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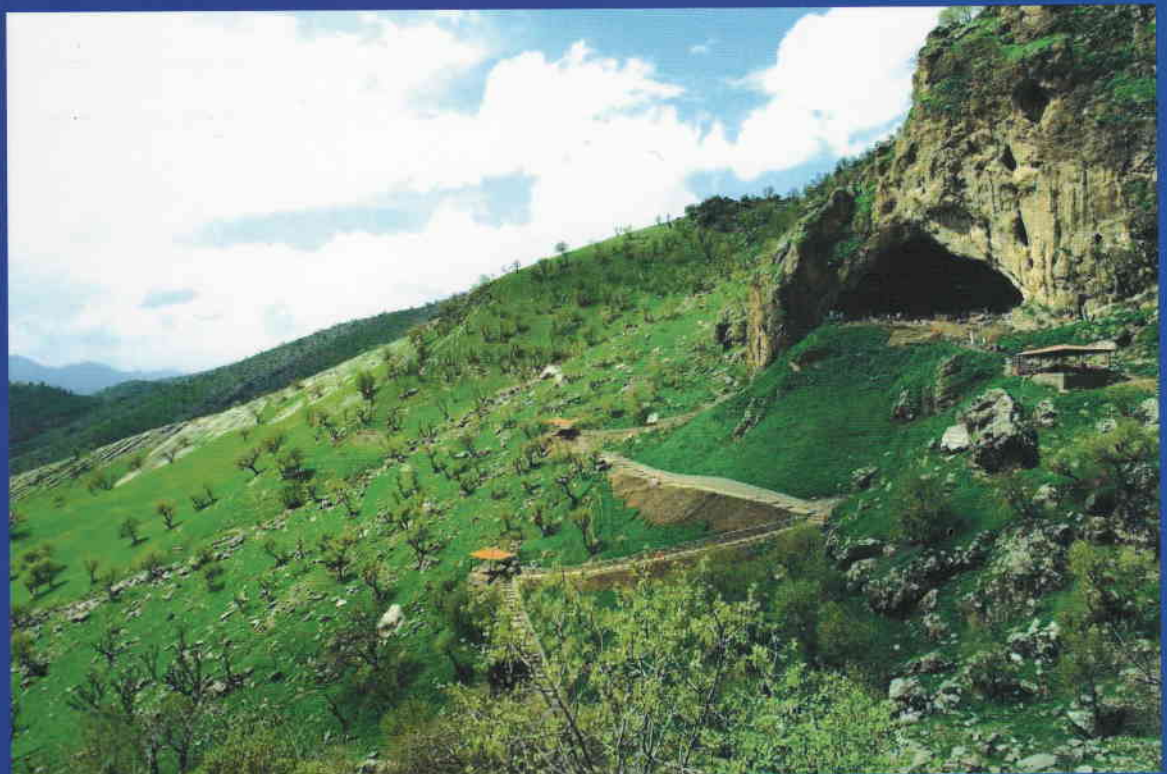
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RISK FACTORS FOR MULTI-DRUG RESISTANT TUBERCULOSIS: A REVIEW

AHMAD M. SALIH, BSc, MSc, PhD*
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SUMMARY

The current review aims to determine the risk factors associated with multi-drugs resistant TB (MDR-TB). Previous treatment is the most important risk factor for inducing MDR-TB. Other important associated factors are: immigration, age 45-64 year, male sex, HIV infection, alcoholism, smoking, diabetes mellitus, and poor socio-economic factors. Effective treatment, control and prevention of emergence and transmission of drug-resistant TB are required in all countries. To achieve this, the World Health Organization (WHO) recommended the adoption of Directly Observed Therapy Short-Course (DOTS) programme which involves giving effective and regular anti-TB drug supply, government security and financing commitment, case detection and diagnosis by smear microscopy, and monitoring the performance and outcome. It is highly recommended to strictly follow the appropriate WHO treatment guidelines, to ensure adequate success rate of treatment in drug-susceptible and drug-resistant strains; this will limit emergence of resistant strains and prevent spread of the disease. The emergence of aggressive new forms of drug-resistant TB is worrying that requires reinforcement of control measures. This demands special attention to case detection and prompt treatment of MDR-TB, extensively drug resistant TB (XDR-TB), and totally drug resistant TB (TDR-TB) to prevent transmission of the disease and further development of drug-resistant strains beyond this stage.

