of ten experts of different specialties related to the field of the present study including psychiatry, psychiatric nursing, community medicine, and statistics. They were asked respectively to review the questionnaire for clarity and adequacy in order to achieve the present study objective.

The experts were (4) faculty members from University of Duhok/ School of nursing, two faculty members were from University of Duhok/ School of Medicine, one member was from psychiatric department in Azadi teaching hospital and three members were from health department of Duhok Directorate of Health.

Those experts were asked to review the questionnaire for content clarity, relevancy, and adequacy; their responses indicated that minor changes should be done according to their suggestions and valuable comments.

For testing the reliability of the IAS, a pilot study was conducted for 10 students from University of Duhok during the

period 23 November to 29 November 2014. The Pearson's Correlation Coefficient was used. In this study, reliability Coefficient (Cronbach's Alpha) of the test was 0.89.

Statistical analyses

The Statistical Package for Social Science (SPSS) version 19 software package was used to perform statistical analyses. For descriptive purpose, internet use and level of internet addiction were analyzed by using percentages or frequencies. The t-test was used to test the differences between means of internet use and addiction in different subgroups of age, gender, field of study, community type, residence, purpose of internet use and previous psychiatric diagnosis. In all calculations, p values equal or under 0.05 was considered significant and p value equal or under 0.01 was considered highly significant.

RESULTS

Table 1 shows the names of university schools or departments chosen from faculties with number of students in each school or department and from different classes. All participants were chosen from University of Duhok. The greatest number of students chosen according to departments was from the account department (128) and the least student number was from school of veterinary (26).

Table 1 Distribution of sample by departments and year of study.

Faculty	Schools or departments	Students (N)	Class
Medical	Pharmacy	37	5 th
	Nursing	38	4 th
Agriculture	Plant product	53	2 th
	Animal product	32	3 th
Veterinary	Veterinary	26	5 th
Art	Sociology	69	3 th
	Translation	58	3 th
Geology	Geology	38	1 st
Administrati On	Account	128	2 nd
and Economy Education	Economy	52	4 th
	Kindergarten	50	3 th
Science	Mathematics	58	3 th
	Chemistry	44	2 th
	Biology	31	4 th
Engineering	Civil	34	4 th
	Source of water	54	2 th
Science and Education of Akre	English	106	2 th
	Arabic	63	3 th
Law and Politics	Law	77	2 th
	Politic	29	4 th
Total		1077	

Table 2 shows that females (53.5%) were slightly higher than males and the age group 18-22 years old constituted three quarter of the sample. The study sample contained nearly equal distributions between urban and rural residents and also between dormitory and family home residence. A total of 632 (58.7%) students were from Humanities field and the rest (41.3%) were from science field. Only (5%) of the sample were previously diagnosed as having one or more psychiatric disorder.

Table 2 Socio-demographic characteristics of students.

Characteristics	N (%)
Gender:	
- Male	501 (46.5)
- Female	576 (53.5)
Age groups:	
- 18-22 years	805 (74.7)
- 23-26 years	272 (25.3)
Community Type:	
- Urban	512 (47.5)
- Rural	565 (52.5)
Residence:	
- Dormitory	510 (47.4)
- Family home	567 (52.6)
Field of study	
- Humanities.	632 (58.7)
- Science	445 (41.3)
Diagnosis:	
-With psychiatric diagnosis	54 (5.0)
-Without psychiatric diagnosis	1023 (95.0)
Total	1077 (100)

According to table 3, it is clear that the total number of internet users among University of Duhok students was 1060 and the majority of them 882 (83.2%) were using it for pleasure and academic purpose.

Table 3 Prevalence and purposes of internet use among University of Duhok students

Internet use	N (%)
- Internet Users	1060 (98.4)
- Non internet users	17 (1.6)
Totals	1077 (100)
Purposes of internet use*	
- Academic	178 (16.8)
- Pleasure/Academic	882 (83.2)
Totals	1060

* Out of the total 1060 internet users.

Prevalence of internet addiction and its levels was illustrated on table 4. A total of 872 (81% of whole students and 82.3% of the users) were internet addicts. From them, (71.8%) of the students have mild addiction on internet, and 212 (24.3%)

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students have moderate internet addiction. Only 34 (3.9%) students were classified as severe internet addicts.

Table 4 Prevalence of internet addiction and internet addiction levels among the study participants (1077)

Internet addiction	N (%)
- Internet addicts	872 (81)
- Non-Internet addicts	188 (17.7)
Totals	1077 (100)
Levels of addiction	N (%)
- Mild	626 (71.8)
- Moderate	212 (24.3)
- Severe	34 (3.9)
Totals	872 (100)

Information about the relationship of internet use, addiction and purposes of use to different socio-demographic data is clarified in Table 5. The independent t-test shows highly significant differences in internet addiction between different genders, community types, and purposes of internet use groups (P values < 0.001). Internet addiction was significantly more prevalent among male gender, and urban community group. The Academic/pleasure purpose of use was highly significantly more common among students.

Table 5 Relationship of socio-demographic characteristics with internet use and internet addiction among University of Duhok students. (N=1077)

Characteristic M (SD)	Internet use* M (SD)	t- test	P	Net Addiction** M (SD)	T- test	P
Gender						
- Male	1.02 (.140)	1.008	.314	1.90 (.303)	6.230	< 0.001
- Female	1.01 (.110)			1.76 (.429)		
Age Groups:						
- 18-22 years	1.01 (.121)	-0.397	.691	1.82 (.382)	0.119	0.905
- 23-26 years	1.02 (.135)			1.82 (.385)		
Community Type:						
- Urban	1.01 (.108)	-1.031	0.303	1.88 (.328)	4.554	<0.001
- Rural	1.02 (.138)			1.77 (.420)		
Residence:						
- Dormitory	1.02 (.124)	-0.025	0.980	1.80 (.397)	-1.438	0.151
- In home	1.02 (.125)			1.84 (.368)		
Study field:						
- Humanities.	1.02 (.142)	1.606	0.109	1.81 (.391)	-1.023	0.307
- Science	1.01 (.094)			1.84 (.370)		
Psychiatric diagnosis:						
-Positive	1.02 (.136)	0.165	0.869	1.79 (.409)	-0.590	0.555
-Negative	1.02 (.124)			1.82 (.381)		
Purpose of Internet use:						
- Academic				1.51 (.501)	-9.405	<0.001
- Pleasure/ Academic				1.88 (.320)		

* Out of 1077 and ** Out of 1060

The relationships of socio-demographic characters with severe internet addiction in the university students are shown on table

6. It's obvious that the gender and study fields are only affecting on the prevalence of severe internet addiction between

students. Severe internet addiction was significantly highly prevalent among male gender and those students from humanistic fields of study (P values < 0.05). Severe internet addiction was not different between those using internet for academic or for pleasure purposes.

Table 6 Relationship of socio-demographic characteristics with severe internet addiction (N=872)

Characteristic	Severe addiction M (SD)	T- test	P
Gender:			
- Male	1.42 (.602)	5.506	<0.001
- Female	1.22 (.458)		
Age groups:			
- 18-22 years	1.31 (.546)	-0.814	0.416
- 23-26 years	1.35 (.540)		
Community Type:			
- Urban	1.30 (.522)	-1.314	0.189
- Rural	1.35 (.566)		
Residence:			
- Dormitory	1.34 (.564)	0.783	0.434
- In home	1.31 (.527)		
Study field			
- Humanities.	1.35 (.573)	1.994	0.047
- Science	1.28 (.501)		
Previous psychiatric diagnosis:			
- Positive	1.52 (.740)	1.840	0.073
- Negative	1.31 (.531)		
Purpose of internet use:			
- Academic	1.25 (.527)	-1.364	0.175
- Pleasure/Academic	1.33 (.546)		

DISCUSSION

According to our knowledge, this can be regarded as a first study estimating internet addiction in Kurdistan- Region of Iraq. It was aimed to estimate the prevalence of internet addiction and internet addiction levels among Duhok University students. Accordingly, 1077 students were randomly

selected and assessed by the Internet Addiction Scale.

The easy and wide availability of internet can benefit people by enhancing their access to a many areas of knowledge easily and creates an avenue for entertainment and social communication.^{29,30} Providing free internet

line can facilitate the access to online books and giving a solution to the deficiency of resources and reference books in university. On the other side, the internet's invasion of all daily life activities can be dangerous and have serious output especially when the use is exaggerated to reach the addiction level.

This study showed that there is high level of internet use (98.4%) indicating that the internet use is very common among the university students. In Iran, all of medical students reported that they used the internet with various periods of times.³¹ The Ministry of Information and Communication technology in 2005, stated that the approximately 94.8% of teenagers are using the internet (as cited in Young, 2006).³² In Turkey, a study showed that the number of internet users was around 20 million at 2007 and this number has increased to 26 million at 2008.³³

Similarly, 100% of United States university students accessed the Internet in 2010.²¹ Researchers sought the factors behind this increased use, like DeBell and Chapman in United States (2006), have explained that parents' education and family income are both positively affecting the increase in number of computers and internet users.³⁴ The internet is used more by younger individuals in Norway within the age group 16–29 years.³⁵ According to AIM Conference Center 2008, 93% of

Korean adolescents were regarded as internet users.

Our study showed that internet addiction is highly prevalent (81%) among Duhok University students. Among those only 3.9% were highly addicted, 24.3% were possible to addict or have moderate addiction. Many factors contribute to this high level of addiction: internet has made life much easier by making data more accessible to all and creating connections with different persons around the world. Internet broadcast or Wi-Fi and monthly participation has led a lot of individuals to spend too much time using it so that it becomes the center of their lives. Being unhappy and stressed can participate in the development of internet addiction. Persons who are overly shy and cannot easily relate to their friends are also at a higher risk of developing this type of addiction.

Similar levels of internet addiction were found in other countries. A study by Bahrainian and Khazaei in Iran in 2014 showed that 2.2% had excessive levels of internet addiction and 38.5% were suffering from moderate severity addiction.³⁶ According to Balci and Gülnar's in Turkey (2009), the rate of internet addiction among the university students was estimated to be 23.2 % and 28.4% were at risk.³⁷ Chou and Hsiao in Taiwan in 2000, study results showed that about 5.9% of undergraduate students are suffering from internet addiction and also Yong in Malaysia (2008), reported internet addiction levels of about 3.3% is classified as excessive users and 54.1% are moderate users.³⁸

Relationship of socio-demographic characteristics of students to internet use, addiction, and severe addiction level:

Gender:

Internet addiction seems to be more common among males than females. This may be because the males spend more time by using internet and social networking than the females and also boys have more experience of earlier forms of internet technology such as laptop and video games.^{39,40}

Results of Vanea research showed that there is significant difference between males and females in Romania (2011), and Sargin in Turkey (2012) in which male adolescent were more internet addicts compared to females.⁴¹ According to Sipal et al. (2011), 36.36% of the male teenagers go online for 5-9 hours a day and nearly, 7.27% percent of them are staying online for more than 10 hours each day.⁴⁰ A vast majority of the female adolescents (40.51%) appeared that they are online for only 2-4 hours each day.

Age groups:

The results showed that there are quite similarity between internet addiction levels and age groups, this may be because there are very small differences between student ages. They are all university student and their ages ranged between 18-26 years old. Similar to our study results, Hasanzadeh et al. in 2012 found that internet addiction in Italy students at different ages wasn't different, or there are no significant differences between age groups and internet addiction rates.⁴² Based on Pawłowska et al. in Poland 2015, study showed that those adolescents aged 13 to 19 years old, the prevalence of internet addiction was 1.83%, and at risk of addiction was 32.22%.⁴³ Youngsters are generally more attracted to risky activities (e.g. chat rooms, online gaming) and

therefore are generally more susceptible to addictive behavior on the Internet.⁴⁴

Community types:

Our study results demonstrated that the internet addiction is variable among communities. For instance, participants showed high rates of internet addiction in urban areas compared to that in rural areas, while the severe addiction was not different in both community types. Student's lives in rural and urban areas communities differ in terms of the accessibility to internet facilities. In urban areas, students can get internet from the university, internet cafe centers and network inside houses, while these facilities are rare in rural community. As well as, the majority of rural community are poor, as a result, they cannot afford internet every day. On the other hand, the level of education and knowledge about the technologic information may also be high among parents in urban areas, to avoid their children from abuse of the internet.

According to Pawłowska et al. in Poland 2015, the results showed that the urban living adolescents have significantly greater severities of internet addiction comparing to rural living adolescents.⁴³ It's estimated that approximately 35.55% of urban dwelling students as well as 30.18% of students inhabiting in rural areas are at risk of internet addiction. Regarding types of online activities; adolescents living in urban areas, use Internet pornography more than those from rural areas, play computer games, Facebook social networking service, and electronic mail and use Instant Messaging (IM) services. In India, research results showed that the internet misuse is more

among the rural adolescents.⁴⁵ This may be because of their ignorance about the seriousness of internet misuse

Residence:

Students stated that they had the ability to access the internet at dormitory and at their home. If they live with family in home, they can get internet broadcast or Wi-Fi. However, if participants live in dormitory, they can access to internet by monthly or weekly paying for mobile internet services. Therefore, the results showed that there are no differences between residencies in terms of internet addiction rates for participants.

According to Gençer in Süleyman Demirel University Turkey (2011), 78% of internet addicts can access internet services at home or dormitory.⁴⁶ When addiction happens, addicts access internet mostly at their homes, which is followed by internet cafes. Causes behind this are: first adolescent can have limitless internet access at home. Secondly, they do not have to pay for each hour of internet access at home.

Field of the study:

Results showed that severe internet addiction is significantly different between students in humanities and science discipline (p value = 0.04). The severe internet addiction mean for humanities participants was 1.35, while those identified natural sciences students was 1.28. It is believable that participants from humanities field of study may have more leisure time than those from scientific discipline; as a result, they might spend longer time with social networks, games, and YouTube. According to Ghamari et al. in Iran (2011), it was obvious that there is no any association between the internet

addiction severity and the field of study and school of education.⁴⁷

The results showed that internet addiction has considerable differences among participants, those who use internet for pleasure / academic mean (1.88) and those who use it for academic purpose mean (1.51). (table 5) It seemed that those used internet for pleasure likes social networks, games, and YouTube have higher rate of addiction than those participants who use it for academic purpose like doing report homework, course work and research project.

According to Fasae & Aladeniyi in Nigerian Universities (2012), about 89% of the science students use the internet for educational purposes, while 58% use it for entertainment purposes.⁴⁸ This agrees with the findings of Kumar and Kaur in India (2005) among Engineering Colleges in which 69.4% use the internet mainly for educational purposes.⁴⁹

According to Naffise et al. in Iran (2013), the results showed that the frequency of internet usage for entertainment is high.⁵⁰ However the number of students who most often use the internet for coursework has greatly decreased and the numbers who use it for entertainment, by contrast, has greatly increased.⁵¹

Sakina et al. in Pakistan (2008), found about 32% use internet for communication purposes, 24% mentioned that they were using it for entertainment, and 33% only were using it to update their knowledge. DeBell and Chapman in United States (2006), mentioned that adolescents commonly use internet for playing games, word processing, completing school assignments, e-mail, and connecting to the internet.^{52,34} The most frequent activities

are e-mail, games, school work, and finding news and product information.

The present study has several limitations. One of the obstacles is that the researchers were unable to measure the time period of excessive internet usage by each individual. Therefore, it is not clear if using internet for short or long period of time will affect the person's addiction level. The other limitation is difficulty to find published information concerning internet addiction among Iraqi university students to make possible comparisons.

Findings from this study have important clinical implications for those caring with mental health of students in general and university students specially. Ministry of higher education, mental health authorities, and families' students should be aware of these high rates of internet addiction among the university students in Duhok. Measures should be undertaken to prevent further increase in rates and manage the possible cases

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پوخته

کارئینان و ئیدمانا ئینتەرنێتی ل دەف قوتابیین زانکویا دهوکی

ئارماج: لساڵێن دوهاهیکی ئینتەرنێتی گوهرین ئیخستنه ژيانا خەلکیدا. ئیدمانا ئینتەرنێتی پێشیلبوته کا نییه و ئەوژی چێدبیت دەمی مروژ کۆنترولی لسه کارئینانا ئینتەرنێتی نهکەت و ساخه ميا دەرونی تێک بجیت. ئارمانجا فی لیکولینی هەلسەنگاندنا مشه بوونا ئیدمانا ئینتەرنێتی یه ل دهف قوتابیین زانکویا دهوکی و چەند په یوه ندی هه یه ب پێزانینیان وان یێن دیموگرافی.

رێکێن فەکولینی: ئەڤ فەکولینا دەرونی هاته کرن لسه قوتابیین زانکویا دهوکی لساالا خاندنی ۲۰۱۴-۲۰۱۵. بەشدارییێن فی لیکولینی پیکهاتیون ژ ۱۰۷۷ قوتابیا کو بشێوه یه کی راندوم هاتیونه دەست نیشان کرن. دەمی فی فەکولینی چار هەیف بوون هەر ژ ۱ کانینا ئیکی ۲۰۱۴ دەست پیکر و هەتا ۳۰ فی ئادارا ۲۰۱۵ بدوماهیك هات. پێشهری ئیدمانا ئینتەرنێتی یی کو پیک هاتی ژ ۲۰ پسپارا هاته بکارئینان.

هه نجام: فەکولینی تومارکر کو ۹۸.۴٪ ژ قوتابیین زانکویا دهوکی ئینتەرنێتی بکارئینن و ۸۲.۳٪ ئیدمانا ئینتەرنێتی یا هەیی. هەر ژوان قوتابیان ۷۱.۸٪ ئیدمانا سڤک یا هەیی و ۲۴.۳٪ ئیدمانا ناقتجی یا هەیی ههروهسا ۳.۹٪ ئیدمانه کا توند یا هەیی لسه بکارئینانا ئینتەرنێتی. ههروهسا فەکولینی دیارکر کو ئیدمانا ئینتەرنێتی پتر یا مشه بوو ل دهف قوتابیین کور و ئاکنجییت بارژیرا. ئیدمانا توند ژ پتر دیار کر هه ل قوتابیین کور و ئەوین پشکێن مروفایه تی دخینن.

دەرئه نجام: ئیدمانا ئینتەرنێتی گه له ک یا مشه یه ل دهف قوتابیین زانکویا دهوکی بتایه تی ل دهف قوتابیین کور و ئاکنجییت بارژیرا و ئەوین لکولجیین مروفایه تی دخینن. نوژدار و چاره سه رکاریین دهرونی تفتت د ناگه هدارین ل مشه بوونا فی پێشیلبوونی ل دهف قوتابیان داکو پێنگاڤین چاره سه ریا پێتقی پافین ل ده مین پئویست.

الخلاصة

استعمال الإنترنت والإدمان عليه لدى طلبة جامعة دهوك

الهدف: غير الإنترنت نمط حياة الناس في السنوات الأخيرة. الإدمان على الإنترنت يعتبر إضطراب حديث الظهور وهو يشير إلى عدم قدرة الفرد على السيطرة على استعماله للإنترنت مؤدياً إلى إختلال صحته العقلية. يهدف هذا البحث الى تقييم مدى إنتشار إدمان الإنترنت بشداتها المختلفة لدى طلبة جامعة دهوك ودراسة علاقته بالمعلومات الديموغرافية.

طرق البحث: تمت الدراسة كمسح ميداني لتقييم إدمان الإنترنت ومستوياته لدى طلبة جامعة دهوك للعام الدراسي ٢٠١٤-٢٠١٥. عينة البحث شملت ١٠٧٧ طالبا وطالبة تم إختيارهم عشوائيا خلال فترة أربعة أشهر من ١ كانون الاول ٢٠١٤ لغاية ٣٠ آذار ٢٠١٥. تم إستعمال مقياس إدمان الإنترنت المؤلف من ٢٠ فقرة.

النتائج: أظهرت الدراسة أن ٩٨.٤% من طلبة جامعة دهوك هم من مستعملي الإنترنت و ٨٢.٣% منهم مدمنين على الإنترنت. من بينهم ٧١.٨% لديهم إدمان خفيف، و ٢٤.٣% لديهم إدمان متوسط الشدة، كما إن ٣.٩% فقط لديهم إدمان بدرجة شديدة. على الرغم من أن إدمان الإنترنت كان الأكثر شيوعا بين الذكور وساكني المدن، إلا أن الإدمان الشديد تواجهه أكثر لدى الطلبة الذكور والمنتمين الى كليات الفروع الإنسانية.

الإستنتاج: نستنتج من البحث أن إدمان الانترنت شائع لدى طلبة جامعة دهوك بنسبة تعتبر كبيرة خصوصا عند الذكور وساكني المدن والدارسين للعلوم الإنسانية. الأخصائيين النفسيين والمعالجين النفسيين يجب أن يتوخوا الحذر من تفاقم هذه المشكلة و يقترحوا التدخلات العلاجية الضرورية في الوقت الملائم.

ASSESSMENT OF QUALITY OF REFERRAL LETTERS AND FEEDBACK
REPORTS BETWEEN PRIMARY AND SECONDARY HEALTH CARE
INSTITUTIONS IN MOSUL

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ABSTRACT

Background: Written correspondence is one of the most important forms of communication between health care providers; poor communication may result in delayed diagnosis, inadequate follow-up, erosion of patient confidence and increased costs through duplication of services. Moreover, the completed referral letter should be legible, with sufficient and appropriate information in the referral letter.

Objective: This study aimed to assess the appropriateness of the referral letter and consultant's feedback.

Methods: A cross-sectional descriptive study was conducted in the referral office of al-Mosul general hospital, using a structured data collection tool. A total of 453 referral letters were randomly selected for the months March, April, and May 2014. The referral letters were reviewed thoroughly for appropriateness of the main items required in ideal referral letters and feedback reports.

Result: Only 4% of referral letters were appropriate with different distribution between referring and receiving facilities. For referring centers, 4%, 39.5%, and 4.2% of referral letters were appropriate regarding patient's demographic details, demographic details for referring center, and (chief complaint, physical examination, and reason for referral) respectively, while for receiving centers, 0.7%, and 9.9% were appropriate for Transfer reception and Counter referral respectively, with statistically significant high appropriate referral letters 15.9% for referring centers compared with receiving centers.

Conclusions: This study shows the deficits in communication and information transfer between primary care doctors and hospitals. It demonstrated that referral letters and feedback reports lacked information and clarity and needs to be improved to guarantee the quality of patient care.

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Keywords: quality; referral letters; secondary health care; Mosul; Iraq

In health care management, often, a patient's condition necessitates referral to a better resourced health care institution for further management. Under these circumstances, communication with the receiving institution becomes imperative. The method commonly used for such communication is the referral letter.^[1]

Therefore, written communication, in the form of consultation or referral requests and reply letters, is the most common- and sometimes sole-means by which doctors exchange information pertinent to patient's care.^[2] The referral form is designed to facilitate communication in both direction, upward, describing the problem that has been seen at the lower level facility and

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requesting specific help and, importantly, information back to the lower facility describing the findings.^[3]

As such the referral letter provides patient information, which will include demographic details, as well as clinical information relating to the reason for the referral decision.^[4] The quantity and quality of information provided by referring practitioners are therefore crucial elements in the effective management of patients.^[5]

Generally, a good quality referral written by a referring physician after a thorough discussion with the patient and the referred consultant is coupled with good compliance, precise diagnosis and effective therapy, teaching and research, and global improvement of health services.^[6]

The most common issues identified which pose difficulties to the current referral letter included: Insufficient administrative and clinical information, and Illegibility.^[7] To measure referral quality, it therefore seems necessary to focus more on measuring the informational quality of referrals than on measuring their structure.^[8]

This study was planned to assess the quality (information content and legibility) of the referral letters issued by referring physician to consultation clinics of government hospitals.

MATERIAL AND METHODS

This study was carried out in Mosul city, the center of Nineveh Governorate. A descriptive cross-sectional study was carried out in Al-Mosul general hospital with different consultation clinics

providing secondary health services through implementation of referral system, and received patients referred from referring centers in the catchment area including, Al-Mansour family health center, Al-Mammon, Al-Gharbi and other primary health care centers (PHCCs)

A purposive sampling was used, and a consecutive referral letters for a period of three months (March, April, and May/ 2014) were be evaluated from the referral registry in the referral office in the hospital, using systematic sampling technique every fourth referral letter and feedback report was selected with no exclusion criteria.