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Key words: Risk factor, *Mycobacterium tuberculosis*, MDR-TB

Tuberculosis (TB) is a major, global public health problem, particularly in low- and middle-income countries. The total number of TB cases is still increasing worldwide, particularly in countries where HIV infection is epidemic. The recently published World Health Organization (WHO) report stated that there were 9.27 million new cases of TB in 2007, 1.8 million deaths from TB, and 13.7million prevalent cases.¹

Recently *Mycobacterium tuberculosis* (MTB) has intensely been studied because of its resurgence and the emergence of drug resistant strains.^{2,3} MDR-TB, that is MTB strains resistant to at least isoniazid (INH) and rifampicin (RIF), is present in

all continents, with 0.5 million estimated new cases in 2007.¹ The highest proportion of MDR-TB cases has been reported from India, China, the Russian Federation, South Africa and Bangladesh.¹ MDR-TB poses a significant global and public health concern, because of low efficacy rates for first line treatment regimens, 18 to 24 months of treatment and association with considerable mortality worldwide.^{4,5} An additional concern is the persistence of high or increasing incidence and spread of MDR-TB in industrialized and the developing world, related to poverty, migration, ethnic conflicts, substance abuse and the increase in HIV infection, sometimes coupled with the poor

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performance of national programmes. These factors may lead to the development or increase of MDR which, however, is susceptible to proper health control measures.⁶ The measures are aimed at reducing the transmission through rapid identification of infectious patients and fast adequate diagnostic measures, followed by immediate treatment with effective drugs according to resistance, as long as sufficient protection by vaccination is not available.⁷

Recently, reports of MTB strains with extensively drug resistant TB (XDR-TB) strains have been described.^{2,8} XDR-TB is defined as TB caused by MDR strains that are also resistant to a fluoroquinolones (FQs) and, at least, one second-line injectable agent (amikacin "AMK", kanamycin "KM" and/or capreomycin "CAP").¹ More recently report of MTB strains of totally drug resistant TB (TDR-TB) or super XDR-TB has been described.⁹ TDR-TB is defined as MTB isolates resistant to all first line (INH, RMP, STM, ethambutol "EMB", and pyrazinamide "PZA"), and second line drugs (ofloxacin "OFX", ciprofloxacin "CIP", cycloserine "CYC", prothionamide "PTH", AMK, KM, ethionamide "ETH", para-aminosalicylic acid "PAS", and CAP).⁹

The aim of this review is to outline risk factors associated with MDR-TB, and the policies for countering the feasible ones.

Risk Factors Influencing Development of Drug Resistance:

Previous treatment It is an important risk factor for inducing drug resistance (especially MDR-TB).^{6,10-15} Generally, high resistance levels are expected among previously treated cases because drug resistance is a strong risk factor for recurrent TB.¹⁰ The WHO/IUATLD working group on global surveillance for anti-TB drug resistance reported a prevalence of primary MDR of 1.4% and acquired resistance of 13% in previously

treated patients¹⁶. Therefore, prevalence of MDR-TB is 10 times higher in previously treated patients. The median combined prevalence of MDR-TB is 2.2%.¹⁶ The high rate of acquired resistance is justified with previous inadequate treatment. There are different explanations for inadequate treatment. It may be due to inappropriate chemotherapy regimens, inadequate or irregular drug supply, unsatisfactory patients or clinicians compliance, lack of supervision of treatment and absence of infection control measures in hospitals.^{6,10,17}

Immigration This has been documented as one factor leading to the increased resistance rate of TB in some countries.^{11,18-20} Factors contributing to increased prevalence of drug resistance in immigrants are believed to be lack of access to health care services and inappropriate working and housing conditions. In certain studies,^{21,22} risk of resistance to anti-TB drugs has been reported to be 3- to 10- folds higher in immigrant than non-immigrant population. In another study,²³ 50% of TB cases in immigrant population had isolates that were resistant to at least one of the standard five drugs, and almost 17% were MDR-TB.

Age Age has been found to be independently associated with drug resistance and there was significantly higher proportion of MDR-TB among the age group of 45-64 years.¹⁵ Faustini et al. found that MDR-TB was more likely in patients under 65 years, but the association was weak and more heterogeneous in patients under 45.²⁴ Another study conducted by Espinal et al. found that MDR-TB were more prevalent among age group 35–64 years old.²⁵

Sex There is no clear association between MDR-TB and sex; however, some studies have shown that male sex may act as significant risk factor for MDR.²⁶ It has been hypothesized that women are more compliant with treatment and therefore less likely to receive

inadequate treatment.²⁴ In contrary to MDR-TB patients, female gender has been found as a significant risk factor in XDR-TB patients; this was attributed to the delayed referral of female patients to hospitals because of certain social factors.²⁷ Further studies are recommended to better understand the role of gender in drug-resistant TB.