A 453 referral letters were reviewed thoroughly using special evaluation tool for the components of an ideal referral letter. The letters evaluated related to different referring and receiving facilities, the name of patients, referring and receiving doctors were not included, only the name of referring and receiving facilities were included. As assessed by the pilot study, each letter needed around 10 minutes for evaluation.

From reviewing of related literature, a referral form evaluation tool was prepared and used for assessing the quality (information content and legibility) of referral letters and feedback reports.^[9, 10]

The tool included five domains A, B, C, D, and E each include several items, each item has equal but divergent importance, some have administrative significance while others have clinical significance, the studying of referral letters were based on the presence or absence of clinical and administrative items in the referral letter, clearly ensuring that a copy of the final

form completed referral and counter-referral.

1-Domain A:

A1- Patient identification includes: Patients name, patients Address, Age and Gender, name of next of kin, telephone number and address of next of kin, and if all information is legible

A2- Information on the referring health provider/unit includes: Providers name; title and signature; referring unit address and telephone number; PCP group, referral number; and if all information is legible.

2-Domain B: Reason for referral includes: Clinical diagnosis; the reason for referral (whether clinical or administrative); the referral contains a brief summary of history and clinical findings; vital signs are recorded, treatment given is clearly stated; and if all information is legible.

3- Domain C: Transfer information includes: The receiving physician/unit was previously contacted by phone; the patient referral form was faxed to the receiving unit previous to arrival; instructions for transfer is attached to the patient referral form; and if all information is legible.

4- Domain D: Transfer reception includes: Vital signs were recorded at reception; patient was received by professional personnel (physician or nurse); the transfer/reception form is signed and attached to patient referral form; and if all information is legible.

5- Domain E: Counter referral includes: Was a counter-referral form completed and sent; was a counter-referral form received by the referring unit; general information (date, clinical findings, Investigations results, consultant's name and signature, consultant's clinic address and phone number); and final diagnosis using ICD-10

classification is present with treatment and follow-up instructions are present and clearly stated.

Domain C was excluded from estimation because in our locality there was no transfer services provided to referral patients, only for urgent cases that usually reach to emergency unit without referral.

Assessment of each domain of referral letter was estimated giving 1 mark for each item was completely performed, 0.5 mark if the item was incompletely performed, and 0 mark was given if the item was not performed, and then the mean of each domain and the overall value of the letter were estimated out of one. The highest possible score for the domain or the letter was 1, and the lowest was 0.

The quality of each domain or the referral letter was considered appropriate if its mean scored (≥ 0.6), and inappropriate if its mean scored (<0.6). The quality of the domains and overall referral letters were compared between referring and receiving facilities regarding the appropriateness of referral letter.

All analyses were conducted using the Statistical Package for Social Science (SPSS) version 23. The Fisher's exact test, and the Chi-Square test were used to test for significant association between categorical variables. A P value of < 0.05 was considered as statistically significant.

RESULT:

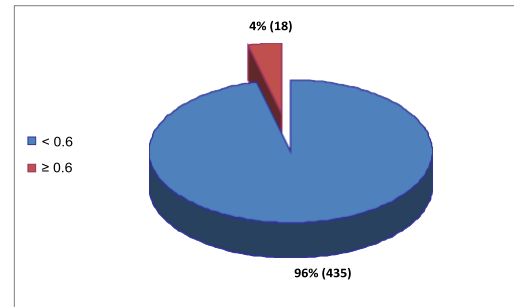
Total number of referral letters included in the study was 453 divided around one third for each month, 34.9%, 34.2%, and 30.9% March, May, and April respectively. 42.8% of referral letters were from Al-Mansour, and about 50% were from Al-

Mammon, and Al-Gharbi PHCCs. Medical clinic received 21.7% of referral letters, with less referral letters to other consultation clinics as shown in table (1). Figure (1) shows that only 4% of referral letters were appropriate (total mean ≥ 0.6), and 96% were inappropriate (total mean < 0.6).

Table (1) Distribution of referral letters by different variables

variables	Categories	No.	%
Reporting period	March	158	34.9
	April	140	30.9
	May	155	34.2
Referring facility	AL-Mansour	194	42.8
	AL-Mammon	130	28.7
	Al-Gharbi	95	21
	Others	34	7.5
Consultation clinics	Medicine	98	21.7
	Ophthalmology	61	13.5
	Obstetrics/Gynecology	48	10.6
	Pediatric	48	10.6
	Surgery	46	10.2
	Rheumatology	45	9.9
	Dermatology	44	9.7
	ENT	37	8.2
	Orthopedic	26	5.7
Total		453	100%

Figure (1) Frequency distribution of appropriateness of referral letters



For referring centers only 4% of referral letters were appropriate regarding domain A1, 6.3% were from Al-Gharbi, and around equal appropriate referral letters from Al-Mansour, Al-Mammon, and other referring center, there was no statistically significant difference between appropriateness of domain A1 and referring centers in study sample, as revealed in table (2a).

Table (2a) Appropriateness of domain A1 of referral letter for referring facilities

Domain of referral letter A1	Referring facility					P
	Mansour	Mammon	Gharbi	Others	Total	
Appropriate ≥ 0.6	No.	7	4	6	1	18
	%	3.6	3.1	6.3	2.9	4
inappropriate < 0.6	No.	187	126	89	33	435
	%	96.4	96.6	93.7	97.1	96
Total	No.	194	130	95	34	453
	%	100	100	100	100	100

By*Fisher's Exact Test

ASSESSMENT OF QUALITY OF REFERRAL LETTERS AND FEEDBACK

Table (2b) illustrates that 39.5% of referral letters were appropriate referral letters regarding domain A2, around two thirds (79.2%) from Al-Mammon, while only 28.4%, 17.9%, and 11.8% are from Al-Mansour, Al-Gharbi, and other referring center respectively, there is a statistically significant ($p < 0.001$) association between appropriateness of domain A2 and referring centers in study sample.

Table (2b) Appropriateness of domain A2 of referral letter for referring facilities

Domain of referral letterA2		Referring facility				Total	P
		Mansour	Mammon	Gharbi	Others		
Appropriate ≥ 0.6	No.	55	103	17	4	179	<0.001*
	%	28.4	79.2	17.9	11.8	39.5	
inappropriate <0.6	No.	139	27	78	30	274	
	%	71.6	20.8	82.1	88.2	60.5	
Total	No.	194	130	95	34	453	
	%	100	100	100	100	100	

By *Pearson Chi-Square

For domain B, 4.2% of referral letters were appropriate, 8.4% were from Al-Gharbi, and less 3.1% appropriate referral letters for each of Al-Mansour, Al-Mammon, and other referring centers, there is no statistically significant association between appropriateness of domain B and referring centers in study sample as revealed in table (2c).

Table (2c) Appropriateness of domain B of referral letter for referring facilities

Domain of referral Letter B		Referring facility				Total	P
		Mansour	Mammon	Gharbi	Others		
Appropriate ≥ 0.6	No.	6	4	8	1	19	.194*
	%	3.1	3.1	8.4	2.9	4.2	
inappropriate <0.6	No.	188	126	87	33	434	
	%	96.9	96.9	91.6	97.1	95.8	
Total	No.	194	130	95	34	453	
	%	100	100	100	100	100	

By *Fisher's Exact Test

Table (3a) shows that 0.72% of referral letters were appropriate regarding domain D, 2.2% were from surgical consultation clinic, and less than 4%, are from both obstetrics/gynecology, and ophthalmology, with no appropriate letters from other consultation clinics, there is no statistically significant association between appropriateness of domain D and consultation clinics.

Table (3a) Appropriateness of domain D of referral letter for receiving facilities

Domain of referral letter D		Consultation clinics									Total	P
		Medicine	Surgery	Obs.gyne	Pediatric	ENT	Ophthalmology	dermatology	rheumatology	Orthopedic		
Appropriate ≥ 0.6	No.	0	1	1	0	0	1	0	0	0	3	.563*
	%	0	2.2	2.1	0	0	1.6	0	0	0	.7	
Inappropriate <0.6	No.	98	45	47	48	37	60	44	45	26	450	99.3
	%	100	97.8	97.9	100	100	98.4	100	100	100	99.3	
Total	No.	98	46	48	48	37	61	44	45	26	453	100
	%	100	100	100	100	100	100	100	100	100	100	

By*Fisher's Exact test

Table (3b) portray that 9.9% of referral letters were appropriate regarding domain E, 17.8% were from rheumatology consultation clinic, and 15.2%, 12.2%, 11.4%, were from, surgery, medicine, and dermatology respectively. Around 20% were from other consultation clinics (pediatric, ophthalmology, obstetrics/ gynecology, and orthopedic), with no appropriate letters from ENT consultation clinic, there is no statistically association between appropriateness of domain E and consultation clinics in study sample.

Table (3b) Appropriateness of domain E of referral letter for receiving facilities

Domain of referral letter E		Consultation clinics									Total	P
		Medicine	Surgery	Obs.gyne	Pediatric	ENT	Ophthalmology	dermatology	rheumatology	Orthopedic		
Appropriate ≥ 0.6	No.	12	7	3	4	0	5	5	8	1	45	.178*
	%	12.2	15.2	6.3	8.3	0	8.2	11.4	17.8	3.8	9.9	
Inappropriate <0.6	No.	86	39	45	44	37	56	39	37	25	408	90.1
	%	87.8	84.8	93.8	91.7	100	91.8	88.6	82.2	96.2	90.1	
Total	No.	98	46	48	48	37	61	44	45	26	453	100
	%	100	100	100	100	100	100	100	100	100	100	

By* Pearson Chi-Square test

ASSESSMENT OF QUALITY OF REFERRAL LETTERS AND FEEDBACK

Table (4) reveals statistically significant ($p < 0.001$) higher 15.9% appropriate referral letters for referring centers compared with 5.3% appropriate referral letters for receiving centers.

Table (4) Assessment of appropriateness of referral letter between referring and receiving facility

	Referring	Facility	Receiving	facility	
	Mean A1,	A2 & B	Mean D	& E	P
	No.	%	No.	%	
Appropriate ≥ 0.6	72	15.9	24	5.3	$< 0.001^*$
Inappropriate < 0.6	381	84.1	429	94.7	
Total	453	100	453	100	

By *Chi-Square test

DISCUSSION

Good communication between primary and secondary care is essential for the smooth running of any health care system. It allows patient to receive optimal care at the correct time without undue delays.^[11]

In the current study, more referral letters (21.7%) were referred to medical clinic, this is inconsistent with a study done in Saudi Arabia in 2010 reported that more referrals 27% were referred to obstetrics/Gynecology clinic, while in the same study the proportions of referrals to other departments such as ophthalmology (13%), orthopedics (11%), general surgery (10.2%), and dermatology (9.7%), were agree with the present study where proportions of referral letters 13.5% to ophthalmology, 10.2% to general surgery, 9.7% to dermatology, and 5.7% orthopedics consultation clinics.^[12]

In the present study the overall assessment was poor only 4% of referral letters were reported appropriate in content and legibility, that is considered very low compared to the study done in Saudi Arabia in 2007 which demonstrated that 82.4% of referral letters were appropriate.^[13]

On the information related to the

patient's demographic details, a study done in South Africa in 2011 showed that, 98% of referral letters were appropriate,^[14] that is inconsistency with the present study regarding domain A1 where only 4% of referral letters were appropriate that also disagree with that reported in Sri Lanka in 2013 as the name of the patient featured in 64.9% of referral letters.^[15]

For domain A2 in this study only 39.5% of referral letters were appropriate this is inconsistent with the study conducted in South Africa in 2011 which revealed that demographic data of the doctor were present in more than 90% of the letters.^[14] A similar study done in Sri Lanka in 2014 where primary care doctor's name, signature and qualifications were present in more than 90% of the letters while the address and telephone number/email were available in 64.2% and 38.2% of the letters respectively.^[11]

In this study 4.2% of referral letters were appropriate for domains B, that was very low and disagree with the result of the study conducted in South Africa in 2011 since 88% of referral letters stating the reason for the referral, and physical

examination (vital signs, systemic examination) was reflected in about 70% of the referral letters.^[14]

In current study regarding domain E, poor quality of feedback were reported, only 9.9% of referral letters were appropriate that goes with the result reported by the study done in Riyadh in 1999 where high rate (80%) of poor feedback reports was noted.^[16] Another study in buraidah, Qassim region, Saudi Arabia 2007 reported low rate of poor feedback, only 30% of the feedback reports were poor.^[13]

The present study shows that 15.9% of referral letters for referring centers were appropriate, and only 5.3% of referral letters for receiving centers were appropriate, this difference was statistically significant. This result agree with the study done in Saudi Arabia in 2010 that reveals significantly higher appropriate referral letters for referring centers (88%) compared with 47% appropriate referral letters for receiving centers.^[12]

Our study demonstrated that while referral letters form an important link between the PHCCs and the hospital, there is generally lack of essential information encountered in the referral letter and feedback reports that are required for continuity of care and need to be improved.

To our knowledge, this is the first study on the assessment of referral letter in Mosul. The present study may be limited because of its design and period which may have limited generalizability of findings. Another limitation that the study includes only primary and secondary health care institutions at the right bank of

Mosul city. Further research is needed to elucidate the problems if we want to improve communication between primary and secondary care.

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پوخته

هه‌له‌سەنگاندنا جوړی نامین هنارتنی و راپورتین خوراکي شه‌گه‌ریای دناقه‌را ده‌زگه‌هین ساخه‌میا ده‌ستیکی و یین لاوه‌کی ل میسل

پێشه‌کی: نامین هنارتنی ئیک ژ پتر و گرتگرین شیوین دان و ستاندینێه دناقه‌را پێشکێشکرین چاڤدیریا ساخه‌می، و بی هیزی ولاوزیا وان دپته شه‌گه‌ری ده‌ستنیشانکرنا دره‌نگ، وکیم دویچوون، و کیمبوونا پاوه‌ریی دناقه‌را نه‌خوشی و زیده‌بوونا مه‌زاختین خه‌مه‌تا، سه‌ره‌رای قی چه‌ندی پێدقه‌ ناما هنارتنی دویمه‌یی یا روون و ناشکراپیت و پیزانینین تیر وته‌سه‌ل دناقه‌روکیدا هه‌بن.

ئارمانج: هه‌له‌سەنگاندنا گونجاندنا نامین هنارتنی و را و بوچوونین شه‌رەتکاران.

رێککین کاری: شه‌کولینه‌کا شیوه‌کاری لایه‌که ژ نفیسینگه‌ها شه‌گه‌هاستنی/ نه‌خوشخانا میسل یا گشتی، بکارشینانا نامیری ریکخستنی بو کومکرنا پیزانینا، و ژ کورمی ۴۵۳ نامین هنارتنی ب شیوه‌یه‌کی به‌ره‌لایی بو هه‌پشین ئادار و نیسان و گولانا سالا ۲۰۱۴. و تیدا نامین هنارتنی هاتنه دیتن و گونجاندنا پێکهینه‌رین سه‌ره‌کی یین پێدقی دنا ناامین هنارتنی دا و راپورتین خوراکي یین شه‌گه‌ریای.

نه‌جام: ریزا ۴٪ بقی ژ نامین هنارتنی گونجای بوون دگه‌ل به‌لافکرنا هه‌مه‌ره‌نگ دناقه‌را سه‌نته‌ری شه‌گه‌هاستنی و پێشوازیی، و ریزا ۴٪، ۳۹.۵٪، ۴.۲٪ ژ نامین هنارتنی یین گونجای لدور پیزانینین دیموگرافی یین نه‌خوشی، روونکرین دیموگرافی یین سه‌نته‌رین هنارتنی (تاریشا سه‌ره‌کی، و پشکینا جه‌سته‌یی، و شه‌گه‌ری هنارتنی) لدویف ئیک. ده‌مان ده‌مدا بو سه‌نته‌رین پێشوازیی ۰.۷٪، ۹.۹٪ ژ نامین هنارتنی یین گونجای بو پێشوازی هنارتیان و سه‌ره‌مه‌ریا وان دگه‌ل هنارتنی لدویف ئیک، دگه‌ل بلندبوونا نامین هنارتنی یین گونجای شه‌وین شیوه‌کی ستاتستیکی هه‌ی ب ریزا ۱۵.۹٪ بو سه‌نته‌رین هنارتنی به‌رامبه‌ر سه‌نته‌رین پێشوازیی.

ده‌ره‌ته‌جام: ده‌کولینی دا دیار بوو نه‌بوونا شیانین هه‌ماه‌نگیی و شه‌گه‌هاستنا پیزانینان دناقه‌را نوژدارین چاڤدیریا ساخه‌می یا ده‌ستیکی و نه‌خوشخاناندا، ژبه‌ر کو دیار بوو دنامین هنارتنی و راپورتین خوراکي شه‌گه‌ریایی دکیم پیزانین و روونکرین و پێدقی ب باشکرتیبه‌ بو گه‌ره‌نتیکرنا باشکرتنا چاڤدیریا نه‌خوشان.

په‌پشین ده‌ستیکی: باشکرتن، نامین هنارتنی، چاڤدیریا ساخه‌میا نه‌ سه‌ره‌کی، میسل، عیراق.

الخلاصة

تقييم نوعية خطابات الإحالة و تقارير التغذية الراجعة بين مؤسسات الرعاية الصحية الأولية والثانوية في الموصل

الهدف: سرطان أبيض الدم المزمن ينتج من النمو الغير المبرمج لخلايا الماييلويد في الدم ونخاع العظم. كان الهدف من هذه الدراسة الكشف عن الحالة السريرية والمرضية للمرضى الكورد الذين يعانون من سرطان الدم النخاعي المزمن (CML) وراجعوا قسم الأورام/ أمراض الدم في مستشفى آزادي التعليمي دهوك/ العراق.

الخلفية: خطابات الإحالة هي واحدة من أكثر وأهم أشكال التواصل بين مقدمي الرعاية الصحية وقد يؤدي ضعف التواصل للتشخيص المتأخر، وعدم كفاية المتابعة، تآكل ثقة المريض وزيادة التكاليف من خلال ازدواجية الخدمات. وعلاوة على ذلك، ينبغي أن تكون رسالة الإحالة النهائية مقروءة، مع توفر المعلومات الكافية والمناسبة في رسالة الإحالة.

الهدف: تهدف هذه الدراسة إلى تقييم مدى ملائمة رسالة الإحالة و ردود الفعل للاستشاريين.

طريقة العمل: أجريت دراسة وصفية مقطعية في مكتب الإحالة/ مستشفى الموصل العام، وذلك باستخدام أداة منظمة لجمع البيانات. وقد تم اختيار ما مجموعه ٤٥٣ رسائل إحالة عشوائياً للشهر مارس وأبريل ومايو ٢٠١٤. وجرى استعراض خطابات الإحالة عن ملائمة العناصر الرئيسية المثالية المطلوبة في رسائل الإحالة وتقارير التغذية الراجعة.

النتائج: كانت ٤٪ فقط من رسائل الإحالة مناسبة مع توزيع مختلف بين مراكز الاحالة والاستقبال. وكانت ٤٪، ٣٩.٥٪، و ٤.٢٪ من رسائل الإحالة المناسبة فيما يتعلق بالتفاصيل الديموغرافية للمريض، التفاصيل الديموغرافية لمراكز الاحالة، و(الشكوى الرئيسية والفحص البدني، وسبب الإحالة) على التوالي. في حين لمراكز الاستقبال كانت ٠.٧٪، و ٩.٩٪ من رسائل الإحالة المناسبة لاستقبال النقل وردود الفعل للإحالة على التوالي، مع ارتفاع خطابات الإحالة المناسبة ذات الدلالة الإحصائية ١٥.٩٪ لمراكز الإحالة مقارنة مع مراكز الاستقبال.

الاستنتاجات: تظهر هذه الدراسة العجز في التواصل ونقل المعلومات بين أطباء الرعاية الأولية والمستشفيات. فقد أظهر أن خطابات الإحالة وتقارير التغذية الراجعة تقتصر إلى المعلومات والوضوح وتحتاج إلى تحسين لضمان جودة رعاية المرضى.

الكلمات المفتاحية: جودة، خطابات الإحالة، الرعاية الصحية الثانوية، الموصل، العراق.

CLINICO-PATHOLOGICAL PROFILE OF PATIENTS WITH CHRONIC MYELOID LEUKEMIA FROM DUHOK/IRAQ

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ABSTRACT

Background: Chronic myeloid leukemia results from unregulated and uncontrolled growth and accumulation of primarily maturing myeloid cells in the bone marrow and peripheral blood. It constitutes 15-20% of all adult leukemias in the western countries, and despite this, no study from the region on the disease available, thus, the current study was initiated to find out the clinical and the pathological profiles of the disease in Kurdish patients presenting to oncology/hematology department at Azadi Teaching Hospital in Duhok/Iraq.

Material and Methods: All patients presented with chronic myeloid leukemia to Oncology unit, Azadi Teaching Hospital from January 2010 to January 2016 were enrolled and their data assessed and analyzed. Diagnosis was based on clinical and laboratory parameters. All enrolled patients followed after therapy to assess their response to Imatinib and other new tyrosine kinase inhibitors.

Results: Out of 53 patients, 29 (54.7%) patients were males and 24 (45.3 %) were females and their ages ranged from 12 to 61 years (median 40.5 years). Chief complaints at presentation were non-specific symptoms in the form of weakness and easy fatigability (66.0%), fever (58.5%), aches and pain (50.9%) and abdominal fullness (37.7%). Clinical signs at presentation included splenomegaly in 100% patients and hepatomegaly in 32.8% patients. Hematological values at presentation were: hemoglobin below normal ranges seen in 83.0%, total leukocyte count (TLC) $> 100 \times 10^9/L$ in 50 cases (94.3%), platelet count < 150

$\times 10^9/L$ in 9 patients (17.0%) and $> 450 \times 10^9/L$ in 16 patients (30.2 %), bone marrow blasts $< 5\%$ in 45 patients (84.9%), 5-20% blasts in 7 patients (13.2%) and $> 20\%$ blasts in 1 patients (1.9%). Biochemical changes included elevated serum Lactate dehydrogenase (LDH) enzyme in 51 cases (96.2%) of patients and raised serum uric acid in 5 cases (9.4%). Molecular study by FISH and RT-PCR: for BCR-ABL gene rearrangement was done and detectable in all cases (100%). All patients treated initially with Imatinib and 49/53 achieve complete cytogenetic response within 6-9 months and the remaining 4 cases respond to nilotinib.

Conclusion: Patients with chronic myeloid leukemia show variable presentation and appeared at a relatively younger age (early fifth decade) with a slight male preponderance. Non-specific symptoms were the commonest presentations and splenomegaly was the invariable consistent features among all patients. Most of our patients presented later with lower hemoglobin, higher WBC count and lower platelets count reflecting lower health surveillance than European countries.

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Keywords: Chronic Myeloid Leukemia, Splenomegaly, Duhok, Kurds, Iraq.

Chronic myeloid leukemia (CML) is defined as a myeloproliferative neoplasm that results from over-proliferation of maturing granulocyte in

the bone marrow resulting in enormous increase in maturing granulocytes in the blood and bone marrow^[1,2]. Characteristically all cases result from

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unique acquired genetic abnormality that result from transposition of ABL1 gene from chromosome 9 onto BCR gene from chromosome 22 [t (9:22); (q34;q11)]. This translocation leads to formation of BCR-ABL1 oncogene that encodes for hybrid protein called 210 kDa (p210BCR-ABL onco-protein) with greater tyrosine kinase activity than the normal ABL gene product^[3-5]. The new hybrid BCR-ABL1 oncogene is responsible for changing the normal hematopoietic cell into a CML cell^[6].

Chronic myeloid leukemia occurs variably among different population with an incidence ranged between 10 and 15 cases/million/year without predilection to any major geographic or ethnic groups^[7]. The median age at diagnosis also variable ranges from 50 years in developing countries to 60 years in developed countries; and there is a steady increase in the prevalence of the disease due to the substantial prolongation of survival that has been achieved with targeted therapy^[8-11].

Before the introduction of tyrosine kinase inhibitors (TKIs) into clinical uses at 1998, most patients ran along three distinct phases with some variable period: chronic phase usually lasted from 3-5 years; accelerated phase with gradual or abrupt increase in blasts usually lasted 6-12 months and a terminal blast crisis phase which was fatal in most cases. However, with the introduction of TKIs majority of patients remain stable, while they stick to the therapy or until they develop resistance to drugs that necessitate alternate tyrosine kinase inhibitor or increase in the dose^[12-13].

The study represents a clinical and pathological prospective study that included all Kurds patients from Duhok province presented with chronic myeloid leukemia to oncology unit at Azadi teaching hospital from January 2010 to January 2016 with no exclusion criteria. The diagnosis was based on guideline adopted by European Society for Medical Oncology (ESMO) working group that relies on finding characteristic laboratory results in peripheral blood and bone marrow including: leukocytosis with increased maturing myeloid cells in different stages of maturation with accompanying basophilia and eosinophilia; gross myeloid hyperplasia with remarkable left shift on examination of the bone marrow and it was confirmed by finding the characteristic BCR-ABL1 gene rearrangement in bone marrow cells with Fluorescent in-situ hybridization technique or Real time -Polymerase chain reaction techniques^[14, 15].

At first, informed consent was gained from all enrolled patients and the study was approved by the appropriate ethical committee at the Duhok directorate of health and Duhok College of Medicine. All Patients diagnosed as CML at the time of initial diagnosis were included in the study. Laboratory data and clinical findings of all enrolled patients were recorded included full history regarding the chief symptoms at presentation; physical findings concentrating on signs of anemia, bleeding disorders and organomegally; as well as laboratory findings included peripheral blood picture, bone marrow examination (aspirate and biopsy), biochemical tests including renal

function tests, uric acid, liver function tests, Lactate Dehydrogenase (LDH) and confirmatory tests including FISH and/or RT-PCR for BCR-ABL1 gene rearrangement.

All of these patients except 2 were treated initially with imatinib only 400 mg/day as recommended by ESMO Guidelines Working Group and they followed for their response^[14]. The only patient with blast crises was treated with a protocol for acute myeloid leukemia (daunorubicin and cytarabine) in addition to imatinib till achieving complete hematological response and the remaining case with very high Total leukocyte count (TLC) ($420 \times 10^9/L$) was treated initially with hydroxyurea 50 mg/kg in addition to imatinib 400 mg for the first 2 weeks then shifted to imatinib only.

All patients were followed regularly as recommended by ESMO Guidelines Working Group to assess the patients' response and the duration of response to various therapeutic agents. For the first 3 months biochemical and hematological investigations were repeated every 2 weeks, to ensure the patients' adherence to the therapy and later on cytogenetic test by FISH was repeated every 6 months until a complete cytogenetic response (CCgR) achieved and confirmed. Quantitative BCR-ABL gene estimation was done every 3 months until a major molecular response (MMoR) achieved and confirmed^[14] and finally descriptive statistics were used to analyze patients' demography.

RESULTS

of the 53 patients included in the study 29/53 (54.7%) were males and the

remaining 24/59 (45.3%) were females with male to female ratio 1.2:1. Ages of enrolled patients were ranged from 12 to 61 years (median 40.5). Chief clinical presentation, as shown in table 1, at the time of first presentation according to their frequency were included: weakness and fatigue followed by fever, aches and pain and finally discomfort in the left hypochondrium. Combination of these complaints was present in more than 90% of patients at presentation. Regarding clinical signs at the time of diagnosis, splenomegaly were invariably presented in all patients followed by hepatomegaly in approximately 1/3 of cases.

Table 1: Clinical presentation of CML patients

Parameters	No. of Patients (N=53)	%
Weakness/fatigue	35	66.0%
Fever	31	58.5%
Aches and pains	27	50.9%
Pain/mass hypochondrium	20	37.7%
Splenomegaly	53	100.0%
Hepatomegaly	17	32.1%

Hematological and biochemical values at the time of diagnosis are summarized in [Table 2] and it showed that 45/53 (84.9%) of these patients presented in chronic phase of the disease, 7/53 patients (13.2%) presented in accelerated and only one patient (1.9%) presented in blast crisis phase of CML. The common hematological abnormalities were mild anemia with very high TLC and normal platelets counts. Renal functions and liver functions tests were normal in all enrolled patients, while LDH elevated in 51 patients (96.2%) and hyperuricemia detected in 5 patients (9.4%).

Table 2: Hematological values at presentation in study group.

Parameter	Ranges	Ranges	Frequencies (N=53)	
Hemoglobin g/dl	8.0-14.4 (Median 11.1)	>13.5(male) >12.5 (female) <13.5-10.0(male) <12.5-10.0(female) <10.0	9 32 12	17 60.4 22.5
TLC	92.6-420 *10 ⁹ /L (Median 175 *10 ⁹ /L)	<100 *10 ⁹ /L 100*10 ⁹ /L 200*10 ⁹ /L > 200*10 ⁹ /L	3 28 22	5.7 52 41
Platelets Count	47- 831*10 ⁹ /L (Median 350 *10 ⁹ /L)	<150*10 ⁹ /L 150*10 ⁹ /L -450*10 ⁹ /L >450*10 ⁹ /L	9 28 16	17 52 30
B.M. blasts	1-30% (Median 4%)	<5% 5-19% >20%	45 07 01	84 13. 1.9
S. Uric acid	4.73-9.17 Mg/dl (Median 5.17)	<7.0 male, <6.0 female >7.0 male >6.0 female	25 23 4 1	90.2 9.4
S.LDH	332-1052 IU/L (Median 664.6)	<400 >400	2 51	3.8 96.2

The response to imatinib was remarkable as most cases 49/53 (92.4%) achieve complete cytogenetic response by the end of first year of imatinib therapy. The remaining 4 cases do not achieve CcgR, they shifted to nilotinib 200mg/day and fortunately they achieve complete cytogenetic response 6 months following initiation of the later drug (Nilotinib, Tasigna).

DISCUSSION

Chronic myeloid leukemia affects all age groups particularly adults and elderly hematological malignancies in some countries like India^[16]. The median age of and it has been estimated that CML constitutes more than 30% of all adult the enrolled patients in the current study was early 40s and this figure is compatible with data reported from Iran and some other East

Asian countries including India and Pakistan^[16-18], however, it is lower than that reported from Turkey- at mid 40s. European countries and United States at late 50s and those mainly reflects the population ages and environmental factors^[19,20].

Regarding the gender males are slightly more affected than females and this is more affected than females and this is compatible with previous data from Iraq and other part other part of the world^[16-21].

Regarding clinical features, the majority of our patients presented with nonspecific symptoms including tiredness, weakness and easy fatigability as in CML bone marrow function are usually are usually preserved better than other hematological malignancies, so that symptoms related to anemia, bleeding and infection are relatively rare and hence most hematological abnormalities were mild anemia with TLC of <200 *10⁹/L and normal platelets counts. In comparison to data reported by Hoffmann and his colleagues from 20 European countries, higher percentage of our patients had anemia, higher WBC counts including higher blasts percentage, lower platelets counts, and higher frequency of organomegaly and these mainly reflect the procedure of surveillance and better health system in European countries^[20].

Finding of splenomegaly in all our patients was striking as it has been reported in ½ to ¾ of cases in most studies, and this also reflects the presentation of our patients with MCL,

in more advanced stage than patients from European countries and United Kingdom^[22].

From the introduction of TKIs into clinical trials at 1998, management of CML had been changed dramatically, and there is no place for hydroxyurea, Interferon- α , stem cells transplantation or other therapeutic drugs as a first choice drugs now a day because the response to TKI is striking and even if the patient fails to achieve CcgR with first generation TKI (Imatinib) due to inherited mutation, they will respond to increases of the doses of the same drug or to an alternative second or third generation TKIs like nilotib, Dasatinib, Bosutinib or even panotinib^[23-25]. All of the 53 enrolled patients were treated initially with imatinib and 92.4% achieve CcgR at the end of the first year, this figure is comparable to that reported from other parts of Iraq, most of European countries and United kingdom^[13, 20, 22], the remaining 4 cases do not achieve CcgR and mostly due to inherited mutations that need specification with sequencing to screen for BCR-ABL KD

mutations and to measure imatinib concentration in the peripheral blood. Unfortunately, the test was not available, that is why all patients shifted to nilotinib and they achieve CcgR after 6 months from starting the drug^[25].

Although, newer TKIs like dasatinib that lead to deeper molecular response are not available currently in the region, however, with the advent of new strategy in the therapy of CML patients that includes induction of stable complete molecular response with potent TKIs and follow up after discontinuation of the drugs mandate introduction of the new TKIs^[26].

In conclusion: CML is a chronic conditions with variable presentation that affects mainly middle age and elderly. Non-specific symptoms were the commonest presentations and splenomegaly was the invariable consistent features among all patients. Most our patients present later with lower hemoglobin, higher WBC count and lower platelets count reflecting lower health surveillance than European countries. Majority can have major molecular response with TKIs, particular with the introduction of new TKIs that lead to a deeper response.

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پوخته

بادەکا کلینیکی و پاتولوجی ل دەف نەخۆشین کورد ئەوێن توشی پەنجەشێرا مێژیی هەستیکی یاکەفناڕ بوین

دهوك/عراق. ل(CML)

ئارمەج: پەنجەشێرا مێژیی هەستیکی یاکەفناڕ بوین (CML) چۆدبیت ژ ئەگەری ژێدەبۆنەکا نە کۆنترۆلکری یا بەردەوام یا شائیت مایوید د خوینی و مەژی هەستیدا ، ئارمانج ژ قی فەکولینی ئەو بو دیارکرا پێزانینی کلینیکی و پاتولوجی ل دەف نەخۆشین کورد ئەوێن توشی پەنجەشێرا مێژیی هەستیکی یاکەفناڕ بوین (CML) و سەرەدانا بەشی پەنجەشێری / نەخۆشی خوینی کرین ل نەخۆشخانا ئازادی ل دهوك/عراق.

رێککێن کاری: هەمی نەخۆشین توشی پەنجەشێرا مێژیی هەستیکی یاکەفناڕ بوین و هاتینە تومارکرن ل بەشی پەنجەشێری ل نەخۆشخانا ئازادی د ماوی دناقبەرا کانینا ئیکێ ۲۰۱۰ تاکو کانینا ئیکێ ۲۰۱۶، هاتنە پشکارکرن د فەکولینی دا و هەمی پێزانین ل سەر وان هاتنە شروقه کرن و نەرخاندن. دەستیشانکرا نەخۆشی پالپشت بو ب پێزانینی کلینیکی و لابوری. دیفجونا وان هاتە کرن پشستی وەرگرتنا دەرمانا ژ بو نەرخاندنا بەرسقا وان بو دەرمانی Imatinib و هیشتا دەرمانی نێر ژ جوری tyrosine kinase inhibitors

ئەنجام: ژ ۵۲ نەخۆشان، ۲۹ (٪۵۴،۷) رەگەزی نێر بون و ۲۴ (٪۴۵،۳) می بون . ژیی وان دناقبەرا ۱۲- ۶۱ سالان دا بون (نافنجی 40.5 سال) بون. گەزندی سەرەکی یت وان نە د دیارکری بون ، وەکا لاوازی و وەستیانا ب ساناھی (۶۶،۰٪)، تا (58.5٪). ئیش و ژان (۵۰،۹٪) و پربونا زکی (۲۷،۷٪). نیشانی کلینیکی ل دەست پیکێ، مەژن بونا خالاکێ ل ۱۰۰٪ و مەژنبونا جەگەرێ ل ۲۲،۸٪ ژ نەخۆشان.

ئەنجامی پشکینی خوینی: هیموگلوبین د بن رێژا نورمال دا (۸۲،۰٪) . ژمارا تەبکیت سپی یاکشتی ($10^9/L$ * 100) (TLC) ل دەف ۵۰ نەخۆشادا بو (۹۴،۲٪)، ژمارا platelet کیمتر $150 * 10^9/L$ ل دەف ۹ نەخۆشان (17.0٪) و پتر ژ $450 * 10^9/L$ ل دەف ۱۶ نەخۆشان (30.2٪)، bone marrow blasts <5% ل دەف ۴۵ نەخۆشان (۸۴،۹٪)، 5-20% blasts ل دەف ۷ نەخۆشان (۱۲،۲٪)، >20% blasts ل دەف ۱ نەخۆش (۱،۹٪). پشکینی بایکمیستری: ئەنژی Lactate dehydrogenase (LDH) بلندتر ل دەف پتریا نەخۆشان بو (۹۶،۲٪) بەلام Uric acid یی بلند بول دەف ۵ نەخۆشان. پشکینی مولوکیولر بایولوجی ب ریکا RT-PCR : BCR-ABL gene rearrangement هاتە ئەنجام دان ل دەف هەمی نەخۆشان. هەمی نەخۆشا Imatinib وەرگرتن و ۵۲/۴۹ باشبون د ماوی ۶-۹ هەپشان دا و یت ماین ۴ بون مفا nilotinib وەرگرتن.

دەرئەنجام: ئەو نەخۆشین توشی پەنجەشێرا مێژیی هەستیکی یاکەفناڕ بوین (CML)، نیشانی پشکینی د جورەوجور بون و ب رێژەیی دیار دبن ل ژیی گەنجایی (ل دەست پی کا پێنجیان) دگەل بلند بونا رێژا رەگەزی نێر. نیشانی نە دیارکری پراڤیا نیشانی پشکینی بون بە ئی پا مەژن بونا خالاکێ ل دەف هەمی نەخۆشان هەبو. پراڤیا نەخۆشان هیموگلوبین و و بلندبونا ژمارا تەبکیت سپی و کیمیا ژمارا platelets دیار دکەت کو کۆنترۆلکرا تەندورستی یا مە کیمتره ژ یا وەلاتین ئەووپیی.

الخلاصة

الملف السريري والمرضى للمرضى الذين يعانون من سرطان الدم النخاعي المزمن في دهوك / العراق

الهدف: سرطان أبيض الدم المزمن ينتج من النمو الغير المبرمج لخلايا الماييلويد في الدم ونخاع العظم. كان الهدف من هذه الدراسة الكشف عن الحالة السريرية والمرضية للمرضى الكورد الذين يعانون من سرطان الدم النخاعي المزمن (CML) وراجعوا قسم الأورام/ أمراض الدم في مستشفى آزادي التعليمي دهوك/ العراق.

طرق البحث: جميع المرضى الذين يعانون من سرطان الدم النخاعي المزمن وراجعوا وحدة الأورام في مستشفى آزادي التعليمي خلال الفترة من كانون الثاني ٢٠١٠ حتى كانون الثاني ٢٠١٦، تم تسجيلهم وإشراكهم في الدراسة وتمت دراسة البيانات الخاصة بهم لغرض تقييمها وتحليلها. التشخيص استند على المعطيات السريرية والمختبرية. تمت متابعة المرضى بعد أخذهم العلاج لتقييم الاستجابة لـ Imatinib وغيرها من مثبطات التيروسين كيناز الجديدة.

النتائج: من أصل ٥٣ مريضاً، كان ٢٩ (٥٤.٧٪) من الذكور و ٢٤ (٤٥.٣٪) من الإناث، وتراوح أعمارهم من ١٢-٦١ سنة (متوسط العمر 40.5 سنة). وكانت الشكاوى الرئيسية للمرضى أعراض غير محددة، على شكل ضعف وفقر (٦٦.٠٪)، والحمى (58.5٪)، والأوجاع والام (٥٠.٩٪) انتفاخ البطن (٣٧.٧٪). العلامات السريرية كانت على شكل تضخم الطحال لدى ١٠٠.٠٪ وتضخم الكبد لدى ٣٢.٨٪ من المرضى.

الهدف: سرطان أبيض الدم المزمن ينتج من النمو الغير المبرمج لخلايا الماييلويد في الدم ونخاع العظم. كان الهدف من هذه الدراسة الكشف عن الحالة السريرية والمرضية للمرضى الكورد الذين يعانون من سرطان الدم النخاعي المزمن (CML) وراجعوا قسم الأورام/ أمراض الدم في مستشفى آزادي التعليمي دهوك/ العراق.

طرق البحث: جميع المرضى الذين يعانون من سرطان الدم النخاعي المزمن وراجعوا وحدة الأورام في مستشفى آزادي التعليمي خلال الفترة من كانون الثاني ٢٠١٠ حتى كانون الثاني ٢٠١٦، تم تسجيلهم وإشراكهم في الدراسة وتمت دراسة البيانات الخاصة بهم لغرض تقييمها وتحليلها. التشخيص استند على المعطيات السريرية والمختبرية. تمت متابعة المرضى بعد أخذهم العلاج لتقييم الاستجابة لـ Imatinib وغيرها من مثبطات التيروسين كيناز الجديدة.

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وكانت القيم الدموية: الهيموجلوبين أقل من النطاقات العادية في ٨٣.٠٪، ومجموع الكريات البيض أكثر من ١٠٠ * ١٠٩ / لفي ٥٠ حالة (٩٤.٣٪)، الصفائح الدموية أقل من ١٥٠ * ١٠ / ل في ٩ مرضى (17.0٪) وأكثر من ٤٥٠ * ١٠ / ل في ١٦ مريضاً (30.2٪)، Blast نخاع العظام أقل من ٥٪ في ٤٥ مريضاً (٨٤.٩٪)، ٥-٢٠٪ Blast في ٧ مرضى (١٣.٢٪) وأكثر من ٢٠ Blast في ١ مريضاً (١.٩٪). الفحوصات الكيميائية لـ Lactate dehydrogenase (LDH) كانت ٢ أكثر من الحد الطبيعي لدى أكثرية المرضى (٩٦.٢) و Uric acid أكثر من الطبيعي لدى ٥ مرضى. ٣- أكثر من الحد الطبيعي (٩.٤٪).

الفحوصات الجزيئية أجريت بواسطة RT-PCR: BCR-ABL gene rearrangement لجميع الحالات التي عولجت بدواء Imatinib ٥٣/٤٩ استجابت للعلاج والباقي ٤ حالات عولجت بـ nilotinib، الاستجابة تحققت خلال ٦-٩ أشهر.

الاستنتاج: المرضى الذين يعانون من سرطان الدم النخاعي المزمن اظهروا أعراض متنوعة والتي ظهرت في سن مبكرة نسبياً (أوائل العقد الخامس) مع رجحان طفيف لدى الذكور. وكانت الأعراض الغير المحددة الأكثر شيوعاً بينما كان تضخم الطحال موجوداً لدى جميع المرضى. معظم المرضى اشتكوا في وقت لاحق من انخفاض خضاب الدم، وارتفاع عدد كرات الدم البيضاء وقلة عدد الصفائح الدموية والتي تعكس ضعف المراقبة الصحية لدينا مقارنة بالدول الأوروبية.

DETECTION OF TOXOPLASMOSIS AMONG WOMEN
WITH ABORTION USING MOLECULAR AND SEROLOGICAL TESTS IN
DUHOK CITY

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ABSTRACT

Background: Toxoplasmosis is accompanied with variable complications in pregnant women. The aim of this study was to detect the rate of *Toxoplasma gondii* infection among aborted women with previous bad obstetrical history and women with no previous history of abortion after normal labour by both serological and molecular techniques.

Subject and Methods: A total of 100 pregnant women were included in the current study admitted to Gynecology and Obstetrics Hospital throughout the period from October 2014 – February 2015, in Duhok City/ Kurdistan Region/ Iraq. The placentae and blood samples of 70 aborted women were tested serologically using ChemlumencenseImmuno Assay and PCR tests, and 30 placental samples of normal women were tested using PCR technique only.

Results: On serological screening by CLIA, 7/70 (10%) and 2/70 (2.8%) of aborted women were seropositive for anti-toxoplasma IgG and IgM antibodies, respectively. While, on conventional PCR, 55/70 (78.5%) of aborted women were positive against *Toxoplasma gondii* infection.

According to gestational period, out of 57 cases in the first trimester, CLIA detected in 5 (8.8%) and 1 (1.8%) anti-toxoplasma IgG, IgM antibodies respectively. The highest positive rate was 43 (75.4%) against *T. gondii* infection by PCR in the first trimester.

A total of 10 cases in the second trimester, 2 cases (20%) and one case (10%) were seropositive for anti-toxoplasma IgG, and IgM antibodies were detected by CLIA respectively, while 9 (90%) cases were positive by PCR in the second trimester, in the third trimester none were seropositive, and all cases (100%) were PCR positive.

Conclusion: The current study showed high infection rate of toxoplasmosis among aborted women in Duhok city – Kurdistan region of Iraq. There is a need to introduce PCR as a confirmatory test for detection of acute toxoplasmosis with serological tests.

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Keywords: Toxoplasmosis, aborted women, ChemlumencenseImmuno Assay, PCR

Toxoplasma gondii is an obligatory coccidian parasite belongs to phylum apicomplexa causes a disease called toxoplasmosis. Toxoplasmosis has a cosmopolitan distribution particularly in warm and humid areas.¹

It is estimated that up to a billion of the world population carries *T. gondii*.² Both prevalence and incidence of infection differ according to population and geographical regions.³ In humans the prevalence and incidence of toxoplasmosis

depend on several factors including, age, geographic location, cultural traditions, nutritional and hygiene habits.^{4, 5}

During pregnancy, congenital transmission happens when an uninfected mother gets primary infection.⁶ Acquiring the infection during pregnancy is associated with transmission of *T. gondii* to the fetus through the placenta, leading to fetus malformation or congenital toxoplasmosis.⁷

Infection causes are spontaneous abortion,

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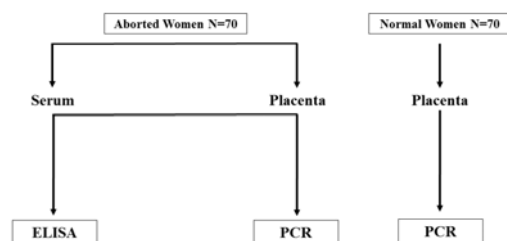
stillbirth, or severe fetal damage. Toxoplasmosis causes miscarriage, death in utero, or severe neurological lesions, while fetal infection occurring later in pregnancy may result in either congenital disease or subclinical infection.³

Where serological assays are unreliable or when the other clinical diagnosis tests are doubted, the PCR technique can be used.⁸ PCR is a powerful diagnostic method with both high sensitivity and specificity compared to serology and culture techniques, which are insensitive and time-consuming.⁹

The aim of the current study are to determine the rate of *T. gondii* infection in aborted women and full term delivery by using serological and conventional PCR techniques.

SUBJECTS AND METHODS

Design of Samples Collection



Collection of Blood Samples for Serological test

A total of 70 blood samples were collected from women with abortion, from each a volume of 5ml of blood was obtained by vein puncture, then centrifuged to obtain the serum. Information were obtained from each women including, age, and number of abortions, residency, occupation, and literacy. Sera were stored at -20 °C until being screened for anti- toxoplasma antibodies. Detection of anti-toxoplasma

IgG and IgM antibodies were achieved by using CLIA.

Collection of Placentae for Conventional PCR

A total of 100 placentae were obtained from both full term (30 samples) and aborted women at different trimesters (70 samples). The entire placentae were achieved in the delivery and curettage rooms of Gynecology and Obstetrics Hospital/ Duhok.

All the placenta samples of the first trimester were obtained after curettage. All samples of the second and third trimesters were collected at delivery rooms. About 50gm of placenta tissue were obtained from different locations of placentas, put in a falcon tube and soaked in Phosphate-Buffered Saline solution (PBS). For every sample, new disposable gloves razor, and a scalpel were used to avoid contamination then the samples were labeled with full information as performed for blood samples, then transferred to the laboratory of Microbiology Department/College of Medicine and were stored at -200C until use.¹⁰

Serological Tests

In the current study CLIA serological test was done according to the manufacturer's protocols (DiaSorin, Italy and plasmatec laboratory product, Italy).

Conventional PCR

The UltraClean Tissue & Cells DNA extraction kit was used for extracting genomics DNA.¹⁰ In order to identify *T. gondii*, the B1 gene was amplified with forward (TCGGAGAGAGAAGTTCGTCGCATG) and reverse (AGCCTCTCTCCTCAAGCAGCGG TA ~125 bp) primers respectively.