HIV HIV infection is not an independent risk factor for development of MDR-TB.^{15,28} However, HIV infection has been shown to influence MDR-TB by favoring the risk of transmission of multidrug-resistant strains of MTB.²⁹⁻³¹

Alcoholism It has been identified to enhance default and failure rates among new TB cases. Hence, it increases the rate of MDR-TB cases.^{6,32-34}

Diabetes mellitus (DM) DM patients are prone to higher incidence of TB drug resistance.³⁴⁻³⁶

Socio-economic factors There are other socio-economic factors like drug abuse, poverty and homelessness that may induce treatment failure and subsequently emergence of drug resistance TB.^{6,30-39}

MDR-TB, XDR-TB and TDR-TB: What to do?

According to Centre for Disease Control (CDC) and the WHO, a survey was conducted based on an international network of TB laboratories for year 2000 – 2004. The result showed that 20% and 2% of MTB isolates were MDR and XDR, respectively. Additionally it was reported that the total number and proportion of XDR-TB isolates observed worldwide (excluding South Korea) increased from 14 (5% of MDR-TB isolates) in 2000 to 34 (7% of MDR-TB isolates) in 2004.⁴⁰

In order to reverse the increasing trend in drug-resistant TB, effective treatment, control and prevention of emergence and transmission of drug-resistant TB are required in all countries. The WHO recommended that the best way to prevent emergence of drug-resistant TB is to encourage adoption of Directly Observed

Therapy Short-Course (DOTS) programme. The programme involves giving effective and regular anti-TB drug supply, government security and financing commitment, case detection and diagnosis by smear microscopy, and monitoring the performance and outcome.^{41,42} Nevertheless, failure of treatment may occur due to many factors, resulting in emergence of MDR-TB. In the case of drug-resistant TB in general and MDR-TB in particular, the WHO established DOTS-Plus within the context of basic DOTS programme. The programme relies on quality-assured and internationally recommended treatment regimens administered under strict supervision that must be scaled up and strengthened to prevent spread of drug-resistant strains i.e. MDR-TB and XDR-TB. Strictly speaking the goal of DOTS-Plus is to prevent further development and spread of MDR-TB.⁴³ The emergence of MDR-TB strains is of great concern, because it requires the use of second line drugs that are less efficient, much more toxic and expensive than the first line regimen.⁴ It is noteworthy that the lengthy treatment course of drug-resistant TB results in complexity and problematic treatment outcome. This can be explained by prolonged time of diagnosis, difficult adherence to treatment and some default from treatment. For these reasons, more aggressive form of drug resistant-TB emerges i.e. XDR-TB, TDR-TB. XDR-TB treatment is much more difficult and costly than MDR-TB. Furthermore, the treatment outcome is found to be significantly worse than that of other MDR-TB cases.^{3,28,44}

Although drug-resistant TB (MDR-TB and XDR-TB) is a critical risk to patient life, yet treatment is feasible and cost effective if WHO guidelines are followed, with cure rates of up to 80% among multidrug-resistant cases and up to 60% among extensively drug-resistant cases in low-resource settings. Inappropriate treatment that is not in line with the recommended guidelines runs the

risk of raising mortality; increasing resistance and spreading resistance even further.⁴⁵

The newly emerging form of drug-resistant TB strains (TDR-TB) is potentially untreatable since they are resistant to all first-line drugs and to the six second-line classes. TDR-TB constitutes a deadly threat to the affected patients because we do not know how to treat these patients and what kind of combination should we use⁹ The current un-effective anti-TB drugs for such patients increase the complexity of the situation, and perplexing TB treatment 60 years back to the era before antibiotics.

Overall, XDR-TB^{2,46} and TDR-TB⁹ constitute an emerging threat for TB control and the further spread of drug resistance. It has been stated that drug-resistant TB is equally infectious as drug-susceptible TB.⁴⁷ One of the important factors that facilitate transmission of drug resistant TB is HIV infected patients; such patients have a rapid progressive course to fatal disease.²⁸ Therefore, drug-resistant TB patients co-infected with HIV should be diagnosed quickly and prompt combination treatment commenced.^{48,49} This is important to prevent further transmission of drug-resistant strains. Finally, rapid detection of drug resistance to both first- and second line anti-TB drugs is a key component of TB control programs.