Master Mix Composition

Composed of mixture 5 units of Taq DNA polymerase, PCR buffer 100 mM Tris-HCl, 1.3mM MgCl₂, and 200mM dNTPs. PCR

was carried in a 25µl reaction mixture containing: 12.5 Master mix, 2 µl genomic DNA, 1µl for each forward and reverse primers, and 8.5µl Distilled water. The reaction was performed in an automatic thermocycler with following cycling parameter: one cycle for initial denaturation at 94 0C for 3 minutes, 40 cycles for Denaturation at 940C, Annealing at 530C, and Elongation at 720C for 30 seconds, and then the final extension 1 cycle at 720C for 5 minutes.10 A volume of 10µl of each PCR product and 4µl of DNA electrophoresed in a 1% agarose gel at ~80 V for 75-120 minutes. The results were visualized after staining with ethidium bromide in UV transilluminator.

Statistical Analysis

Results were considered to be statistically significant with (P-values < 0.05) using Chi-square test.¹¹ The statistical analysis of the results was performed by using statistical program (R) Tutorials for Chi – square test of independence.

RESULTS

Table1 displays that all (100) examined women were distributed as groups according to residency, 24 (24%) cases from rural areas, and 76 (76%) were urban. Regarding the occupation status, 36 (36%) were employed, and 64 (64%) were housewives. The educational status, 39 (39%) of cases were literate, and 61 (61%) were illiterate. Among the literate cases, they were either primary, secondary or university levels.

Out of 70 examined aborted women, 34 (48.6%) were represented with a history of abortion for the first time, 26 (37.1%) with second time abortion 6 (8.6%) with triple abortion and 4 (5.7%) with fourth times or more abortions. Age groups were 18-24 (35.1%), 25-31 (57.1%), 32-38 (4.3), and 39-45 (2.9%) years. Regarding the gestational period of first trimester cases was 57 (81.4%), second trimester 10 (14.3%) and third trimester 3 (4.3%).

Table 1: Socio-demographic characteristics among total examined women in Duhok city (n = 100)

Examined groups		Aborted		Normal women		Total
Characteristics	Groups	Women		Women		n=100
		n.=70	%	n=30	%	
Residency	Rural	19	27.1	5	16.7	24
	Urban	51	72.9	25	83.8	76
Occupation	Employed	26	37.1	10	33.3	36
	Housewife	44	62.9	20	66.7	64
Education	Literate	31	44.3	8	26.7	39
	Illiterate	39	55.7	22	73.3	61
Number of aborted fetuses	Abortion for first time	34	48.6	4	13.3	38
	Abortion for second time	26	37.1	2	6.7	28
	Abortion for third time	6	8.6	2	6.7	8
	Fourth times or more	4	5.7	1	3.3	5
	18-24	25	35.7	12	40	37
Age of the groups(years)	25-31	40	57.1	15	50	55
	32-38	3	4.3	3	10	6
	39-45	2	2.9	0	0.0	2
Gestational period	First Trimester	57	81.4	-	-	57
	Second Trimester	10	14.3	-	-	10
	Third Trimester	3	4.3	30	100	33

Table 2 shows that the total infected women with *T. gondii* among the 70 aborted women using serological test were

9/70 (12.9%). Whereas, by using PCR, the number increased to 55/70 (78.5%).

Table 2: Distribution of *T. gondii* infection among 70 aborted women using Serological and PCR tests

Tests	Positive results				Total <i>T. gondii</i> infection	
	IgG	%	IgM	%	%	
Serological	7	10	2	2.9	9	12.9
PCR	55		55	78.6%	55	78.6%

NS=Non significant (P-value >0.05)

RESULTS OF SEROLOGICAL TEST

It was evident that most cases 51/70 (72.9%) obtained from *T. gondii* infection related to residency groups of women with bad obstetrical history (BOH) using serological were reported from the urban group, while a lower number of cases 19/70 (27.1%) were from the rural group. High levels of IgG anti-toxoplasma antibodies were found in an arural group of 3/19 (15.8%) than urban cases of 4/51 (7.8%). While regarding IgM anti-toxoplasma, antibodies were detected in urban group 2/51 (3.9%), but it was not indicated in rural group. There was no significant difference between these two groups concerning IgG and IgM (P-value > 0.05).

According to occupations the numbers of the positive IgG cases were 5/44 (11.4%) and 2/26 (7.7%) in housewives versus in employed women. No IgM anti-toxoplasma antibodies were detected in housewives cases while two (7.7%) IgM positive cases were detected in employed women 2/26 (7.7%). Statistically there was no significant difference between the both groups.

The seropositivity of anti-*T. gondii* IgG and IgM among abnormal women with BOH according to educational status was

3/31(9.7%) and 4/39 (10.3%) of IgG among literate and illiterate cases respectively. While anti-*T. gondii* IgG and IgM was detected in 2 out of 31literate cases (6.5%).

The age groups with BOH were considered as 25(35.7%) cases of (18-24) year group, 40 (57.1%) cases of (25-31) year group, 3 (4.3%) cases of (32-38) year group, and 2 (2.9%) cases of (39-45) year group. The high seropositivity of both IgG and IgM were found in age group (25-31)years, IgG was 5/40 (12.5%), and IgM was 2/40 (5%) in comparison to other groups. Whereas, IgG anti-toxoplasma antibody was 2 (8%) in (18-24) age group and no IgM was recorded. Regarding both age groups (32-38) and (39-45), no IgG and IgM were detected among them. Statistically there was no significant difference between the both groups.

Seropositivity of *T. gondii* among the abnormal group with BOH concerning the gestational period; high abortion cases were found in first trimesters, 57 (81.4%) while the lowest cases were found in the third trimester as 3 (4.3%). The high number of IgG 2/10 (20%), and IgM 1/10(10%) cases were recognized in the second trimester. While the seropositivity of *T. gondii* among the abnormal group

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with BOH belonged the first-trimester group identified IgG in 5/57 (8.7%) and IgM in 1/57(1.8%) cases. No IgG and IgM were detected in the third trimester.

Out of 70 of aborted women, 34 were with single abortion cases, 26 with double abortions, 6 with triple abortions and 4 four and more abortions. Results revealed that women belonged to triple abortions group, 2/6 (33.3) were seropositive for IgG, while no IgM antibodies. Then women belonged to double and single abortions groups have shown seropositive for IgG 4/26 (15.4%) and 1/34(2.9%), respectively and no anti- toxoplasma IgM

antibodies were detected. Women belong to four and more times abortions revealed no IgG and IgM seropositivity.

RESULTS OF PCR

Table 3 shows the PCR positive cases among the normal and aborted women. As indicated in the table, 55/70(78.6%) of women with BOH were PCR positive and 22/30(73.3%) of normal women were PCR positive.

Table 3: PCR detection of *T. gondii* among the normal and aborted women (n=100)

	Women groups				Statistics		
	Normal group		BOH group		X2 Test	Df	P-value
N. (%)	n=30	30%	n=70	70%			
PCR +ve	22	73.3	55	78.6	0.096	1	0.755

NS= Non significant (P-value > 0.05)

According to residency, the highest number of PCR positive was among urban resident, since 43/51(84.3%) while 12/19(63.2%) of the rural residents were PCR positive as shown in Table 4.

Table 4: PCR detection of *T. gondii* among aborted women related to the residency

Residency					Statistics		
	Rural		Urban		X2 Test	df	P-value
N. (%)	n=19	27.1	n=51	72.9			
PCR +ve	12	63.2	43	84.3	2.530	1	0.111

NS=Non significant (P-value >0.05)

Table 5 represents the PCR positive cases in relation to occupation. Housewives showed the highest PCR positive samples, since 35/44 (79.4%), followed by employed women, as 20/26(76.9%).

Table 5: PCR detection of *T. gondii* among aborted women related to the occupation

N. (%)	Occupation				Statistics		
	Housewives		Employed		X2 Test	df	P-value
	n=44	62.9%	n=26	34.1%			
PCR +ve	35	79.5	20	76.9	1.266	1	1

NS= Non significant (P-value >0.05)

According to the education, Table 6 shows that illiterate groups showed more PCR positive cases 32/39 (82.1%) than literate groups 23/31 (74.2%).

Table 6: PCR detection of *T. gondii* among aborted women related to the education

No. (%)	Education				Statistics		
	Literate		Illiterate		X2 Test	df	P-value
	n=31	44.3%	n=39	55.7%			
PCR +ve	23	74.2	32	82.1	0.252	1	0.615

NS=Non significant (P-value >0.05)

Regarding to the age, the highest rate of toxoplasmosis was found among the age groups 25-31 year as, 33/40(82.5%), followed by the age group 18-24 year which showed 18/25 (72%) cases of toxoplasmosis. While both age groups 32-38 and 39-45 years, showed the lowest number of infection as, 2/3 (66.7%) and 2/2(100%) had toxoplasmosis, respectively as indicated in Table 7.

Table 7: PCR detection of *T. gondii* among aborted women related to the age groups

No. (%)	Age groups (years)								Statistics		
	18-24		25-31		32-38		39-45		X2 Test	df	p-value
	n=25	35.7%	n=40	57.1%	n=3	4.2%	n=2	2.9%			
PCR +ve	18	72.0	33	82.5	2	66.7	2	100	1.805	3	0.613

NS= Non significant (P-value >0.05)

Regarding to the pregnancy period, those at the first trimester, have the highest number, since 43/57 (75.4%), followed by the second trimester, 9/10(90%) and the least those at the third trimester, 3/3 (100%) as shown in Table 8.

Table 8: PCR detection of *T. gondii* among aborted women related to pregnancy periods

No. (%)	Pregnancy periods						Statistics		
	First Trimester		Second Trimester		Third Trimester		X2 Test	df	p-value
	n=57	81.4%	n=10	14.3%	n=3	4.3%			
PCR +ve	43	75.4	9	90	3	100	1.926	2	0.381

NS=Non significant (P-value >0.05)

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According to the number of abortions, it was found that 26/34 cases of (76.5%) of single abortion had toxoplasmosis. Besides 21/26 (80.8%) 4/6 (66.7%), and 4/4 (100%) cases of women with two, three, and four abortions had toxoplasmosis, respectively, as shown in Table 9.

Table 9: PCR detection of *T. gondii* among aborted women in relation to the number of abortions

	Number of abortions								Statistics		
	Single		Twice		Triple		Four and more		X ²	df	p-value
No. (%)	n=34	48.8%	n=26	37.1%	n=6	8.6%	n=4	5.7%	Test		
PCR +ve	26	76.5	21	80.8	4	66.7	4	100	1.759	3	0.623

NS=Non significant (P-value >0.05)

The results of positive and negative cases are listed in Table 10. Among total examined women using serological, and PCR. It was evident from serological test that 7 cases had IgG and 2 cases had IgM anti-toxoplasma antibodies. PCR technique showed that 55 had toxoplasmosis of aborted women. While from normal women 22 had toxoplasmosis.

Table 10: Serological and PCR results of screening sera and placenta samples of full term and aborted women

Groups	Cases	CLIA results				PCR results	
		IgG+	%	IgM+	%	PCR+	%
Aborted women	70	7	10	2	2.9	55	78.6
Full term women	30	--	--	--	--	22	73.3

It is clear from figure1 that the positive PCR bands were with ~125bp. using specific primers.

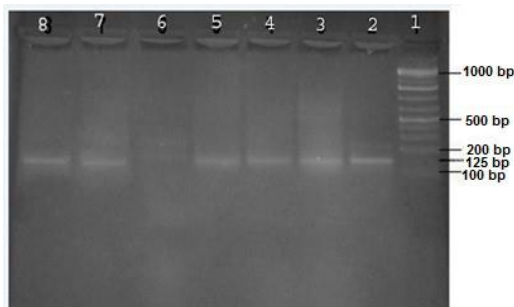


Figure 1: Agarose gel (1%) electrophoresis analysis of PCR amplification of 5 DNA samples with specific primers for *T. gondii* using (Toxo F and Toxo R). Lane (1) marker (1kb). Lanes (2-4): positive results (~125bp) of aborted fetuses' placentae. Lane (5): positive control. Lane (6): negative control. Lanes (7-8): positive results (~125 bp) of full term fetuses' placentae.

DISCUSSION

Toxoplasma gondii infection is often asymptomatic or a mild clinical disease which is not detectable.¹² Nevertheless, the parasites may be transmitted to the fetus when toxoplasmosis occurred during the pregnancy period and caused severe damage.¹³ Toxoplasmosis diagnosis in pregnant women at early gestation period (first trimester) is important by physicians, to provide early treatment to prevent congenital infection of fetuses. The physicians focus on women with the previous case of BOH, such as a number of abortions and other types of congenital abnormalities.¹⁴

In the current study, 2.9% of the aborted women were positive for anti-toxoplasma, IgM antibody out of 70 cases. Our result is in agreement with the study which was done in Duhok province – Kurdistan Iraq in which they were revealed that out of 310 women who were tested by ELISA only, low percent (0.97%) detected with anti-toxoplasma IgM antibody.¹⁵ Additionally, our results were in agreement with a survey done in New Zealand, in which 500 aborted women were tested using ELISA, they found that 2.5% and 33% of 500 women were seropositive for IgM and IgG anti-toxoplasma antibodies respectively, this might be related to large sample size and presence of high cases of old infection.²⁴ While the study conducted by¹⁶ in Kalar-Kurdistan region - Iraq disagree with the present results, as he recognized high levels of IgG (34%) and IgM (27%) anti-toxoplasma antibodies in aborted women using ELISA test. While in the present study, low levels of IgG (10%) and IgM (2.9%) antibodies were detected using the same test.¹⁶ Moreover, results of the current study were in disagreement with the results of a survey done in both Iraqi cities, Mosul and Thiqr, in which 43% and 47% of aborted women were seropositive for IgG and IgM anti-toxoplasma antibodies respectively.^{21,22} Also, our results were in disagreement in the relation of IgG antibodies with the results done in Cameroon, in which 110 pregnant women of BOH were tested by using ELISA, and 70% of them had positive IgG which demonstrated high rates of past infection.²⁸ This indicated that high rate of Toxoplasma infection might also be due to the geographical

location, large spreading of stray cats, low hygienic and education levels, immune status, and socioeconomic status.

The results of the current research showed that 55/70 (78.6%) of the aborted cases were PCR positive, this agreed with the study done in Erbil province-Kurdistan Region, in which 47 samples of aborted placentae of BOH women were tested using PCR and 35 (74.46%) of them were PCR positive. This indicated the high sensitivity of PCR in comparison with other techniques.¹⁸ The present results of serological and PCR tests partly agree with those done in Baghdad/Iraq, in which 120 of aborted women of BOH were tested by ELISA and PCR tests. In which IgM antibodies were detected in 4.16% of the cases and IgG in 25.83% of the cases, and 13.3% of the cases had both IgM and IgG antibodies.¹⁷ Results of the PCR in this study showed that 15.83% of the cases were PCR positive. While previous researcher showed low detection of PCR positive cases in comparison with the present results (high positive cases, 78.5%, this could be due to the inadequate sensitivity of the primers used in their study or a low affinity for the DNA target and using amniotic fluid samples rather than tissues of placentae.²⁰

The results of the current study were in disagreement with the results of a study was carried out in Saudi Arabia, in which out of 137 pregnant women with BOH were tested by using ELISA and PCR. They revealed that 41% of the cases were PCR positive, and 36.6% of the cases were seropositive with IgG and 6.5% IgM anti-toxoplasma antibodies. Although, it showed that high sensitivity of PCR test but the reason of difference might be the

type of sample used in the previous study which was blood and persistence of immunoglobulin in blood for an extended period.²³

Regarding PCR test, this study disagree with the results of a study in Shiraz/Iran, in which a total of 542 of aborted women were tested by PCR, 14.4% had PCR positive, while in the current study showed that 78.6% of aborted women were PCR positive. The difference between the rates of positivity might be related to the type of samples used in Iranian study, as they used paraffin-embedded blocks of aborted placentae.²⁶

This research is in disagreement with the results of a study done in Mexico; in which 100 spontaneously aborted women were tested by both ELISA and conventional PCR. It has been found that 19% were PCR positive, 55% and 20% of the serum samples were seropositive for IgG and IgM anti-toxoplasma antibodies, respectively. The high rates of antibodies might be due to false positive results and cross-reactivity.²⁷

Toxoplasma was more prevalent among the housewives than the employed women, in young ages (25-31) than older, furthermore, women in the first trimester were more infected than second and third, also with single abortion more than others.¹⁹ In this study all examined women with BOH were suffering from abortions either once, twice or more. The percentage of one time was higher (48.8%) than twice and more, this is in agreement with the results of many other studies such as²⁵ in India which found that a maximum number of cases of abortions (27.27%) were with single abortion, possible reasons might be the development of immunity

against the infection or other pathogenic causes in case of repeated abortions.

Regarding to the education and occupation, in the present study higher number of illiterate (32) and housewives had toxoplasmosis versus literate (23) and employed women. It indicating the importance of education, with regard to occupation, housewives are at higher risks of infection than the employed women, because they have higher chances of exposure to sources of infection and are at high-risk during their homework such as dealing with raw meat and vegetables, in addition to their outdoor activities as gardening and cleaning outside the home. Regarding residency, unexpected results were found in the present study, high rate of infection in urban women in comparison with rural women, this may be due to a large number of urban women examined in this study, or to the eating habits as more urban women attend restaurants and consume fast food. These results were in agreement with the results of¹⁷ Baghdad and Yemen²⁹.

The results clearly indicated that the molecular method characterized by high sensitivity and specificity with no opportunity for false positive and false negative, results because of deals with specific genomic DNA of Toxoplasma.²³ Therefore, PCR test is considered as a gold standard test for diagnosis, since out of 70 aborted women examined in the present study, 55 cases were PCR positive, while using serological test was 9 only. In addition unexpected result was found in 30 cases of full normal women, in which 22 cases had Toxoplasma infection using PCR test, this encourages to focus more on testing newly born infants against

toxoplasmosis. The possible reasons for this unexpected result might be due to the occurrence of the infection during the third trimester of pregnancy, because at this stage, the parasite does not affect the baby. This study revealed an important issue in our community and a further investigations is recommended in a wider scope introducing PCR as a confirmatory test in prenatal clinics to point out and treat acute cases of Toxoplasmosis infection in pregnant mother.

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پوخته

ده ست نيشانكرنا نه خوشيا توکسوپلازما ل ناف ئاغرتين زاوكتن ژبه رچووي ب ريكا پشكنينين سپرولوي و

زنجيرين نه نزيمة په لمه ركرني

ئارماچ: نه ساخيا پشيك يا هاتيه گريدان ب گه له ك گريي يافه ل ده ف ژنكتين دووگيان. دياركرنا گه ردي بو توکسوپلازماي گوندي ب ريكا كارلنكتين زنجيره يين نه نزيمة په لمه ركرني ل ناف وه ريسى مالبچووكي يين زاووكين ژبه رچووي جينين ده ستنيشانكرى هاتينه خاندن.

مه رهم مه رهم ژ فئ هه كوليني نه و بوو دياركرنا تووشبوون ب توکسوپلازماي گوندي ل ده ف ژنكتين زاووك ژ به رچووي يين خودان ميژوويه كا زاووكبوونه كا خراب يا كهفن و ژنكتين نورمال ب ريكا بكارتينانا ته كننيكتين سپرولوي و گه ردي.

كه ره سته و ريكتين ب كارتيناني ايلازا و ريكا نيكسه را بله ز هاتينه ب كارتينان وه ك تيستين سپرولوي و كارلنكتين زنجيره يين نه نزيمة په لمه ركرني يي كلاسيكي وه ك تيستا گه ردي.

نه فئ هه كوليني 100 ژن ب ده ست خووه گريديانه ژ ماوي (چريا نيك-شوات 2010) ل بارژيري دهوكي.

حه فتي ژنكتين زاووك ژ به رچووي هه ردو ژ رداف و وه ريسى مال بچيكي زاووكين وان هاتينه تيست كرن ب ريكتين سپرولوي و گه ردي ل ديف نيك به لي 30 ژنن نورمال وه ريسى مالبچيكي زاووكين وان هاتينه تيست كرن ب تيستا گه ردي.

نه نجام

ژ لايي پشكنينين سپرولويته ب ريكا ايلازا , $7/70$ (10%) ژ ژنكتين زاووك ژ به رچووي سپروپوزه تيف بوون بو دژه ته نئ IgG دژي توکسوپلازمايي و $2/70$ (2.8%) د پوزه تيف بوون بو دژه ته نئ IgM دژي توکسوپلازمايي.

ژ لايه كئ ديفه , تيستا نيكسه را بله ز دياركر , كو $5/70$ (7.1%) ژ ژنكتين زاووك ژ به رچووي د پوزه تيف بوون بو دژه ته نئ IgG و $7/70$ (10%) بو دژه ته نئ IgM دژي توکسوپلازمايي.

ژ 70 سامپلين شانه يين وه ريسى مال بچووكي ب ريكا PCR يا كلاسيكي , $50/70$ (71.4%) ژ ژنكتين زاووك ژ به رچووي د پوزه تيف بوون دژي تووشبوونا توکسوپلازماي گوندي.

ژ لايي ماوي دوو گيانبوونيته , ژ 57 حاله تال سئ هه يفتين ده ستنيكي يين دوو گيانبوونيته , ايلازا دياركر $5(8.8\%)$, $1(1.8\%)$ دژه ته نئ IgG و IgM دژي توکسوپلازمايي ل ديف نيك هه بوون به لي تيستا نيكسه را بله ز دياركر كو 4 (7.0%) و 6 (10.7%) دژه ته نئ IgG و IgM دژي توکسوپلازمايي ل ديف نيك هه بوون.

بلندترين ريژا پوزه تيف $42(75.4\%)$ بوو بو توکسوپلازماي گوندي بريكا PCR سئ هه يفتين ده ستنيكي يين دوو گيانبوونيته.

ژ كوما 10 حاله تال سئ هه يفتين دووي يين دوو گيانبوونيته , هاتبوونه دياركرن كو $2(20\%)$, $1(10\%)$ حاله تين سپروپوزه تيف بوون بو IgG و IgM ب ايلازا ل ديف نيك و 1 (10%) حاله تين سپروپوزه تيف هاتبوو دياركرن بو هه رتيك ژ IgG و IgM ب تيستا نيكسه را بله ز ل ديف نيك ب تني $9(90\%)$ PCR د پوزه تيف بوون ژ سئ هه يفتين دووي يين دوو گيانبوونيته.

ژ 2 حاله تا ژ سئ هه يفتين سبي , خو سپروپوزه تيفه ك نه بوو ب هه ردو تيستان به لي و هه رسي حاله ت 2 (100%) PCR د پوزه تيف بوون.

ده رته نجام

نه ف هه كولينه نها دياركر كو پيژديبوون ب PCR وه ك تيسته كا موكم و پالپشت زيده باري تيستين سپرولوي بو ده ست نيشانكرنا نه ساخيا پشيك و ل ديف چوون بو زاووكين شني بووين يين ب زارركبوونه كا تمام يا نورمال.

الخلاصة

الكشف عن داء المقوسات بين النساء المجهضات باستخدام الفحوصات المصلية وتفاعل البلمرة التسلسلي في مدينة دهوك

الهدف: داء المقوسات أو Toxoplasmosis، إصابة بدوى سببها طفيلي المقوسة الغوندية ينتقل من الحيوانات المصابة إلى البشر. داء المقوسات إذا أصاب النساء الحوامل قد يسبب الاجهاض وانه من الممكن تودّي إلى ضرر بالغ للجنين.

الغرض: الغرض من الدراسة الحالية كانت تشخيص عدوة مقوسة غوندي في النساء المجهضات اللواتي لديهن تاريخ ولادي سيء مسبق و النساء الطبيعيات باستخدام التقنيات المصلية و الجزيئية.

المواد و طرق العمل: استخدم اختبار الانزيم المرتبط بالامتصاصية المناعية (الايليزا) و تفاعل البلمرة التسلسلي التقليدي (PCR) ك(اختبار جزيئي). تضمنت الدراسة الحالية ١٠٠ امرأة خلال الفترة من (تشرين الاول 2014 - شباط ٢٠١٥) في مدينة دهوك. مجموع ٧٠ حالة من النساء المجهضات فحص مصلهن و مشيمات اجنتهن بالطرق المصلية و الجزيئية، بينما ٣٠ حالة فقط من النساء الطبيعيات فحص مشيمات اجنتهن بالاختبار الجزيئي.

النتائج: باستخدام الفحص المصلي الايليزا، كشف ان (١٠%) (٧٠/٧٠) من النساء المجهضات كانوا ايجابيين مصلياً للجسام المضادة IgG ضد التوكسوبلازما و (٢.٨%) (٢/٧٠) للجسام المضادة IgM ضد التوكسوبلازما. بينما من مجموع ٧٠ عينة من نسيج المشيمة فحصت بـ(PCR)، أظهر الاختبار الجزيئي PCR ان (٧٨.٥%) (٥٥/70) من النساء المجهضات كانوا ايجابيين ضد عدوة التوكسوبلازما.

وفقاً لفترة الحمل، اظهرت الايليزا من ٥٧ حالة في فترة الحمل الاولى انه (8.8%) 5 و (1.8%) 1 كانوا ايجابيين لـ IgM, IgG ضد التوكسوبلازما على التوالي، أعلى نسبة ايجابية كانت (٧٥.٤%) ٤٣ ضد مقوسة غوندي بواسطة PCR في الثلث الاول من الحمل.

من مجموع ١٠ حالات في في الثلث الثاني من الحمل. اظهرت الايليزا ان حالتين (٢٠%) ايجابيتين مصلياً لـ IgG وحالة واحدة (١٠%) ايجابية مصلياً لـ IgM. فقط ٩ (٩٠%) حالات كانوا ايجابيين لـ PCR. ولكن لا توجد اي حالات ايجابية مصلية لكلا الاختبارين بينما كل الحالات (١٠٠%) ٣ كانت ايجابية لـ PCR في الثلث الثالث للحمل.

الخاتمة: أظهرت الدراسة الحالية معدلات عالية من الاصابة بداء المقوسات بين النساء المجهضات في مدينة دهوك- اقليم كوردستان في العراق، بالإضافة الى اهمية اختبار الجزيئي الـ PCR و الاختبار المصلي (الايليزا) في الكشف و التأكيد على الاصابة بداء المقوسات الغوندية التوكسوبلازما.

PREVALENCE OF PERIODONTAL DISEASE AMONG RHEUMATOID ARTHRITIS PATIENTS

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ABSTRACT

Background: Patients with rheumatoid arthritis (RA) may have higher prevalence of periodontitis.

Aim: To determine the prevalence of periodontal disease among rheumatoid arthritis patients. Patients and methods: Cross-sectional study was done on 250 patients, who were selected by from patients attending Duhok Center for Rheumatic Disease and Medical Rehabilitation. Periodontal health status of the patients based on probing pocket depth score, clinical attachment loss, and disease activity score was determined. Validated questionnaire was used to record smoking, body mass index, tooth brushing, duration of rheumatoid arthritis disease.

Results: The age range of patients was 35-60 years. All rheumatoid arthritis patients have some degree of periodontal diseases, 133(53.2%) with mild and 117(46.8%) with moderate periodontitis.

A significant prevalence of periodontal diseases occurred in patients with age group (40-54) years was 144 (57.6%) compared to younger age 46 (18.4%) and older age 60 (24%) respectively, p-value <0.001 The duration of diseases was more significant in intermediate (1 year to 3 years) 125 (50%) compared to early (< 12 months) 45 (18%) and longer disease (> 3 years) 80 (32%) p-value<0.001.

Conclusion: All patients were suffering from some degree of periodontal diseases with no significant difference in severity between males and females.

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Keywords: Periodontitis, Rheumatoid arthritis

Rheumatoid arthritis (RA) is characterized by systemic inflammation of wrist and hand joints and leads to destruction of joints and permanent deformity; it is associated with early mortality; its cause has not been established yet.¹ Periodontal disease (PD) is an inflammation of the tissue which supports and surrounds the tooth and leads to a chronic inflammatory status. Several relations have been found between PD and different diseases like RA, diabetes and hypertension.²

Berthelot et al. found that a significant relationship is present between these two

chronic inflammatory diseases; the pathological process of both are similar.³ Abbas et al. indicated that subjects at risk of developing periodontitis are at the same time at risk of developing RA, or vice versa.⁴

Periodontitis is as a risk factor for RA has been shown in some pilot studies.⁵⁻⁸ After management of periodontitis, a decrease in disease activity of RA occurred, probably due to a reduction in periodontitis associated inflammatory burden. Increased levels of erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) have been noticed in RA patients with

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periodontitis because periodontitis also has inflammatory burden.⁹⁻¹² Thus, increased systemic inflammation in periodontitis may increase severity of RA.¹³ Likewise, *Helicobacter pylori* infections may be the cause for increased severity of RA by posing inflammatory burden; eliminating *Helicobacter pylori* from RA patients improved their laboratory markers of disease activity and clinical condition.¹⁴ Several studies found that patients with RA have significant periodontitis compared to non-RA individual.¹⁵⁻¹⁶ Other study concluded that patients with RA are twice as likely to have periodontal disease compared to non-RA individual.¹⁷

The goal of this study was to find the prevalence of periodontal disease among rheumatoid arthritis patients in Duhok city.

PATIENTS AND METHODS

This cross-sectional study occurred during December 2013 until May 2015. The study population consists of 250 patients both male and female, chosen from every third patient attended Duhok Center for Rheumatic Disease and Medical Rehabilitation during the period of the study. All patients were informed about the nature of the study and then verbal consent was obtained from each one. The study protocol was approved by the ethics Committee of the General Directorate of Health in Duhok. All RA patients have already diagnosed by Rheumatologists according to revised American College of Rheumatology /European League Against Rheumatism classification criteria for rheumatoid arthritis.¹⁸ The exclusion criteria for the RA, include patients that are not able to tolerate any of the study procedures, and being diagnosed with diabetes I or II, Osteoporosis, Pregnancy.

In Dental Health Polyclinic, assessment of periodontal disease was done by using of disposable gloves and mask, disposable dental mirror and calibrated periodontal probe (William probe). The clinical attachment loss (CAL) examination was done by Williams probe. For chronic periodontitis 4 sites were examined for each tooth: distobuccal, mesiobuccal, midlingual and midbuccal (Loe and Brown)¹⁹. This included CAL and probing pocket depth (PPD). The CAL was estimated by measuring the distance from cement-enamel junction to base of the pocket. The severity was measured according to the scale of the American Academy of Periodontology²⁰:

Mild: 1-2mm of attachment loss

Moderate: 3-4 mm of attachment loss

Severe: ≥ 5 mm of attachment loss

The Body Mass Index (BMI) was measured. The weight was checked using digital scales with the patient wearing the lightest possible clothes, while the height was measured by special height ruler with patients standing straight without shoes. A BMI < 25 was considered normal, 25-29.9 overweight and those with BMI ≥ 30 were considered obese²¹

Statistical analysis

Analysis of data was done using SPSS version 23 (2015). Quantitative data were analyzed with Chi-square test; p-value less than 0.05 was considered significant.

RESULTS

The study was done on 250 patients (99 male and 151 female) with RA. Mean age $\pm$ standard deviation of participants was 48.8 ± 8 years and the mean BMI was 28.1 ± 2.9 . The prevalence of tooth brushing was 22.8%. The prevalence of smoking was 36%, as shown in Table 1.

Table (1): Demographic and other clinical characteristics

		No.	%	Mean	SD	Range
Gender	Male	99	39.6			
	Female	151	60.4			
Age (years)	25 - 39	46	18.4			
	40 - 54	144	57.6	48.8	8.5	27.0 - 66.0
	55 - 69	60	24.0			
Duration of Disease (years)	1	45	18.0			
	2	125	50.0	2.1	0.7	1.0 - 3.0
	3	80	32.0			
BMI (kg/m2)	18.5 - 24.9	31	12.4			
	25 - 29.9	137	54.8	28.1	2.9	23.3 - 34.3
	≥ 30	82	32.8			
Tooth brushing	Yes	57	22.8			
	No	193	77.2			
Smoking	Yes	90	36.0			
	Not smoker	160	64.0			
Total		250	100			

All rheumatoid arthritis patients suffered from periodontitis; with 133 (53.2%) with mild and 117 (46.8%) with moderate periodontitis as shown in Table 2.

Table (2) Prevalence of periodontal disease in rheumatoid arthritis patients

CAL	No.	%
Mild (< 3 mm)	133	53.2
Moderate (3-4.9 mm)	117	46.8
Mean± SD (range)	2.64± 1.24 (0 – 4.9)	
Total	250	100

Table 3 shows that the prevalence of moderate periodontal diseases was significantly higher among patients aged more than 55 years in comparison to other

age groups ($p < 0.001$). Similarly the

prevalence periodontitis was higher among those who have longer duration of RA ($p < 0.001$). Severe periodontitis was significantly higher among obese patients (95.1%) in comparison to those who are normal (3.2%) and overweight (27.7%) respectively. ($p < 0.001$)

Table 3 also reveals that the severity of periodontitis was significantly lower in those who are in the habit of regular tooth brushing ($p < 0.001$) while no significant association was found with tobacco smoking.

Table (3) Characteristics of the patients according to chronic periodontitis

		CAL severity						P-value*
		< 3		3 - 4.9		Total		
		No.	%	No.	%	No.	%	
Gender	Male	52	52.5	47	47.7	99	39.6	0.863
	Female	81	53.6	70	46.3	151	60.4	
Age (years)	25 - 39	35	76.1	11	23.9	46	18.4	<0.001
	40 - 54	79	54.9	65	45.1	144	57.6	
	55 - 69	19	31.7	44	68.3	60	24.0	
Duration of	1	38	84.4	7	15.6	45	18.0	<0.001
	2	72	57.6	53	42.4	125	50.0	
Disease (years)	3	23	28.8	57	71.3	80	32.0	
BMI (kg/m2)	18.5 - 24.9	30	96.8	1	3.2	31	12.4	<0.001
	25 - 29.9	99	72.3	38	27.7	137	54.8	
	≥ 30	4	4.9	78	95.1	82	32.8	
Tooth brushing	Yes	42	73.7	15	26.3	57	22.8	<0.001
	No	91	47.1	102	52.8	193	77.2	

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		CAL severity						P-value*
		< 3		3 - 4.9		Total		
		No.	%	No.	%	No.	%	
Smoking	Yes	51	56.7	39	43.3	90	36.0	0.410
	No	82	51.3	78	48.8	160	64.0	
Total		133		117		250	100	

*Calculated out of the total 250 patients

DISCUSSION

Chronic periodontal disease is a potential focus of inflammation, which causes the metabolic control of patients with RA to worsen.²² The pathobiology of rheumatoid arthritis and periodontal disease is the same, both are chronic inflammatory diseases, with releasing of cytokines, production of other inflammatory cell product and activation of complement.^{23,24}

In the present study, osteoporosis was considered a risk factor for periodontal disease progression,²⁵ so we excluded it from the study, as well as epidemiological studies have consistently shown that diabetes is associated with increased risk of periodontitis,^{26,27} so it was excluded too. The study found that tooth brushing will significantly reduce the severity of periodontitis. This could be due to the fact that RA patients may have more difficulties in achieving good oral hygiene because of functional limitation or joint pain and this agree with other studies.^{28,29}

Smoking has frequently considered as a risk factor of periodontal disease³⁰. Despite that, however, the study found no significant association between smoking and the severity of the disease.

The mean of periodontal diseases among RA patients in current study was (2.64 ± 1.24), while other study found higher potentiality for periodontitis involvement

among RA patients, possibly due to similar nature of the two diseases.³¹ Mercado et al in a cohort study on 1412 patients showed that percentage of the RA patients who had progressive destructions in periodontal tissues was 62.5% while in non-RA patients was 43.8%¹³.

No significant difference was detected between male and female in the severity of periodontal diseases. On the other hand, a significant association was found between the severity of periodontal disease and old ages, longer duration of the disease, obesity and non regular tooth brushing. Similar results were reported in other studies.³²

All rheumatoid arthritis patients suffer from different severities of periodontal disease with no significant difference between male and female. There is need for a detailed immunological and clinical studies in a larger sample for studying this common and important diseases.

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پوخته

بە لافبونا ئیشیت پیدی دناف نه خوشیت ئیشین گەهان

پێشهکی: ئارمانج ژفی فەکولینی دیارکرن بە لافبونا ئیشیت پیدی دناف نه خوشیت ئیشین گەهان تا چ رادهیه.

رێککێن فەکولینی: فەکولین ل سەر ۲۵۰ نه خوشان هاته کرن بریکا گوترهیی ئەوین ژیی وان دناقبهرا (۶۰-۳۰) سالیی دا ئەوین سەرهدانا بنگههی ئیشین گەهان دکەن. ساخلهمیا دەف و ددانا گریدای پیقانا کویراتیا فالامیین پیدی و دژواریا ئیشین پیدی.

ئەنجام: بە لافبونا ئیشیت پیدی دناف نه خوشیت ئیشین گەهان ۱۳۳ (۵۳,۲٪) نه خوشیا پیدی یا سفت. ۱۱۷ (۴۶,۸٪) ژوان ئیشیت پیدی نافهندی. جیاوازیهکا بهرجاف دئیشیت پیدی دا دناف بهرا نه خوشیت ئەوین ژیی وان دناقبهرا (۵۴-۴۰) سالی دا ههبو بهراورد گەل وان ئەوین ژیی وان کیمتر ۴۶ (۱۸,۴٪) و بهراورد گەل وان ئەوین ژیی وان پتر ۶۰ (۲۴٪).

دەرئەنجام: ئەنجامیت فەکولینی دیارکر کو چ جیاوازیین بهرجاف یا دژواریا ئیشین پیدی دناقبهرا ههردو رهگهزاندنا نهبو ههه چهنده ریزا رهگهزی می پتر بو ژ رهگهزی نیر.

الخلاصة

مدى انتشار امراض اللثة في المرضى المصابين بالتهاب المفاصل

الخلفية والأهداف: احتمالية ان يكون التهاب اللثة اكثر انتشارا في المرضى المصابين بالتهاب المفاصل. تهدف الدراسة الى ايجاد مدى انتشار امراض اللثة في المرضى المصابين بالتهاب المفاصل.

طريقة البحث: تمت الدراسة على ٢٥٠ من المرضى الذين تتراوح اعمارهم بين ٣٠-٦٠ الذين يراجعون مركز التأهيل الصحي لامراض المفاصل. مدى صحة الفم واللثة يعتمد على قياس عمق الجيوب اللثوية و مدى فعالية المرض.

النتائج: انتشار امراض اللثة في المرضى المصابين بالتهاب المفاصل كانت ١٣٣ (٥٣.٢%) التهاب لثة خفيف و ١١٧ (٤٦.٨%) التهاب لثة متوسط . يوجد اختلاف معنوي في امراض اللثة في المرضى الذين تتراوح اعمارهم بين (٤٠-٥٤) سنة كانت ١٤٤ (٥٧.٦%) مقارنة بالاقبل اعماراً ٤٦ (١٨.٤%) والاكبر اعماراً ٦٠ (٢٤%).

الاستنتاجات: توصلت الدراسة الى انه لا يوجد اختلاف معنوي في شدة امراض اللثة بين الجنسين ولو ان نسبة الاناث اكثر من نسبة الذكور .

THE EFFECT OF VITAMIN K EPOXIDE REDUCTASE COMPLEX AND CYTOCHROME P450 GENE POLYMORPHISMS ON WARFARIN DOSE AMONG KURDISH PATIENTS IN DUHOK- IRAQ

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ABSTRACT

Background: Warfarin metabolism is subject to a variety of environmental and genetic factors that make the response variable among different individuals. These factors include Vitamin K epoxide reductase complex and cytochrome P450 (CYP2C9) gene polymorphisms. This study was initiated to address the presence of VKORC1 -1639G>A and CYP2C9*2,*3 gene polymorphisms and their effects on warfarin drug needed to keep a target International Normalized Ratio (INR) in Kurdish patients from Duhok/Iraq.

Methods: Seventy-two patients from the outpatient anticoagulation clinic were enrolled in this study. INR values and required warfarin doses were gained from the clinical records of patients and their DNA extracted and amplification was done with specific primers for determination of the VKORC1 -1639G>A and CYP2C9*2,*3 genotypes using restriction fragment length polymorphism technique (PCR-RFLP).

Results: Among 72 enrolled patients, 47 were females and the remaining 25 were males with a median age of 55.3 years. The primary causes of anticoagulation were heart valves replacement (38.9%), venous thromboembolism (33.3%), arterial thrombosis (23.6%) and mitral valve stenosis (4.2%). Molecular studies revealed that the frequency of VKORC1 -1639G>A variant allele found to be 34.7% and that of CYP2C9*2 and CYP2C9*3 to be 26.4% and 10.4%, respectively.

The mean stable therapeutic dose (MSTD) was 3.0 mg/day (20.8 mg/week, range 10.5-56.0 mg/week) and patients with CYP2C9*1/1 genotype required significantly larger doses to maintain their INR within the targets in comparison to other CYP2C9*1/3, CYP2C9*2/2 and CYP2C9*2/3 genotypes with P value of 0.0002, 0.0132 and 0.0080 respectively. Also, patients with VKORC1 GG genotype required significantly larger doses in comparison to VKORC1 GA and VKORC1 AA genotypes with P value of 0.0002 and < 0.0001 respectively.

Conclusions: Genetic variability related to warfarin metabolism and clearance determines the response to the drug and doses of the drugs to maintain therapeutic INR within the targets.

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Keywords: Warfarin, VKORC1, CYP2C9, Kurd, Duhok, Iraq.

Warfarin is considered as the furthermost extensively used anticoagulant drug worldwide^[1,2]. It has narrow therapeutic range with a wide variation of dose requirements in different individuals and the subsequent hazard of bleeding in case of over anticoagulation or thrombosis in case of under anticoagulation^[2,3]. Both genetic and environmental factors play roles to various

degrees in defining the ideal dose of warfarin for an individual. Different pharmacogenetic variations have been identified to affect the dose requirement including vitamin K epoxide reductase complex (VKORC1) and cytochrome P450 (CYP2C9) genes polymorphisms^[4-7].

Warfarin exerts its effect through VKORC1, which is the target enzyme of warfarin, and genetic alteration in the

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above gene can be coupled with paucity in active form of vitamin-K-dependent clotting factors that may be associated with warfarin resistance in man as well as in rats^[8,9]. More than one polymorphisms affecting different exons and introns of the gene have been detected and one include VKORC1-1639G>A that affect the promoter region of the VKORC1 gene and it diminishes the binding of the transcription factor to the promoter region and hence decreasing the gene expression, thus reducing the level of the target enzyme and finally reducing warfarin dose requirements^[9].

Cytochrome P450 (2C9) enzyme aids in removing of warfarin from the body through activation of liver metabolism of the drug and variant alleles of the CYP2C9 gene; CYP2C9*2 and CYP2C9*3 have lower activity than the wild ordinary type CYP2C9*1. Thus, the mutant alleles are expected to lower the warfarin requirements^[2].

To the best of our knowledge, no data are available from Iraq on the effect of these genes polymorphism on warfarin requirement, thus this study was initiated to determine the presence of polymorphism in VKORC1 and CYP2C9 genes among Kurds and to study the effects of such genetic alteration on the warfarin drug requirement necessary to keep a target International Normalized Ratio (INR) in patients with warfarin therapy.

MATERIAL & METHODS

Kurdish patients on warfarin therapy for more than 6 months were selected from the outpatient anticoagulation clinic at Azadi Teaching Hospital in Duhok/Iraq. Any

patient who was on combined therapy with other anticoagulant, anti-platelet or other drugs that are known to interfere with warfarin metabolism^[10] was excluded as well as patient with known hepatic and/or renal insufficiency. All data from patients were recorded in special sheet designed for the purpose of the current study including the age, sex, rationale and duration of therapy, any interruption due to bleeding or history of thrombosis while patient on anticoagulation as well as INR value and dose of warfarin. Stable therapeutic INR was needed for each patient which can be labeled as at least 2 repeated INR measurements between the targets ranges of 2-3 considered at least 2 weeks apart^[11]. After performing INR, the remaining samples were freezed to be used for DNA extraction later on. A prior written informed consent was obtained from all patients and the study was approved by the ethical committee at the Duhok College of Medicine and Duhok directorate of health. DNA extraction was done by a modified salting out method adapted by Iranpur-Mubarakeh and Esmailizadeh^[12], then the extracted DNA was amplified with specific primers for detection of VKORC1 and CYP2C9 gene polymorphisms and finally subjected to enzyme digestion using restriction fragments length polymorphism technique (PCR/RFLP). All primers, enzymes and the procedural details for the current study are shown in table1^[11, 13].

Table1: primers and restriction enzymes used in the current study.

Gene	Primer	Restriction enzyme	Reference
VKORC1*	VF=5'ATCCCTCTGGGAAGTC AGC-3' VR=5'CACCTTCAACCTCTCCATCC-3'	NCI1	11,13
CYP2C9*2*	2F=5'TACAAATACAATGAAAATATCATG3' 2R=5'CTAACAACCAGGACTCATAATG3'	AvaII	11
CYP2C9*3*	3F=5'AGGAAGAGATTGAACGTGTGA-3' 3R=5'GGCAGGCTGGTGGGGAGAAGGTCAA-3'	STY I	11

Primers obtained from Eurofins Genomics

The PCR conditions were made from 34 cycles of 94°C for 45 seconds (denaturation), 54.3°C for 1 minute (annealing) and 72°C for 1.5 minute (annealing) following an initial denaturation at 94°C for 5 minutes and followed by final extension at 72°C for 8 minutes^[11].

After amplification, amplicons were subjected to enzyme digestion with specific enzymes for each gene as shown in table1. Finally, the amplicons were

subjected to electrophoresis on 2% agarose gel at 100 V for 45 minutes. Staining performed at the same time of electrophoresis with addition of 40µL of Ethidium Bromide to one liter of 1X TBE electrophoresis buffer. Finally visualization and documentation carried out with ultraviolet viewer using photography system (Proxima 10 phi). The results of digestion with variable possibilities are shown in table 2 and figure 1

Table 2: possible products following enzyme digestion with each polymorphism.

Gene	Wild	heterozygous	Homozygous, mutant
VKORC1 -1639G>A	GG: 472, 114, 50 bp	GA: 522,472,114,50bp	AA: 522,114
CYP2C9*2	1/1: 521, 169 bp	1/2: 690, 521, 169 bp	2/2: 690 bp
CYP2C9*3	1/1: 130 bp	1/3: 130, 104, 26 bp	3/3: 104, 26 bp

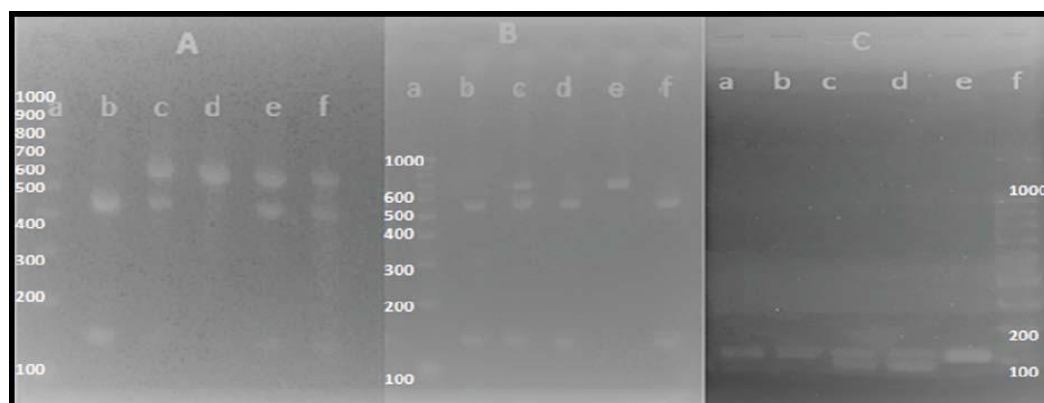


Fig. 1. Gel electrophoresis pictures of PCR/RFLP of the three reactions: (A) Show ladder (lane a), VKORC1-1639GG as 472, 114 bp (lane b), VKORC1-1639GA as 522,472,114 bp (lane c, e,f) and VKORC1-1639AA as 522,114 bp (lane d) for VKORC1-1639G>A polymorphisms. (B) Show ladder (lane a), homozygous CYP2C9*1/1 as 521, 169 bp (lane b,d,f), CYP2C9*1/2 as 690, 521,169 bp (lane c) and CYP2C9*2/22 as 690 bp (lane e) for CYP2C9*2 polymorphisms. (C) Show CYP2C9*1/1 as 130bp (lane a,b,e), CYP2C9*1/3 as 130,104bp (lane c, d) and ladder (lane f) for CYP2C9*3 polymorphisms.