CONCLUSION

It is important to recognise the growing global challenges of TB as a result of current global resurgence of the disease and progress in emergence of drug-resistant TB i.e. MDR-TB, and especially XDR-TB and TDR-TB. Additionally, the drug-resistant TB and HIV association has increased the complexity of the situation. It is highly recommended to strictly follow the appropriate WHO treatment guidelines, to ensure adequate success rate of treatment in drug-susceptible and drug-

resistant strains; this will limit emergence of resistant strains and prevent spread of the disease. The emergence of aggressive new forms of drug-resistant TB is worrying that requires reinforcement of control measures. This demands special attention to case detection and prompt treatment of MDR-TB, XDR-TB, and TDR-TB to prevent transmission of the disease and further development of drug-resistant strains beyond this stage. A prospective population-based surveillance encompassing all regions of the world is warranted with the implementation of standardized protocols to further understand trends of drug resistance.

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THE APPLICATION OF THE AMPLIFICATION REFRACTORY MUTATION SYSTEM (ARMS) FOR CHARACTERIZATION β -THALASSEMIA MUTATIONS IN DUHOK

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ABSTRACT

Background and Objectives β -thalassemias are important health problems in Duhok governorate, requiring establishing proper control programs, based in screening, counseling and prenatal diagnosis. Such programs should be reliable and cost effective. Amplification refractory mutation system-polymerase chain reaction (ARMS-PCR) is the cornerstone of such programs worldwide. However, such technology has not been yet applied in our country. The aim of the study is introducing ARMS-PCR technique and applying it to the molecular characterization of β -thalassemia in the province.

Methods A total of 68 unrelated patients with thalassemia major/intermedia were screened for eight main thal mutations namely : IVS-II-1 (G>A), Codon 44 (-C), IVS-I-1 (G>A), Codon 5 (-CT), IVS-I-6 (T>C), IVS-I-5 (G>C), Codon 39 (C>T) and Codon 8/9 (+G) sequentially, using ARMS-PCR method. Uncharacterized cases were further evaluated using Multiplex PCR-Reverse hybridization.

Results ARMS-PCR allowed the full characterization of 85.3%. If ARMS is followed by RH then 97% of cases will be fully characterized. The most common mutation identified were IVS-II-1, Codon 44, IVS-I-6 and Codon 39. In 40 cases where PCR-Reverse hybridization as well as ARMS were available the concordance rate was 100%.

Conclusion The use of ARMS-PCR for the above eight mutations is a feasible, cost effective and a reliable technique and should be advocated as the first line molecular diagnostic tool for characterization of β -thal as part of our regional control program for this disorder.

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Key words: β -thalassemia mutations, ARMS, IVSII.1, Codon 44, Codon 39, kurds, Iraq

β -thalassemias (thal) are inherited defects in the rate of synthesis of β globin chains of hemoglobin, that are widely distributed throughout the world, with considerable frequencies in the Eastern Mediterranean countries, including Iraq.¹⁻³ The northern province of Duhok

covers an area of around 6500 square kilometers with a population of around a million of mostly ethnic Kurds. Thalassemia major/Intermedia are important health problems in this province with more than 350 registered patients. The huge burden imposed on the health

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authorities and on the patients and their families mandates that a proper preventive program is established in this region. The preventive program is based on the principle of premarital screening for thalassemia carrier state, followed by genetic counseling for the couples at risk and prenatal diagnosis.⁴ The latter requires performing molecular studies on the parents and on a chorionic villus sample obtained in early pregnancy. Two previous studies have already determined the molecular basis of thalassemia in Duhok using Multiplex PCR followed by reverse hybridization using commercial kits, which is an expensive procedure.^{5,6} An alternative more cost effective and reliable method employed in a similar context in most countries worldwide is the Amplification refractory mutation system (ARMS). The latter is a PCR-based method utilizing allele specific priming, where specific wild and mutant primers are used in two separate reaction tubes to determine whether a particular mutation is present (in hetero or homozygous state) or it is absent.⁷ The technique has not been previously applied in our country, and this study was aimed at introducing this technique and applying it to the molecular characterization of β -thalassemia in the province.

METHODS

A total of 68 unrelated β -thal major/intermedia patients registered at Duhok thal care center, northern Iraq, were recruited. The patients were all ethnic Kurds, with ages ranging between 1 and 36 years (median age of 8 years). They included 38 males and 30 females. Informed consent was obtained from all subjects, and the study was approved by the research council of college of Education, Duhok University, Iraq. A 5 mL sample was aspirated by venipuncture from each subject, anti-coagulated in EDTA, frozen and then at the appropriate time had its DNA extracted by a phenol-

chloroform based method.