Statistical study performed with IBM SPSS Statistics 23 to compare mean stable therapeutic doses (MSTD) between different CYP2C9 and VKORC1 genotype groups. Comparison of mean daily warfarin requirement in different genotype groups was done by using Chi square test and Mann-Whitney U test to evaluate the association of different genotypes daily warfarin doses. P value < 0.05 was considered statistically significant.

RESULTS

A total of 72 patients were enrolled in the current study. They all were Kurds from

Duhok visiting coagulation center at Azadi teaching hospital for monitoring their drug, warfarin. There were 47 (65.3%) females and 25 (34.7%) males with the age ranged from 29 to 87 (Median 55.3 years). In the enrolled patients, the main purpose for warfarin therapy was a heart valve replacement in 28 (38.9%); deep venous thrombosis and/or pulmonary embolism in 24 (33.3%); arterial thrombosis, ischemic heart disease and cerebrovascular accident in 17 (23.6%) and mitral valve stenosis in another 3 (4.2%). The genotypes and allele frequencies for the studied VKORC1 and CYP2C9 genes are as given in Table 3.

Table 3: Genotype and allele frequencies of VKORC1 and CYP2C9 gene.

Allele and genotype frequencies of VKORC1 – 1639G>A and CYP2C9*1,*2,*3					
VKORC1 – 1639G>A			CYP2C9		
Allele	N	Frequency (%)	Allele	N	Frequency (%)
VKORC1 G	94	65.3	CYP2C9*1	91	63.2
VKORC1 A	50	34.7	CYP2C9*2	38	26.4
			CYP2C9*3	15	10.4
Genotype			Genotype		
VKORC1 GG	33	45.8	CYP2C9*1/1	29	40.3
VKORC1 AG	28	38.9	CYP2C9*1/2	21	29.2
VKORC1 AA	11	15.3	CYP2C9*1/3	12	16.7
			CYP2C9*2/2	7	9.7
			CYP2C9*2/3	3	4.1

For the 72 patients, the MSTD was 3.0 mg/day (20.8 mg/week, range 10.5-56.0 mg/week). The mean weekly stable therapeutic dose as well as numbers of bleeding episodes per the last year for the enrolled patients with various CYP2C9 and VKORC1 genotypes are given in Table 4.

Table 4: The MSTD requirements of Warfarin and bleeding episodes in various VKORC1 and CYP2C9 genotypes.

VKORC1- 1639 polymorphism				CYP2C9 polymorphism			
Genotype	MSTD*	SD†	bleeding‡	Genotype	MSTD	SD	bleeding
VKORC1 GG	24.0	7.5	2	CYP2C9*1/1	23.6	8.4	1
VKORC1 AG	18.9	4.2	3	CYP2C9*1/2	21.3	3.4	2
VKORC1 AA	15.7	2.1	3	CYP2C9*1/3	16.4	3.8	2
				CYP2C9*2/2	18.0	1.9	1
				CYP2C9*2/3	13.5	3.0	2

* Mean Stable Therapeutic Dose (MSTD) in mg/week; †SD: Standard Deviation; ‡ bleeding episodes per 1 year.

Significant difference was detected when comparing variant alleles with the wild type alleles in warfarin dose requirement and it revealed that of the 53 patients with some variant alleles of either gene, 36(36/53, 67.9%) required ≤ 20 mg/week while of the 19 patients with non-mutant type of allele in both genes only 3 patients (3/19) (15.8 %) required low dose (less than 20mg) with p value of 0.0012 and by comparing various genotypes using man Whitney U test, it revealed that patient with CYP2C9*1/1 genotype required significantly larger doses to maintain their INR within the targets in comparison to other CYP2C9*1/3, CYP2C9*2/2 and CYP2C9*2/3 genotypes with P value of 0.0002, 0.0132 and 0.0080 respectively. Also, patients with VKORC1 GG genotype required significantly larger doses in comparison to VKORC1 GA and VKORC1 AA genotypes with P value of 0.0002 and < 0.0001 respectively.

Regarding complications, bleeding tendency were reported significantly more frequently among patients bearing CYP2C9*3 and VKORC1A polymorphism (P=0.043) particularly in a single patient who was carrier for VKORC1 AA and CYP2C9*3 alleles at the same time who required only 10.5 mg/week.

DISCUSSION

Genetic and environmental variability among different individuals contribute to considerable variability in warfarin dose requirement and pharmacogenetic studies revealed that VKORC1 and CYP2C9*2,*3 gene polymorphisms are the most significant hereditary variations that

determine the required doses of warfarin^[14, 15].

Our study revealed that both VKORC1-1639G>A and CYP2C9*2/ CYP2C9*3 occur at polymorphic rates among Kurdish patients with allele frequencies of 0.347 and 0.368 respectively, a pattern that is somewhat different from most surrounding countries as well as from other countries throughout the world as for example, the allele frequencies of VKORC1-1639G>A and CYP2C9*2/ CYP2C9*3 have been shown as 0.424 and 0.156 in Saudi Arabia [16]; 0.404 and 0.277 in Turkey^[17]; 0.417 and 0.208 in Iran^[18]; 0.104 and 0.111 in India^[15]; 0.165 and 0.095 in Croatians[19] and 0.4 and 0.2 in Caucasian respectively^[20] Concerning the effects of these 2 polymorphisms on warfarin dose requirements, our study revealed that patients with variant alleles necessitates lower doses of the warfarin to keep their INR within the target and from these, patients with CYP2C9*3 and VKORC1 AA had particularly the minimal drug requirement. These observations are agreed with other studies on the effects of VKORC1-1639G>A and CYP2C9*2,*3 polymorphisms on warfarin^[11,21]. On evaluation of the data from the two warfarin dosage groups (low dose versus high dose requirements), significant difference was detected between the two groups as 67.9% of the patients bearing at least one of the variant alleles required MSTD of ≤ 20 mg/week in comparison to only 15.8 % of those with wild allele required a low dose. Thus, it's apparent that presence of variant allele decreased the warfarin dose requirement.

Although patients with combined mutations affecting both VKORC1 and CYP2C9*3 genes are infrequently seen, however, they are liable for greater risk of bleeding tendency as this has been observed from the single patient that bears mutations in both genes.

Our study also revealed a large difference in the warfarin dose requirements of different patients with same VKORC1 and CYP2C9 genotypes and this may imply that other factors including: genetic (like CYP4F2 and CYP2C18 polymorphisms) and non-genetic factors might contribute to the dose requirement in these patients^[20].

Different environmental factors have also been implicated in the variable warfarin dose requirement including drug therapy, vegetable intake especially green vegetable, smoking, liver enzyme induction with alcohol and energy drinks. Dietary factors may have contributed to the above variations, since such factors have not been excluded by the current study^[14, 22-24].

The foremost restraint of the current study is the number of the enrolled patients and larger studies are reasonable to ensure scrutiny of the effect of combined CYP2C9 and VKORC1 gene polymorphisms.

Despite the testing for genotyping had been included in FDA to guide therapy and in the International Warfarin Pharmacogenomics Consortium (IWPC) algorithm, the test is requested infrequently, due to availability of effective and very useful and informative test, namely: prothrombin test and INR. However, the test for genotyping may be recommended for those receiving warfarin for the first time, in patients with previous

history of difficulty with warfarin, and less common patient who are compliant to the drug, but with difficult to maintain their INR within the therapeutic ranges (e.g. patients requiring <10 mg/week or >49 mg/week to keep therapeutic INR) and for population study^[25-26].

In conclusion: our study revealed the occurrence of VKORC1- 1639G>A and CYP2C9*2/ CYP2C9*3 at polymorphic rate among Kurds from Iraq and confirmed its contribution to warfarin dose. Additional studies on larger numbers of patients as well as on other patients from other region from Iraq are required to determine the significance of the emerging data.

Conflict of interest

The author declare that he has no conflict of interest.

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پوخته

کارتیکرنا هه مه جوریا جینی یا فینامین K ایبوکساید ریده کتهیز و سیتوکروم P450 ل سهر قورچا ده رمانی
وارفرین ل دهف نه ساخین کورد ل دهوکی/عیراق

پیشه کی: میتابولیزم وارفیرینی یا لژیر کارتیکرنا کومه کا جوره و جور یا فاکته رین ژینگه هی و جنتکی دا و ئەوا کو کارتیکرنی دکته ل سهر قه بارئ بهرسفدانی لدهف نه خوشان دا , و ئەف فاکته ره شیوازین هه مه جور یین مولوکیوله رین جیناتانه VKOR1- (1639G>A and cytochrome P450 CYP2C9) له ورا ئەفی قه کولینی دهست کر ب نیشانکرنا کارتیکرنا شیوازین هه مه جور یین مولوکیوله رین جینی ئەوین پیش وخت هاتینه دیارکرن لسه قه بارئ قورچا وارفیرینی ئەوا پیتقی بو پارلستنا (INR) دجارچوئی ئارمانجی دا ل دهف نه خوشین کورد ل عیراقی.

رێککێن کاری: ئەفی قه کولینی ههفتی و دوو نه خوش بخو قه گرتن ئەوین سهره دانا کلینیکیته دهرفه کرین. ریزا INR و هه ره سا قه بارئ قورچا وارفیرینی هاتنه وه رگرتن ژ تومارین کلینیکی یین نه خوشان و هه ره سا و دی ان ای (DNA) هاته ده رنخستن ژ خوینا نه خوشاندا و باشان مولوکیوله رین جینی VKOR1-1639G>A and cytochrome P450 (CYP2C9) (هاتنه دیارکرن ب ریکا (PCR – RFLP)).

ئه لجام:

ئەفی قه کولینی 47 کج و 25 کور ئەوین نافنجیی ژێ وان 55,2 سال. و سه ده مین سهره کی یین چاره سه رین: گوهرینا فالقین دلی (28,9%), ستروکا خوینی (22,2%), مه هینا خوینی (22,6%) و ته نکبونا فالقیت دلی یین پاشایی (4,2%), ئەفی قه کولینی دیارکر VKORC1 1639G>A لدهف 24,7% و CYP2C9*2 و CYP2C9*3 لدهف 26,4% و 10,4% ل دیف ئیک هه بون. تیکرای قورچا روزانه 2,0 ملغ بو (20,8 ملغ/هه فته ک) و دناغه را (10,5-56,0 ملغ/هه فته کی دا), ئەفی قه کولینی دوپات کر کو ئەو نه خوشین CYP2C9*1/1 لدهف هه یین پیتقی قورچه کا مه زتر بوه ژ وارفیرینی د اکو INR ل ئارمنج بیتن لدهمی برابردکرنی دکه ل 1/3, CYP2C9*2/2 و CYP2C9*3/2. هه ره سا ئەو نه خوشین جینیت VKORC1*GG پیتقی قورچه کا مه زتر بوه ژ وارفیرینی د اکو INR ل ئارمنج بیتن لدهمی برابردکرنی دکه ل VKORC1 GA و VKORC1 AA

ده رئه لجام: هه مه جوریا جنتیکی یا گریدای میتابولزم و رامالیکرنا وارفیرینی راده یا قورچا ده رمانا یا پیتقی بو پاراستنا INR یا چاره سه رکرنی دجارچوئی ئارمانجاندا دیار دکته .

الخلاصة

تأثير تعداد الاشكال الجزيئية لفيتامين K الايبوكسيد المختزل والسيتوكروم P450
على جرعة الوارفارين لدى مرضى الكورد من دهوك/ العراق

الخلفية: يخضع عملية ايض الوارفارين لمجموعة متنوعة من العوامل البيئية والوراثية والتي تؤثر على مقدار الاستجابة لدى المرضى، وتشمل هذه العوامل تعدد الأشكال الجزيئية للجينات (VKOR1-1639G>A and cytochrome P450 (CYP2C9)). وقد بدأت هذه الدراسة لبيان تأثير الأشكال الجزيئية للجينات السابقة ذكرها على جرعة الوارفارين اللازمة للحفاظ على (INR) ضمن الهدف لدى مرضى الاكرد من دهوك / العراق .

طرق البحث: شملت الدراسة اثنان وسبعون مريضاً من العيادات الخارجية. تم الحصول على قيم INR والجرعات الوارفارين من السجلات السريرية للمرضى وتم استخراج الحمض النووي من عينات دم المرضى و من ثم التحري عن الاشكال الجزيئية للجينات (VKOR1-1639G>A and cytochrome P450 (CYP2C9) باستخدام تقنية تقييد الطول متعدد الأشكال (RFLP- PCR).

النتائج: شملت الدراسة ٤٧ إنثاً و ٢٥ من الذكور مع متوسط العمر ٥٥.٣ عاماً. وكانت الأسباب الرئيسية للعلاج: استبدال صمامات القلب (٣٨.٩٪)، الجلطات الدموية الوريدية (٣٣.٣٪)، تخثر الدم الشرياني (٢٣.٦٪)، وتضييق الصمام التاجي (٤.٢٪). وكشفت الدراسات الجزيئية وجود وتيرة VKORC1-1639G>A أليل البديل لدى ٣٤.٧٪ و CYP2C9*3 و CYP2C9*2 لدى ٢٦.٤٪ و ١٠.٤٪ على التوالي. كانت معدل الجرعة المستقرة ٣.٠ ملغ / يوم (٢٠٠.٨ ملغ / الأسبوع) والتي تراوحت بين ١٠.٥-٥٦.٠ ملغ / الأسبوع، و اكدت الدراسة بان المرضي الذين لم تكن لديهم الوتيرة البديلة CYP2C9*1/1 احتاجوا لجرعات أكبر للحفاظ على INR في إطار الهدف في مقارنة مع CYP2C9*1/3، CYP2C9*2/2 و CYP2C9*3/٢. أيضاً، المرضى الذين يعانون من النمط الجيني VKORC1*GG يتطلب جرعات أكبر بكثير بالمقارنة مع VKORC1 GA و VKORC1*AA المورثات.

الاستنتاجات: التباين الوراثي المتعلقة باستقلاب الوارفارين وإزالتها يحدد جرعات من الأدوية للحفاظ على INR العلاجية ضمن أهداف.

SAFETY AND EFFECTIVENESS OF HOLMIUM-YAG LASER VERSUS PNEUMATIC LITHOTRIPTER IN THE MANAGEMENT OF URETERAL STONES

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ABSTRACT

Background: This study aimed to compare effectiveness and safety of laser and pneumatic lithotripsy in the management of ureteral stones.

Methods: From October 2014 to March 2016, 75 patients with single unilateral impacted ureteral stone of any size were selected. The patients were randomized into two groups according to the lithotripter used to fragment the stone: Laser (n = 40) and pneumatic (n = 35). Patient's demographic, stone characteristics and post-operative follow-up findings were analyzed and compared.

Results: The overall rate of stone clearance in laser group was 92.5 % (n = 37) compared to only 85.7% (n = 30) of the patients in the pneumatic group (p = 0.038). The mean operation time among patients in the laser group was 36.7 minutes (SD = 9.7) compared to 30.2 minutes (SD = 7.0) in the pneumatic group (p = 0.002). Most common post-operative complications in laser group included stone migration (n = 3), perforation (n = 1), and post-operative fever (n = 1) compared to migration (n = 1), post-operative fever (n = 3), and ureteric stricture (n = 1) in pneumatic group. Approximately an equal number of patients in both groups required JJ stent insertion at some point (n = 20).

Conclusion: Higher rates of stone clearance and lesser complications were noted among patients treated with YAG laser lithotripsy, indicating its superiority over pneumatic lithotripsy in the management of ureteral stone.

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Keywords: Chronic Myeloid Leukemia, Splenomegaly, Duhok, Kurds, Iraq.

Without intervention, ureteral stone may result in a subsequent deterioration of renal function. The semirigid ureteroscopy accompanied by a stone crushing process is the gold standard method in the management of ureteral stones. To fragment a stone, different energy sources are used, such as; electrohydraulic, pneumatic and Holmium-YAG laser. Parallel to technological developments, pneumatic and laser lithotripters are the most preferred energy sources.^(1,2)

After its emergence in early 1990s, the effectiveness of Holmium:Yttrium, Aluminum, garnet (YAG) laser was highlighted in 1993.⁽³⁾ Further, clinical

studies documented the effectiveness of Holmium: YAG laser in the management of ureteric stones in vivo in both children and adults.⁽⁴⁻⁶⁾ The excellent performance of holmium:YAG laser as a lithotripter and a surgical laser was the cause of its growing success. It has the ability to vaporize and coagulate the tissues. Holmium: YAG laser has a lot of endoscopic uses and showed successfulness in stone management and clearance of all composition.⁽⁷⁾ The waves of Holmium: YAG laser conveyed via flexible fibers. Holmium: YAG laser can produce pulses which generate thermal effect due to plasma bubble formation.⁽⁸⁾ The laser ablation thermal zone ranges between 0.5 to 1.0 mm.⁽⁹⁾

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Pneumatic (Ballistic) lithotripsy depends on the energy that is generated by the movement of a metal projectile contained within the handpiece when comes in contact with another object, the ballistic energy is transmitted to this object.⁽¹⁰⁾ The first ballistic lithotrite introduced in the early 1990s was the Swiss Lithoclast. The hand piece of the Lithoclast has a metal projectile that is pushed in by compressed air at a frequency of 12 cycles per second. The main advantages of ballistic lithotrites are their maintenance and low costs.⁽¹¹⁾ However, the relatively high rate of stone propulsion back to the kidney and the rigid nature of lithoclasts requiring further sessions of ureteroscopes or nephroscopes regarded the main disadvantage of this device.⁽¹²⁾

In this study, our aim was to compare pneumatic and Holmium: YAG Laser lithotripters in the treatment of impacted ureteral stones at different locations of the ureter and to identify the risk factors for complications.

METHODS

This retrospective study had been carried out in Urology department in Vajeen Private Hospital. From October 2014 to March 2016, seventy five patients with single unilateral impacted ureteral stone of size 7-20mm were selected. The site of the stone determined whether left or right and by its location in the ureter (proximal, middle or distal) according to anatomical division of the ureter. Patient with renal failure, coagulopathies, multiple stones, bilateral stones and those with congenital anomalies of the ureters that make the passage of ureteroscope technically difficult had been excluded from the study.

A thorough history, physical examination and investigations were obtained from all patients prior to the procedure. Radiological investigations like Ultrasonography, KUB, IVP and CT scan were performed preoperatively to evaluate the stone size and site. All patients with urinary tract infection were treated with antibiotics and all of them received prophylactic antibiotic one hour before starting the procedures. Operative time defined as the duration from the first insertion of ureteroscope into the urinary system till the end of operation.

Patients were divided into two groups, laser lithotripsy (40 patients) and pneumatic lithotripsy (35 patients). Ureteroscopy combined with either laser or pneumatic lithotripsy was performed by a single urologist using 6 French semirigid single channel ureteroscope. Ureteroscopy

- Holmium laser lithotripsy with the power setting of 0.5-1.5 joule, Frequency 5-15 Hz (hertz) per second, 365 micron fiber was applied under general anesthesia for ureteral stones. Narrow ureters where ureteroscope could not pass were dilated. The laser fiber was kept at least 1 mm from the urothelium, and lithotripsy proceeded until the stone fragments were small enough to be passed spontaneously or extracted by dormia basket or stone forceps. Swiss Pneumatic lithoclasts with 1mm probe was used to break the stones in Pneumatic lithotripsy group. Using simple or multiple fire technique, stones were fragmented and lithotripsy proceeded until the stone fragments were small enough to be passed spontaneously or could be safely retrieved with grasping devices.

Double-J (D-J) Stenting of the ureter is not routinely used for every patient having

ureteroscopic treatment, except in those having stone fragments, apparent mucosal damage and/ or. odema. This was essential in some patients to prevent potential obstruction due to ureteral edema and to provide better postoperative drainage. Most of the patients were discharged from the hospital in the first 24 hours following the procedure, provided that no complications happened. The ureteral stents were removed 15-20 days postoperatively. Stone clearance defined as complete disappearance of stone after one month from the procedure. All patients in each group were re-evaluated by direct KUB, ultrasound and non-contrast spiral computerized tomography (CT) one month following ureteroscopy. The outcome measures of these modalities of treatment were compared.

Differences in the demographic factors and stone characteristics of all patients were compared between patients who underwent Laser versus Pneumatic lithotripsy using Chi square test for categorical variables and independent sample t test for continuous variables. A $p < .05$ was considered statistically significant. SAS

9.4 Software (SAS Institute Inc, Cary, North Carolina) was used to perform all analysis in this study.

RESULTS

The mean age of patients in laser and pneumatic group were (40.3 ± 14.2) years and (39.3 ± 13.6) years, respectively (P value=0.761). In laser group the male to female ratio was 28 to 12, while in pneumatic group male to female ratio was 24 to 11 ($P=0.893$), (Table 1). Statistically, there was no significant difference between these two groups. The mean stone

size in laser and pneumatic group were $10.48\text{mm} \pm 2.82$ (range: 7-18mm), and $10.79\text{mm} \pm 2.19$ (range: 7-16.3mm) ($P=0.281$) respectively with no statistically significant difference.

Anatomically, the ureter was divided into proximal, middle and distal portion. In Laser group, 10 (25%) stones were located in proximal ureter, 16 (40%) in mid ureter and 14 (35%) in distal ureter while in pneumatic group 6 (17.1%) were in proximal part of ureter, 8 (22.9%) in mid ureter and 21 (60%) in distal ureter ($P=0.093$) (Table 1). The mean operation time in laser and pneumatic group were (36.7 ± 9.7 minutes) and (30.2 ± 7.0 minutes), respectively ($P=0.002$) (Table 2). Regarding postoperative hospital stay, in laser group 36 patients discharged in the first 24 hours, 2 within 24-48 hours and 2 after 48 hours while in pneumatic group 31 patients discharged in the first 24 hours, 3 within 24-48 hours and 1 patient after 48 hours ($P=0.863$) (Table 1). The rate of stone clearance in laser and pneumatic group were 92.5% and 85.7% respectively ($P=0.038$) (Table 2). In laser group double J stent was inserted in twenty one (52.5%) patients intraoperatively while in twenty (57.1%) patients in pneumatic group ($P=0.687$) (Table 2).

As to the complications of each procedure, stone migration up in to the pelvicalyceal system was reported in one (2.5%) patient treated with laser compared to three (8.6%) patients treated with pneumatic lithotripsy ($P=3.334$). Ureteral perforation occurred in only one (2.9%) patient in pneumatic group while not in laser group ($P=0.467$). The overall complication rate (Migration/perforation) was more common in pneumatic group (11.5%) than laser

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(2.5%). Postoperative fever had been reported in three (7.5%) patients in laser group and in only one (2.9%) patient in pneumatic group ($P=0.618$) (Table 2).

Three patients who had laser treatment and one patient in pneumatic group developed postoperative-fever and signs of bacteraemia impending sepsis and they were re-admitted to the hospital and

treated with intravenous antibiotics, analgesics and fluid support. Only one patient in laser group developed ureteric stricture which was diagnosed three months postoperatively with intravenous urography and treated later on with open surgery (ureteroureterostomy).

Table 1. Characteristics of Patients Stratified by Type of Lithotripsy

Characteristics		Laser	Pneumatic	P value*
		N (%) or mean $\pm$ SD	N (%) or mean $\pm$ SD	
Overall		40 (53.3)	35 (46.7)	-
Sex :	Male	28 (70.0)	24 (68.6)	0.893
	Female	12 (30.0)	11 (31.4)	
Age (yr)		40.3 $\pm$ 14.2	39.3 $\pm$ 13.6	0.761
Laterality:	Left	16 (40.0)	17 (48.6)	0.456
	Right	24 (60.0)	18 (51.4)	
Stone location:	Proximal	10 (25.0)	6 (17.1)	0.093
	Middle	16 (40.0)	8 (22.9)	
	Distal	14 (35.0)	21 (60.0)	
Prior TUL:	Yes	5 (12.5)	4 (11.4)	0.274
	No	35 (87.5)	31 (88.6)	
Stone size:	7 – 10 mm	24 (60.0)	15 (42.9)	0.162
	10 – 15 mm	13 (32.5)	19 (54.3)	
	>15 mm	3 (7.5)	1 (2.9)	
Mean stone size (mm)		10.48 $\pm$ 2.82	10.79 $\pm$ 2.19	0.281
Hospital stay:	< 24 hours	36 (90.0)	31 (88.6)	0.863
	24– 48 hours	2 (5.0)	3 (8.6)	
	>48 hours	2 (5.0)	1 (2.9)	

TUL, transurethral ureterolithotripsy

* Chi-square tests for categorical variables and unpaired t-tests for continuous variables

Table 2. Operation Characteristics and Outcome Stratified by Type of Lithotripsy

Characteristics		Laser	Pneumatic	P value*
		N (%) or mean $\pm$ SD	N (%) or mean $\pm$ SD	
Need Double J stent		21 (52.5)	20 (57.1)	0.687
Operation time (minutes)		36.7 $\pm$ 9.7	30.2 $\pm$ 7.0	0.002
Stone free		37 (92.5)	30 (85.7)	0.038
Complications:				
Migration		1 (2.5)	3 (8.6)	3.334
Perforation		0 (0)	1 (2.9)	0.467
Hematuria		0 (0)	0 (0)	-
Post-operative fever		3 (7.5)	1 (2.9)	0.618
Ureteric stricture		1 (2.5)	0 (0)	-

* Chi-square tests for categorical variables and unpaired t-tests for continuous variables

DISCUSSION

Management of any stone within the ureter can now be successfully done using ureteroscopy with different intracorporeal lithotripters; replacing open ureterolithotomy in most of the centers. Holmium: YAG laser has the ability to fragment stones of all sizes and composition so it has significant advantages over the other modalities of lithotripsy: the fibers of laser lithotripsy are small so making it suitable for small caliber ureteroscopy. Holmium: YAG laser has a long pulse duration which produces cavitation bubbles generating weak shockwave. (13) For this reason, in this study laser lithotripsy causes stone retropulsion in only one patient (2.5%) compared to three patients in pneumatic lithotripsy (8.6%).

Holmium: YAG laser causes stone vaporization through photothermal mechanism so it has the ability to fragment stones of all composition.⁽⁸⁾ In this study, the rate of stone clearance with Holmium: YAG laser was (92.5%) while in pneumatic lithotripsy (85.7%). The occurrence of ureteric perforation in this study is very low and didn't happen in laser lithotripsy compared to one patient in pneumatic lithotripsy, because the depth of thermal injury by laser is 0.5-1 mm. (14,

15) Only one patient in laser group developed ureteric stricture and treated later with open surgery (ureteroureterostomy) after repeated trials of JJ stent and dilatation. The rate of JJ stent insertion in this study following fragmentation of stone were slightly lower in those who underwent laser lithotripsy (52.5%) compared to pneumatic lithotripsy (57.1%). Double J stent placement was an

intraoperative decision. Patients, who had apparent edema, mucosal damage or had stone fragment after ureteroscope at the end of the procedure and to prevent the transient obstruction that can develop due to ureteral edema and to provide better postoperative drainage, double J stent were placed. Disadvantages of laser lithotripsy are that related to the cost of the device and eye protection requirement.⁽¹⁶⁾

The results of pneumatic lithotripsy in this study show that this modality is also effective in fragmenting stones and the rate of stone clearance reached up to 85.7% 4 weeks following the procedure which is comparable to other studies, but the disadvantages are stone retropulsion due to jack hammer mechanism of probe of lithoclasts. The risk of stone retropulsion is more with stones located in the proximal ureter.⁽¹⁷⁾ Mean operative time was longer with laser lithotripsy (36.7 ± 9.7) compared to pneumatic lithotripsy (30.2 ± 7.0) because they differ in the mechanism of stone fragmentation and the same results appeared in other studies.⁽¹⁸⁾

Peh et al in his study showed that Holmium: YAG laser lithotripsy is more effective and safer than pneumatic lithotripsy in the treatment of ureteral stone.⁽¹⁹⁾ In another study James et al. said

that Holmium: YAG laser is even safer in those suffering from bleeding disorders.⁽²⁰⁾ In another study done by Seong et al. in Korea regarding the comparison between Holmium: YAG laser lithotripsy versus pneumatic lithotripsy in fragmentation of ureteral calculi, it showed that the laser lithotripsy has better stone free rate and low complication rate than pneumatic lithotripsy.⁽²¹⁾ This study also gave the similar results.

CONCLUSION

Holmium: YAG laser lithotripsy is a superior modality to pneumatic lithotripsy in the management of ureteral stone and it has a higher rate of stone clearance and less complication but to some extent a longer operation time. Larger studies are needed to disclose more details about the effectiveness of this method.

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پوخته

نیمناهی و کاریگریا ریکا لیزه‌ری (هولمیوم یاگ) بیه‌راوردی دگل شکاندنا ه‌وایی بو چاره‌سهرکنا به‌رکین میزه‌روی

نارمانج: نارمانجا قه‌کولینئ به‌راوردکنا نیمناهی و کاریگریا ریکا لیزه‌ری دگل شکاندنا ه‌وایی بو چاره‌سهرکنا به‌رکین میزه‌روی.

ریکین قه‌کولینئ: هر ژ چرییا ئیکئ ۲۰۱۴ ه‌تا ئادارا ۲۰۱۶ ئ (۷۵) نه‌خوشین به‌رکین میزه‌روی ه‌ین ب ه‌ر چ قه‌باره‌بیت و ل لایه‌کی بتنی هاتنه به‌شدارکرن د قه‌کولینئ دا. ئه‌ف نه‌خوشه هاتنه دابه‌شکرن لسه‌ر دو گروپا لدویف ریکا چاره‌سهری، ۴۰ بریکا شکاندنا ه‌وایی و ۲۵ بریکا لیزه‌ری. ولدویفا پیزانین نه‌خوشا و ساخله‌تین به‌رکا و دویفچوونا پشتی نشته‌رگه‌ری بو ه‌ردو گروپا هاته به‌راوردکرن.

نه‌نجام: ریژه‌یا گشتی یا نه‌مانا به‌رکا ۹۲،۵٪ ل گروپی چاره‌سهری لیزه‌ری به‌رامبه‌ر ۸۵،۷٪ ل گروپی شکاندنا ه‌وایی هاتیه بکارئینان ($P=0.038$). تیکرایئ ده‌می نشته‌رگه‌ری ۲۶،۷ ده‌قیقه بوون لگروپی لیزه‌ری بیه‌راورد دگل ۲۰،۲ ده‌قیقه لگروپی دووی ($p=0.002$). مشه‌ترین ئالوزین پشتی نشته‌رگه‌ری لگروپی لیزه‌ری پیکه‌اتبوون ژ مشه‌ختبوونا به‌رکی و کونبوونا میزه‌روی و تایا پشتی نشته‌رگه‌ری، ولگروپی دووی مشه‌ختبوونا به‌رکی و تایا پشتی نشته‌رگه‌ری و ته‌نگبوونا میزه‌روی. ه‌ردو گروپ پنژیکی د یه‌کسان بوون سه‌باره‌ت ه‌وجه‌یا دانانا بوریا JJ لده‌مکی ده‌ستنیشانکری.

ده‌نه‌نجامی داوی: ریژه‌کا پتر ژ نه‌مانا به‌رکا و کیمتر ژ ئالوزین نشته‌رگه‌ری لده‌می بکارئینانا ریکا لیزه‌ری کو دیاردکته ئه‌ف ریکه باشتره ژ ریکا شکاندنا ه‌وایی بو چاره‌سهرکنا به‌رکین میزه‌روی.

الخلاصة

أمان وفعالية معالجة حصى الحالب بالتفتيت الليزري (Holmium-YAG) مقارنة بالتفتيت الهوائي

الهدف: تهدف هذه الدراسة إلى مقارنة أمان وفعالية التفتيت الليزري بالتفتيت الهوائي في معالجة حصى الحالب. **طرق البحث:** من أكتوبر ٢٠١٤ إلى مارس ٢٠١٦ تم اختيار ٧٥ مريضاً لديهم حصاة حالب واحدة في جانب واحد ومن أي حجم كانت. تم تقسيم المرضى إلى مجموعتين حسب أداة تفتيت الحصى المستخدمة: تفتيت الحصى الليزري (عدد = ٤٠) وتفتيت الحصى الهوائي (عدد = ٣٥). ثم تم تحليل ومقارنة العوامل الديموغرافية للمرضى، خصائص الحصى، ومتابعة ما بعد التداخل الجراحي.

النتائج: المعدل العام لإزالة الحصى في مجموعة التفتيت الليزري كان ٩٢.٥٪ (عدد = ٣٧) مقابل ٨٥.٧٪ فقط (عدد = ٣٠) من المرضى في مجموعة التفتيت الهوائي ($P=0.038$). معدل وقت العملية بين المرضى في مجموعة التفتيت الليزري كان ٣٦.٧ دقيقة ($SD = 9.7$) مقارنة مع ٣٠.٢ ($SD = 7.0$) في مجموعة التفتيت الهوائي ($P=0.002$). المضاعفات الأكثر شيوعاً بعد التداخل الجراحي في مجموعة التفتيت الليزري تضمنت هجرة الحصاة (عدد = ٣)، انثقاب الحالب (عدد = ١)، وحصى ما بعد العملية الجراحية (عدد = ١)، في حين أن هجرة الحصاة (عدد = ١)، حصى ما بعد العملية الجراحية (عدد = ٣)، وتضيق الحالب (عدد = ١) كانت المضاعفات الأكثر شيوعاً في مجموعة التفتيت الهوائي. ما يقرب من عدد متساو من المرضى في كلا المجموعتين احتاجوا لعملية وضع أنبوبة JJ عند نقطة معينة (عدد = ٢٠). **الاستنتاج:** كانت معدلات إزالة الحصى أعلى والمضاعفات أقل عند المرضى الذين عولجوا بالتفتيت الليزري (YAG)، مما يدل على تفوق هذا النوع من التفتيت على التفتيت الهوائي للحصى في معالجة حصى الحالب.

ORAL HEALTH STATUS AMONG INTERNALLY DISPLACED PEOPLE LIVING INSIDE CAMPS / DUHOK PROVINCE: A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Internally Displaced People (IDPs), They have been forced from their homes for many of the same reasons as refugees, but have not crossed an international border. The aim of this study was to describe the dental caries and periodontal health status of (15-19) year-old Internally Displaced People (IDPs) students living inside camps in Duhok governorate.

Methods: A cross-sectional study was carried out to gather information on oral health status of secondary school students in Khanki camp in May 2015 with an ethical approval. One trained examiner performed the clinical examination according to the World Health Organization (WHO) criteria in 1997. Caries experience was measured using DMFT, DMFS index, and CPI index was used to report on the periodontal health status. Descriptive statistics used to describe the study outcomes.

Results: A total of 384 students were examined, and 349 (90.9 %) participated in the survey. The prevalence of caries experience among the participants was 86.5 %. The mean DMFT and DT scores were 3.9 and 5.0, respectively. The CPI scores of gingival bleeding, calculus, shallow and deep pockets were 77.7%, 68.5%, 11.7% and 4.6%, respectively. Boys had higher prevalence and severity of dental caries than girls (DMFT= 4.3 vs. 3.4, DMFS= 5.6 vs. 4.2, respectively) as well as they had worse periodontal health status than girls.

Conclusion: High prevalence of dental caries and periodontal diseases in the (15-19) year old students living in the examined sample in Khanki camp. The study demonstrates the urge need for a better planning and implementation of preventive oral health programs in the IDPs camps.

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Keywords: Dental caries, Periodontal health status, IDPs, Camps, Duhok Province.

Iraq has been through many wars over the last decades and the last one was against what called Islamic State in Iraq and Syria (ISIS) since June 2014 until the current time. This led to a mass internal displacement of population to Kurdistan Region due to violence in the country. Duhok governorate had the biggest share

of IDPs¹. Due to these unusual conditions the IDPs are living, this may have an effect on the quality of their life.

As it is well documented in the literature that there is a strong positive association between quality of life and oral health^{2,3}, that dental caries and periodontal diseases are very expensive diseases to treat⁴. All

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that may add more restrictions on the IDPs living inside camps. On the other hand, dental caries and periodontal diseases are still preventable diseases⁵.

Very little reliable, published studies reporting the prevalence of dental caries and periodontal disease status were conducted in Iraq; however, all these studies were conducted in middle or south of Iraq with an age group under 15 year old children^{6,8}. Only one study, which was also conducted in south of Iraq (Maysan governorate), has an age group of 15 years old only. The study just reports on the dental caries prevalence, with no reporting on the mean DMFT or periodontal health status⁹.

To the best of our knowledge, there is no previous reliable published epidemiological study that reports on the prevalence of dental caries and periodontal health status in northern Iraq. Although, the effect of wartime on the prevalence of dental caries and oral health has been studied previously 10,12, yet there is no previous study explored the oral health status among the IDPs in Iraq. This population is of a particular interest in that providing a base line record about oral health status in young adult IDPs living inside camps in Duhok governorate. This will help the regional government and other Non-Governmental Organizations (NGOs) to provide a better planning of preventive oral health programs for the camps and this may help in improving the IDPs quality of life.

This study was conducted on 15-19 year-old Iraqi school students, representing the first generation of youth brought up during years of war conflict, displacement and difficult living conditions in camps. The

survey was limited to only one camp (Khanki camp); meanwhile, the profile of this camp probably applies to most settings in other camps in Duhok governorate¹.

The authors of this paper conducted epidemiological survey and reported on the oral health status of young adults 15,19 year old secondary school students living in Khanki camp. This survey aimed to map out the caries prevalence and mean DMFT and DMFS as well as to assess the periodontal health status using the community periodontal index (CPI) in secondary school students aged 15,19 years living in Khanki camp in Duhok governorate.

MATERIALS AND METHODS:

A cross-sectional study was carried out to gather information on oral health status of secondary school students in Khanki camp (Duhok Government), in May 2015. An ethical approval was taken from Scientific Committee of College of Dentistry/Duhok University (Committee council meeting number 7 at April 7th 2015).

SAMPLE SIZE:

To calculate an optimal sample size for this survey, a prevalence of 50% was assumed. Since, there was no previous study reported dental caries and periodontal health status prevalence in this population. Prevalence of 50% will give the maximum sample size required to estimate the prevalence among this population^{13, 14}.

The Danial formula was used to achieve a sample size of 384 people from a total population of 800 students in the three

secondary school students, with significance level of 5% ¹³.

Some exclusion criteria were included in this study because they may act as confounding factors for both dental caries and periodontal diseases:

Individual with systemic disease or drug intake.

Subjects who had fixed or removable orthodontic appliances.

Receiving any kind of antibiotics or mouth washed for the last two weeks before initial examination.

Smokers.

History of allergy of any component of the products being used.

One trained examiner performed the clinical examination, which it took place during school hours in a class room, on a comfortable chair and a uniform artificial light was used for dental examination.

Dental caries examination (DMFS/DMFT):

The examination for these indices was done by using disposable dental mirrors and probes. This oral examination was conducted to assess the main outcome measures which are dental caries indices (DMFS and DMFT).

The Palmer Notation Numbering System for permanent (adult) dentition was used, supernumerary tooth or third molar were excluded from the examination ¹⁵.

Examination was carried out in a systematic manner from one tooth or tooth space to the adjacent tooth or tooth space and ending with the lower second molar. A tooth was considered present in the mouth when any part of it is visible or can be touch with the tip of the explorer without excessively displacing soft tissue. A numerical coding system designed by

WHO was used for recording the status of permanent teeth. All information about clinical examination was registered in a special chart (Appendix I). Recording of dental caries was carried out according to the criteria suggested by WHO in1997¹⁶.

2- Periodontal Health Status; Community Periodontal Index (CPI):

WHO probe was used for examination: A specially designed light weight CPI probe with a 0.5mm ball tip is used with a black band between 3.5 and 5.5mm, and rings at 8.5 and 11.5mm from the ball tip.

The periodontal examination included the following:

Bleeding on probing- the presence or absence of bleeding following probing.

Calculus score – the presence or absence of visible calculus deposits on each tooth.

Probing depth- measured from the free gingival margin to the base of the gingival sulcus (in mm).

If none of the above was seen, zero score will be given as no periodontal disease present.

These periodontal measurements were performed for 6 index teeth: first, the mouth is divided into six parts (sextants). The following teeth were examined (Appendix II).

6	1	6
6	1	6

DATA ANALYSIS:

The Statistical Package of Social Sciences (SPSS) version 20 was used to analysis the data. The data was first cleaned from errors and there was no missing data, then the data analysis was performed. Firstly, the data analysis included descriptive statistics looking at the frequency, percentages, means and Standard

Deviation (SD) of the study variables, for instance, DMFT/ DMFS and CPI indices. Secondly, the independent sample t-test was used to assess the relationship of gender with the mean values of the DMFT/DMFS and CPI scores. Besides, the differences in the highest CPI scores between boys and girls were assessed using a chi-square test.

RESULTS:

A total of 384 students from 3 secondary schools in Khanki camp were examined randomly and 349 students, 210 (60.2%) boys and 139 (39.8%) girls, were included in the survey. Thirty four students were excluded from the study as they did not fit in the eligibility criteria of the study. Response rate was 90.9 % (n=349) and the age range was (15-19) years old with the mean age of 17 years.

1. Dental caries findings:

The prevalence of dental caries in the study population was 86.5% with a mean DMFT= 3.9 (± 3.0). Higher, statistical significant mean DMFT scores were found for boys compared to girls (4.3 ± 3.3 vs.

3.4 ± 2.5 ; $P = 0.03$). The severity of dental caries was significantly higher prevalence in boys than girls, (DMFS= 5.6 ± 5.3 vs. 4.2 ± 3.5 ; $P = 0.001$), respectively. (Table 1)

Taking a closer look at the DMFT components, the D-component (DT) contributed most to the DMFT index in both boys and girls. A majority of decayed teeth (86.5 %) were left untreated (total mean DT= 5.0 ± 4.7), the highest DT range score found in a student was 21. On the other hand, only 2 teeth with decay were restored (total mean MT= 0.02 ± 0.2) and three teeth were missing due to dental

caries (total mean FT= 0.008 ± 0.1) (Figure 1).

It is clearly showing that the majority of the DMFT was due to high DT scores for both boys and girls (mean DT for boys= 5.5 ± 5.3 and for girls = 4.2 ± 3.5). In general, the total mean scores of DMFT components were higher in boys than girls, 4.3 ± 3.3 vs. 3.4 ± 2.5 , respectively.

2. Periodontal findings:

Only 27.8% of the participants (on at least one sextant) were with no periodontal diseases using a CPI index (Table 2). The mean score of sextants with no periodontal diseases was 2.7 ± 1.7 per individual.

The highest prevalence to describe the periodontal health status was bleeding on probing (gingival bleeding) followed by detectable calculus, in which they were 77.7% and 68.5%, respectively. The mean score of sextants with detectable bleeding on probing was 3.6 ± 1.7 and it was 2.9 ± 1.6 sextants with detectable calculus.

For pocket depth, pockets with 4-5mm were detected in 11.7% of the population, with a mean score (1.8 ± 1.3) sextant per individual. The prevalence was less for Pocket depth ≥ 6 mm with only 4.6% of the population and a mean score of 1.4 ± 0.9 sextant per individual. Comparing boys and girls on their periodontal findings, the boys have significantly worse periodontal health status than girls. As 60.3% of the boys have significantly higher detectable calculus compared to only 39.7% girls ($P=0.024$); furthermore, the pocket depth of 4-5mm was significantly higher in boys (63.4%) than girls (36.6%) with P -value=0.042.

When looking at the frequency distribution and number of participants of the CPI highest score in each participant, it is very

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clear that almost more than half of the participants have detectable calculus in their mouth and more than one quarter of the study population has bleeding on probing. Although there was no significant statistical difference between boys and girls in their highest CPI score ($P=0.255$), yet it was obvious from frequency

distribution and counts that more boys have periodontal problems than girls.

Only 3.7% ($n=13$) has healthy gingiva, while pocket depth of 4-5mm was detected in 10% ($n=35$) of the study sample and only 4.6% ($n=16$) of the participants has a pocket depth ≥ 6 mm (Figure 2).

Table (1): Study Population by Gender and DMFT / DMFS

	Total		Male		Female		P-value*
	No.	Mean (+ SD)	No.	Mean(+ SD)	No.	Mean (+ SD)	
DMFT	349	3.9 (+ 3.0)	210	4.3 (+ 3.3)	139	3.4 (+ 2.5)	0.03*
DMFS	349	5.1 (+ 4.7)	210	5.6 (+ 5.3)	139	4.2 (+ 3.5)	0.001*

* Based on independent sample t-test.

Table (2): Study Population by Periodontal Findings and Gender

Periodontal Findings	Total participants with positive findings % (N)	Total Mean sextants for periodontal findings(+ SD)	Male % (N)	Female % (N)	P-value*
No periodontal diseases	27.8 % (97)	2.7 + 1.7	60.8% (59)	39.2% (38)	0.087
Bleeding on Probing	77.7% (271)	3.6 + 1.7	57.6% (156)	42.4% (115)	0.271
Calculus	68.5% (239)	2.9 + 1.6	60.3% (144)	39.7% (95)	0.024*
Pocket 4-5mm	11.7 % (41)	1.8 + 1.3	63.4% (26)	36.6% (15)	0.042*
Pocket ≥ 6 mm	4.6% (16)	1.4 + 0.9	87.5% (14)	12.5% (2)	0.859

* Based on Chi-square test.

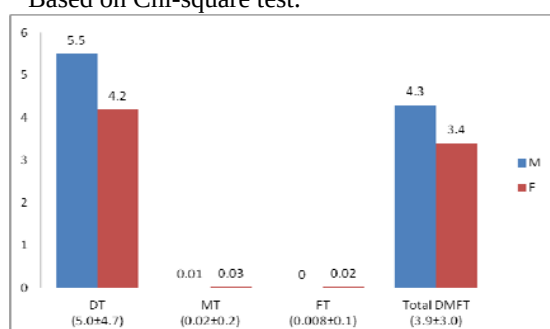


Figure (1): Caries Experience (Mean DMFT and its Components) by Gender.

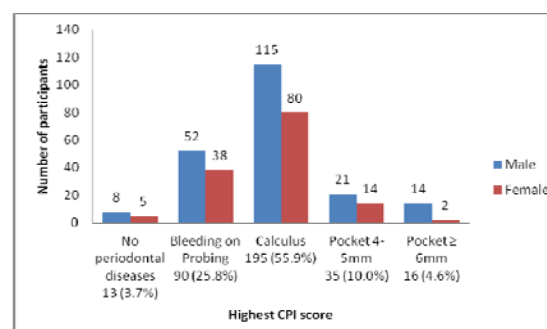


Figure (2): Periodontal Status by Highest CPI Score and Gender.

DISCUSSION:

There is no published epidemiological data on the caries experience of young adults (15-19) year-old living in Duhok Province, particularly among the IDPs living in

camps. So this study's results can be considered as base line data to compare with other studies in the future also produce a reliable baseline data for development of national or regional oral health programs.

This study has highlighted three important findings in regards to the dental status of IDPs' students. Firstly, more than three quarters of the students (86.5 %) had dental caries. Secondly, the majority of DMFT was mostly due to dental caries (mean total DT= 5.0 ± 4.7), very little contribution of the filling or missing components to the DMFT (MT= 0.02 ± 0.2 , FT= 0.008 ± 0.1). Finally, both DMFT and DMFS means were significantly higher in boys than girls (DMFT= 4.3 ± 3.3 vs. 3.4 ± 2.5 ; $P = 0.03$ and DMFS= 5.6 ± 5.3 vs. 4.2

± 3.5 ; $P = 0.001$). This means that the prevalence and severity of dental caries were significantly higher in the boys compared to the girls.

Regarding the periodontal findings, the main results from this study were the prevalence of gingival bleeding, calculus, shallow and deep pockets were 77.7%, 68.5%, 11.7% and 4.6%, respectively. Moreover, there was a significant difference between males and females, in which the boys has worse periodontal health status than girls.

This paper presents for the first time updated data for dental caries and periodontal disease prevalence among young adults in north Iraq, inside the IDPs camps. Overall, rather high prevalence of dental caries, gingival bleeding as well as visible calculus was detected in this study. The dental caries prevalence in this study (86.5%) is less than the prevalence in Maysan governorate study (92.53%) 9.

This could be explained by the fact that the location of Maysan governorate is on Euphrates River and the fluoride content of the tap water originated from Euphrates is (0.129-0.260 mg/L)¹⁷, while the north of Iraq governorates mainly have their water supplies from Tigris and natural spring waters with more fluoride content (0.160-1.5 mg/L) ¹⁸. According to the updated U.S. Public Health Services (PHS) in 2015 for the optimal fluoride content to reduce dental caries, the fluoride content should be 0.7–1.2 mg/L ¹⁹. This might explain the relative decrease in dental caries, when comparing the study results to Maysan governorate study. However, further studies needed to investigate this association in more details.

The present study provides an evidence of relatively high caries prevalence and severity when comparing to other countries in the world ^{20,22}; especially when majority of DMFT was due to high DT (mean total DT= 5.0 ± 4.7). This indicates that the untreated dental caries is a major problem for the students in high school living in camps, this might have an effect on their performance in school, absence hours from school besides their productivity as they represent the first generation of youth brought up after ISIS invasion.

There are several factors that might explain the high prevalence of dental caries and periodontal diseases in this population: the people quality of life due to their displacement from their homes and living in difficult camp conditions besides the lack of availability and access to oral health services, lack of awareness regarding the importance of regular dental brushing and flossing as well as the lack of

parental and professional education. All these factors need to be further investigated in future studies and investigate the association between these variables with the DMFT, DMFS and CPI indices.

Interestingly, the dental caries experience, gingival bleeding and calculus were significantly higher in males compared to females. This might be due to some cultural issues, as in this community males are more responsible for the financial aid of the household and to a lesser extent than females. This may create more stress on males due to financial collapsing that the IDPs families are suffering from. This may lead the males to neglect their oral health and this may explain the increase in their caries experience and worsen their periodontal health status.

Some limitations in this study was due to its design as a cross sectional study. Although we got significant association between gender and different variables, but it was not possible to evaluate the temporality relationship to assess whether these factors came first or the diseases come first. A longitudinal study is needed to investigate this. Moreover, the Chi-square and t-independent sample test analyses were used to assess the relationship between gender and DMFT, DMFS and CPI indices. However, these tests do not test for the complex interrelationship between different variables²³. So, further studies are needed to test for any confounding effects between different variables.

Epidemiologic data provided in this study, with a representative sample, should serve as a basis for planning and implementation of strategies to prevent and treat dental

caries and periodontal diseases. Improvement of the overall oral hygiene in this population should have a notable impact on reducing the prevalence of dental caries and periodontal diseases among this population.

Awareness of the occurrence of disease, the infectious nature of these diseases, and the available means to prevent the disease, activation of topical fluoride application programs and providing better access to oral health care may be achieved through improving the health delivery system inside camps and a better interaction between oral health providers and community decision makers and stakeholders; this should lead to changes in the educational programs to promote healthy attitudes^{24, 25}.

The epidemiological data of this survey highlighted the high prevalence of dental caries and periodontal diseases in the (15-19) year-old student living inside Khanki camp. These results along with more thorough epidemiological studies should be taken into account and they demonstrate the urge need for a better planning and implementation of preventive oral health programs in the IDPs camps.

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Appendix I:

Patients Name

Department of preventive

Operator.....

Age.....

Group.....

Dentition status DMFS/ dmfs Index

R	UPPER				
	M	O	D	B	L
7					
6					
5					
4					
3					
2					
1					
1					
2					
3					
4					
5					
6					
7					

L	LOWER				
	M	O	D	B	L
7					
6					
5					
4					
3					
2					
1					
1					
2					
3					
4					
5					
6					
7					

DS.....

ds=.....

MS=.....

ms=.....

FS=.....

Fs=.....

DMFS=.....

dmfs=.....

DMFT=.....

dmft=.....

CODES : D=decayed M=Missing due caries F= filling due to caries

Appendix II:

University of Duhok

Faculty of Medical Sciences

School of Dentistry

Case sheet of examination (17/3/2015)

1-	Name		
3-	Age in years		
4-	Gender	Female	Male
5-	Systemic disease	Yes	No
6-	Orthodontic appliance	yes	No
7-	Taken any drugs	yes	No
8-	Smoker	yes	No

Community periodontal index (CPI):

0=Healthy

1=Bleeding

2=Calculus

3=Pocket 4-5 mm (black band on probe partially visible)

4= Pocket 6mm or more (black band on probe not visible)

X=Excluded

9=Not recorded

R	6	1	6	L
	6	1	6	

پوخته

باری نه خوشیی دهف و دانا بیته وان ناواریته دناف که مپا دا دژین: پاریزگه ها دهوکی: خواندنا پارچهیی

ئارماج: ئامانج ژفی خواندن هه لسه نگاندا باری ساخله می یی نه خوشیت دهف و دانا بوو وهکی کرمیوونا دانا و نه خوشیت پدیا یین قوتابیته قوتابخانته بنه رته یین وان ناواریته کو دناف که مپاندا دژین نهوین ژیی وان دناقهرا (۱۵ تا ۱۹) سالی دا، پاریزگه ها دهوکی، کوردستانا عیراقی.

ریکین کاری: نهف خاندنا پارچهیی هاته کرن ژبو کومکنا پیزانینان لسه باری ساخله می دهف و دانت قوتابیته قوتابخانته بنه رته یی نهوین که مپین خانکی دا دژین ل هه یفا گولانی یا سالا ۲۰۱۵ نهوژی پشتی بده ستفه ئینانا رزامه ندیا یاسایی و نه خلای، دیسان پشکنین هاتنه کرن بو وان ل دویف وان پشه رین ریکخراوا ساخله میا جیهانی یا سالا ۱۹۹۷ و پشه رین کرمیوونا دانا و دیسان پشه ری نه خوشیت پدیا CCPI و پاشی ده رته نجامین ئاماره یی هاتنه شلوفه کرن بو دیارکنا نه نجامین خواندن.

نه نجام: ژکویی ۲۸۴ قوتابیین کو هاتینه پشکنین کرن ۲۴۹ (۹۰،۹) پشکداری دنان پشکنینا دا کرن، و دیاریوو کو ریژا به لافه بوونا کرمیوونی دناف به شداربوویان دا (۸۶،۵٪) کو کومره دبیه DMFT (۳۰۹) و کو نمره DT (۵،۰). دهمه کی دا پشه ری CDI ژلایی هژمارتنا خوینریژیا پدیا و هه بوونا پشکنین کلسی (تارتار) و کیراتیا پدیا یا کیم و نور ۷۷،۷٪، ۶۸،۵٪، ۱۱،۶٪، ۴،۶٪ بو ل دویف ئیکدا، و دیسان دیاریوو کو ریژا به لافه بوون و زیده بوونا کرمیوونی لدهف ره گه زی نیر پتر بو ژ ریژا کرمیوونی دناف ره گه زی می دا (DMFT ۲،۴ به رامبه ری ۲،۴)، (DMFS ۵،۶ به رامبه ری ۴،۲) بوو، و هه مان تشت دیاریوو ده یاره یی نه خوشیت پدیا ژی.

ده رته نجام: ژخواندن دیاریوو کو ریژا به رز یا نه خوشیت کرمیوونی و پدیا ژی یا هه ی دناف قوتابیین که مپین خانکی دا دژین نهوین کو ژیی وان دناقهرا (۱۵ تا ۱۹) سالی، دیسان پیدفیا فەر یا وان دیاریوو ب پلانین باش و یین پیدفی بو پاراستنا ساخله میا دهف و دانت ناواریته دناف که مپاندا دژین.

الخلاصة

تقييم الوضع الصحي لأمراض الفم للنازحين الذين يعيشون داخل مخيمات / محافظة دهوك :دراسة مقطعية

الهدف: من هذا الدراسة كان تقييم الحالة الصحية لأمراض الفم المنتشرة مثل تسوس الاسنان وامراض اللثة لطلاب المدارس الثانوية للنازحين الذين يعيشون داخل مخيمات النازحين وللاعمار (١٥-١٩) سنة في محافظة دهوك/ كوردستان العراق.

طريقة البحث: اجريت دراسة مقطعية لجمع المعلومات عن الحالة الصحية لافواه طلاب المدارس الثانوية في مخيم خانكي في شهر ايار لسنة ٢٠١٥ وذلك بعد استحصل الموافقات القانونية الاصولية وتم اجراء الفحوصات السريرية وفقا لمعايير منظمة الصحة العالمية لعام ١٩٩٧ وتم قياس مؤشري التسوس (DMFT,DMFS) وقياس مؤشر أمراض اللثة (CPI) وبعدها تحليل النتائج احصائيا لوصف نتائج الدراسة.

النتائج: من مجموع ٣٨٤ طالب من الذين تم فحصهم تم مشاركة ٣٤٩ (٩٠.٩%) في الاستطلاع. وتبين ان نسبة انتشار التسوس بين المشاركين ٨٦.٥% وكان معدل DMFT (٣.٠٩) ومعدل DT (٥.٠). بينما كانت معدل مؤشر (CPI) من ناحية احتساب نزيف اللثة، وجود الترسبات الكلسية (تارتار)، ووجود الجير (البلاك) كان ٧٧.٧%، ٦٨.٥%، ١١.٦% و ٤.٦% على التوالي. وكانت نسبة انتشار وشدة التسوس أعلى بين الذكور منه بين الاناث DMFT ٤.٣ مقابل ٣.٤ (DMFS ٥.٦ مقابل ٤.٢) على التوالي. وتبين نفس الشيء بالنسبة لمؤشر امراض اللثة.

الاستنتاج: تبين ان هناك انتشار عالي التسوس الاسنان وامراض اللثة بين الطلاب النازحين المقيمين في مخيم خانكي للاعمار (١٥-١٩) سنة. وتوضح الدراسة الحاجة الماسة والملحة الى وضع الخطط الوقائية اللازمة لصحة الفم للنازحين داخل المخيمات.

PREVALENCE OF SCABIES AMONG REFUGEES IN CAMPS OF DUHOK PROVINCE, KURDISTAN REGION, IRAQ

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ABSTRACT

Background: Scabies, a skin disease caused by *Sarcoptes scabiei* mite, that is highly pruritic and contagious. It's endemic in tropical regions among low socio-economic and homeless population. Scabies is a common problem among refugees and immigrants. The aim of this study is to estimate the prevalence of scabies among refugees in Duhok Province, Kurdistan Region, Iraq.

Methods: A cross-sectional survey was performed on 35 camps of refugees. A total of 21320 skin lesion cases attended health care centers in refugee's camps were examined and diagnosed by the physician. Data were collected from December 2015 to May 2016.

Results: The prevalence of scabies was 4.5% (959), the rate of male and female were 52.8% (506); 47.2% (453) respectively, more prevalent in age groups 5-14 years 35% (335), the majority of cases were found in Essian camp 38.7% (371).

Conclusion: The prevalence of scabies was higher in refugees than other communities. Scabies spread quickly among family members, affect both sexes and all age groups, especially among refugees because of poverty, overcrowding, bad personal hygiene, and bad housing.

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Keywords: Refugees, *Sarcoptes*, Scabies, Duhok.

Scabies, a skin lesion caused by infestation with a mite called *Sarcoptes scabiei*, that affect approximately 300 million people worldwide each year. The cardinal symptom is itching, but secondary bacterial infection with *Streptococci* and *Staphylococci* is frequent and can lead to serious complications, such as renal failure, and chronic rheumatic heart disease.¹⁻³

Epidemiological studies indicated that the most predisposing factors in contracting scabies seem to be poverty and overcrowded living conditions, however the prevalence of scabies is not affected by sex, race, or age.⁴

The diagnosis of scabies in endemic areas is often easy; it could be sometimes one of

the misdiagnoses in dermatology clinic. Scabies is easy to misdiagnose with other skin problems that are common among school children, such as popular urticaria, atopic dermatitis, and contact eczema. That's why the basis of the diagnosis is: family history, endemicity, presence of itching especially at night, and lesions channels.¹

Life cycle occurs when female mites burrow under the skin and lay small number of eggs each day for several weeks. Symptoms are caused by allergic reactions of host's body to mite proteins found in mite's eggs, proteins and feces. Itching continue for few days to several weeks, after all mites are killed. Initial infections require four to six weeks to become symptomatic. Transmission occurs

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from person to person and from objects like: shared beddings, towels, and clothing, but is most often transmitted by direct skin-to-skin contact, with a higher risk after prolonged contact with an infected person. Re-infection may occur. Recommendation for disease prevention requires treatment of all affected family members and all people came in contact with patients regardless of whether symptoms are present or not, to reduce rate of recurrence.⁵

Scabies can lead to serious complications, through secondary bacterial skin infection, like septicemia, renal disease, and rheumatic heart disease.⁶

Foreign adopted children and children of asylum applicants and refugees, newly arrived in Denmark, often have lived under conditions that make the following diagnostic considerations relevant: scabies, lice, impetigo and fungal skin infections, nutritional iron deficiency or bleeding, anemia caused by hook worms in the gastrointestinal tract, malaria, tuberculosis, hepatitis B, HIV infection and various intestinal parasites.⁷

Scabies is a public health problem, delayed or misdiagnosis and delayed treatment may lead to outbreaks that may be difficult to be controlled.⁸

The highest prevalence of scabies is found in Pacific island countries.⁹

In a survey done in Fiji, found 24% of participants had scabies, with a particularly high prevalence in young children. A prospective study in Fijian school children documented scabies incidence at 51 cases per 100 people.¹⁰

The treatment of scabies is started with topical agents, including benzyl benzoate

and permethrin cream, which was the standard of care and till now.¹¹

Treatment of close contacts is also advised because *Sarcoptes scabiei* is transmitted by contact or shared objects. Oral treatment, ivermectin (IVM), has been used as a single dose, repeated at two weeks if symptoms persist.¹²

Ivermectin is as effective as permethrin in the treatment of scabies. In comparison to other medications such as lindane, benzyl benzoate, crotamiton and malathion. Ivermectin was more effective in the treatment of scabies.¹³

Application of 1% lindane topically daily lasting at least 2 weeks is required to clear scabies, safe and effective to evaluate the efficacy of scabies treatment, and to follow up the patients.¹⁴

Other study in Netherlands indicates that a single dose of ivermectin was as effective as two applications of lindane lotion 1% in 2-week follow-up.¹⁵

MATERIALS AND METHODS:

This study was conducted in refugee's camps of Duhok province, Kurdistan Region of Iraq. Data were collected from December 2015 to May 2016. A total of 21320 skin lesion cases attended health centers in 36 refugee's camps were enrolled in the study.

A questionnaire was used for data collection, which includes:

Age, sex, occupation. Family history: number of members of their families, number of rooms in their houses or cabinets or tents, number of children who sleep together in the same bed. History of itching, and sharing clothes with others.

In cooperation with a dermatologist to diagnose the scabies. The diagnosis of

scabies was done clinically, continuous itching especially at night, and skin

burrows (visualized with mineral oil), and itchy papules or nodules. In case of doubt, definite diagnosis was done by microscopic identification of mites or their eggs from skin scraping.^{6, 16}

RESULTS:

The prevalence of scabies was 4.5% (959), the rate of male and female were 52.8% (506); 47.2% (453) respectively as shown in table 1, more prevalent in age groups 5-

14 years 35% (335) as shown in the figure. Majority of cases were found in Essian

camp 38.7% (371) as shown in table 2.

Table 1: Sex distribution of scabies among refugee's camps.

Sex	Scabies	%
Male	353	46.5
Female	406	53.5
Total	759	100.0

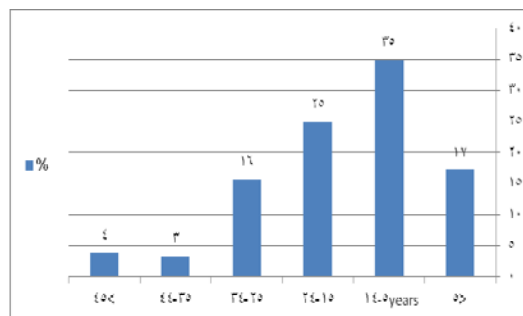


Figure: distribution of Scabies among refugee's age groups.

Table 2: Distribution of scabies among refugee's camps.

Camp/ Mobile Team	Total skin lesion	Scabies	%
Bajet Kandala 1	486	6	0.6
Bajet Kandala 2	77	13	1.4
Bersive 2	571	0	0.0
Chamishku	3007	100	10.4
Dawanesh	5	0	0.0
Dawodia	1297	2	0.2
Domiz 1	226	12	1.3
Domiz 2	1067	2	0.2
Essian	700	371	38.7
Garmawa	434	116	12.1
Gawilan	570	4	0.4
IMC MT Al Mumi	48	0	0.0
IMC MT Garsur	7	0	0.0
IMC MT Jazronea	18	1	0.1
IMC MT Tal Al-Hawa	44	1	0.1
Kabarto 1	360	3	0.3
Kabarto 2	264	0	0.0
Kadia	262	0	0.0
Khanke	406	0	0.0
Mam Reshan	3	1	0.1
Mamilian	784	8	0.8
Medair MB	2272	87	9.1
Medair O.Khaled	25	4	0.4
Medair Wana	558	8	0.8
MMU Khanasor	5	0	0.0
MMU Sardashti 2	12	0	0.0
MMU Sharfadeen	28	0	0.0
MMU-Seage	38	0	0.0
MMU-Segea	427	0	0.0
MMU-Sejea	35	1	0.1
Musharaf Abeet	26	0	0.0
PUAMI Mobile	1551	0	0.0
Rabiala Clinic	171	5	0.5
Shariya	5446	127	13.2
Sheikhan	90	87	9.1
Grand Total	21320	959	100.0

DISCUSSION:

The housing nature is very important for disease transmission that's why refugees get the disease and spread within the family members easily because of close contact as they sleep in one cabinet or tent.

Our results were close to a study done in France in 2015 the prevalence of scabies was 6.5% in individuals sleeping in public places.¹⁶

Regarding the sex and age a similar results showed in a study done in a primary school in Nigeria in 2015 for 400 pupils, 153 males and 247 females, 6-12 years old. The prevalence of scabies was 10.5%. More cases occurred among males than females 80.4%, 67.2% respectively.¹⁷

Because of rapid transmission, misdiagnosis, and mistreatment outbreaks can occur like a study done in 2015 on a large outbreak of scabies in three health care centers in a university teaching hospital in the Netherlands. The outbreak potentially affected 460 patients and 185 health care workers who had been exposed to the primary patient.¹⁵

Another study done in Bangui in 2014 for 376 cases of scabies were identified from a total of 6391 patients (a hospital prevalence of 5.88%) with high frequency.¹⁸

Scabies is considered as a re-emerging disease after it has been controlled like our country and others like Sierra Leone in 2001, the prevalence of scabies was investigated among 125 children between the ages of 1-15 years. Children under five years accounting for 77%, while 86% among the 5-9 years, and declining with an increase in age. The prevalence of scabies was high in children in the displacement camps, which is a public health problem not only in these camps, but also in the entire country. The reason may be due to overcrowding, poor personal hygiene, and poverty that spread the disease among the camp residents.

Control and prevention protocols are recommended, by reducing overcrowding, health education, personal hygiene, and treatment of patients.¹⁹

A retrospective study in Athens in 2012 for 4071 children, the most frequent disease was dermatitis/eczema (34.7%), scabies (4.8%).²⁰

The incidence rates of scabies were four times higher in immigrants than in persons with Belgian nationality, with no difference between male and female.²¹

A study done in Egypt in 2015 the results were close to our study, the prevalence was 4.4%, male and female students 3.9%, 4.8% respectively, with no statistical significance.²²

In conclusion the prevalence of scabies was higher in refugees than other communities. Scabies spread quickly among family members, affect both sexes and all age groups, especially among refugees because of poverty, overcrowding, bad personal hygiene, and bad housing. In our locality, scabies is still a re-emerging disease affecting schoolchildren, especially in rural areas.

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پوخته

بە لافبونا کورباتیی دناڤ کەمپێن ئاوارە و پەنا بەرندا ل پارێزگە ها دهوکی – هەرێما کوردستانی عێراق

پێشهکی: گوریبوی نه خوشیه کا پبستیه ته که ری وی مشه خوری *Sarcoptes scabiei*، نه و ئی گه له ک یا ب خوریانه و شه گره . یا به ربه لافه ل ده قه رین گهرم و کیم ده رامت و وه لاتیبین بی خانی. گوریبوی تاریشه کا به ربه لافه لناف ئاواره و په نا به را دا.

ئارمانج: بو ناشکرا کرنا ریژا گوریبوی لناف ئاواره یین با ژیری دهوکی.

هوکار: شه کولینه کا ریژه یی هاته نه جامدان لسه ر ٣٥ که مپین ئاواره یان. ژ کوژمی 21320 نه خوشین پبستی قه ستا سه نته رین ساخه میی کرین ل که مپین ئاوارا هاتینه تاقیکرن و شلو قه کرن ژ لای دختوران شه. داتا هاتنه خرفه کرن ژ به روار ی کانونا دووی ٢٠١٥ هه تا نه ییاری ٢٠١٦.

نهجام: ریژا گوریبوی ٤٠.٥٪ (٩٥٩) بو، ریژا ره گه زێ نیر ومی ٥٢.٨٪ (٥٠٦) ٤٧.٢٪ (٤٥٣) لایف نیدا بوو. ریژا پتر هه بو ل کووما ته مانی ٥-١٤ سالی ٣٥٪ (٣٣٥)، پتریا نه خوشان ل که مپا ئیسیان بوون ٣٨.٧٪ (٣٧١).

ده رنه جام: ریژا گوریبوی لناف ئاواره یان داپتر بوو ژ جفاکی دی. گوریبوی زوی به لاف دبی لناف نه ندامین خیزانی دا، هه ر دوو ره گه زا هه می کووما ته مانی شه دگرت، ب تایبه تی ئاواره یان ژ به ره ژاری، قه ره بالغ، کیم ساخه میا که سایه تی، و کیماسیا جهین ناکنجی بوی.

الخلاصة

انتشار الجرب بين النازحين في المخيمات في محافظة دهوك - إقليم كردستان العراق

المقدمة: داء الجرب، مرض جلدي يسببها طفيلي *Sarcoptes scabiei*، ذو حكة عالية ومعدية. ومنتشر كثيراً في المناطق الاستوائية بين السكان ذوي الدخل القليل وعديمي المأوى. داء الجرب مشكلة شائعة بين اللاجئين والمهاجرين.

الهدف: لقياس نسبة داء الجرب بين اللاجئين في محافظة دهوك.

طريقة العمل: اجريت احصاء على ٣٥ مخيم اللاجئين. مجموع ٢١٣٢٠ اصابات جلدية ممن زاروا المراكز الصحية في مخيمات اللاجئين وفحصهم وتشخيصهم من قبل الطبيب. اخذت البيانات من تاريخ كانون الاول ٢٠١٥ حتى أيار ٢٠١٦.

النتائج: نسبة داء الجرب كانت ٤.٥% (٩٥٩)، نسب الذكور والاناث كانت ٥٢.٨% (٥٠٦)؛ ٤٧.٢% (٤٥٣) على التوالي، النسبة كانت عالية في فئات العمر ٥-١٤ سنة ٣٥% (٣٣٥)، اثرية الاصابات كانت في مخيم ئيسيان ٣٨.٧% (٣٧١).

الاستنتاج: نسبة داء الجرب بين اللاجئين كانت اعلى من بقية المجتمع. داء الجرب تنتشر بسرعة بين افراد العائلة، تصيب كلا الجنسين وجميع الفئات العمرية، خاصة بين اللاجئين وذلك بسبب الفقر، الازدحام، سوء النظافة الشخصية، وسوء السكن.

کانوونا ئیکئی ۲۰۱۶

پەربەندا ۱۰ ژمارە ۲



زانکویا دھوک
کولێژا پزیشکی

گوفارا پزیشکی یا دھوکئی

گوفارا فەرمی یا کولێژا پزیشکی یا دھوکئی

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