Amplification refractory mutation system (ARMS) was thereafter used for the detection of 8 β -thal mutations namely: IVSII-I, Codon 44, Codon 5, Codon 39, IVS1-5, IVS1-6, IVS1-1 and Codons 8/9. ARMS for these 8 mutations was performed sequentially for all samples until homozygous or compound heterozygous state was confirmed and then further testing was discontinued.

The components required for ARMS-PCR reaction were 10x ARMS-PCR buffer, dNTP mixture (Promega-USA), set of Internal primer, sets (forward and reverse) for wild or mutant primers (MWG-Germany), deionized distilled water (DDW), and Taq DNA polymerase (Promega-USA). The program using MWG primus-25 thermocycler (Germany) was set as follows : Pre-PCR 94° C for 2 minutes. Then 30 cycles of denaturation 94° C 1 minute, annealing 65° C 1 minute and extension 72° C 1.5 minutes, followed by final extension at 72° C for 3 minutes. The sequences of primers used are listed in Table (1). The amplified products of all experiments were run on 2% agarose gel in a horizontal submerged tank (Amersham – USA) at 5 volt/cm, stained by ethidium bromide and resulting bands visualized under UV light and photo-documented. As controls stored DNA of documented cases of heterozygous, homozygous and non-carriers of a particular mutation were handled in the same way as the tested DNA. All controls have been documented by reverse hybridization using commercial kits by earlier studies^{5,6} at the Hematology department at Azadi Teaching Hospital – Duhok.

For samples which were not fully characterized by use the ARMS protocol, Reverse Hybridization using specific immobilized probes for 22 β -gene mutations following multiplex PCR was used (Vienna Lab-Austria). These mutations include (-87 (C>G), -20(T>A), Cd5 (-CT), Hemoglobin C, Hemoglobin S,

Codon 6 (-A), Codon 8 (-AA), Codons 8/9 (+G), Codon 22 (7bp del), Codon 30 (G>C), IVS-I-1 (G>A), IVS-I-II (T>A), IVS-I-5 (G>C), IVS-I-6 (T>C), IVS-I-110 (G>A), IVS-I-116(T>G), IVS-I-25 (25bp del), Codons 36/37 (-T), Codon 39 (C>T), Codon 44 (-C), IVS-II-1 (G>A), IVS-II-745 (C>G). The components of the multiplex PCR reaction provided by the manufacturer included: diluted Taq DNA polymerase, pre-prepared amplification mix which included 3 sets of primers, dNTPs and reaction buffer to which template DNA was added. The reaction mixtures were placed in the thermocycler (MWG primus-25, Germany) and the program was set at : Pre-PCR 94° C for 2 minutes, 35 cycles of denaturation 94° C for 10 sec, annealing 54° C for 15 sec and extension 72° C for 45 sec, followed by final extension at 72° C for 3 minutes. Hybridization of amplification products to test strips containing allele-specific oligonucleotide probes immobilized as an array of parallel lines was then performed. Bound biotinylated sequences were detected using streptavidin-alkaline phosphatase and color substrates. The results were read using manufacturer provided charts.

The concordance rate between results of ARMS and RH was calculated in 40 of the 68 cases enrolled who had both procedures done.

The study also included attempts to use more than one set of primers in a single reaction (Multiplexing). The basic principle was to use primers which produce different sized amplicons, so that the results could be properly interpreted. Multiplexing two and three sets of primers was attempted.

RESULTS

Figures 1-5, show examples of gel electrophoresis following ARMS PCR for IVS-II-1, Codon 44, IVS-I-1, Codon 39

and IVS-I-6. The gels show clear differentiation between homozygotes, heterozygotes and non-carriers of particular mutations.

Among 68 β -thal patients investigated, a total of 32 different genotypes were identified. Using the eight sets of ARMS primers a total of 58/68 cases (85.3%) were fully characterized (both alleles), another 7 (10.3%) were partially characterized (only one allele), while another 3 were uncharacterized (4.4%) (neither allele was characterized). Reverse hybridization was applied to the 10 latter cases and it managed to fully characterized 6 of the partially characterized cases and two of the uncharacterized cases.

Among 40 cases who had both ARMS and RH done, the concordance rates between results were 100%.

Table 2 outlines the 32 genotypes detected in the current study and shows that 36 patients were homozygous, while 32 were compound heterozygous. The most frequent homozygous genotypes were those for IVS-II-1 followed by Codon 44, IVS-I-6 and Codon 39 respectively. While the most common compound heterozygous states were for IVS-II-1 or Codon 44 with other less frequent mutations.

Table 3 outlines the frequencies of each particular mutation and shows that the most frequent is IVS-II-1 seen in 26.5% followed by Codon 44, Codon 39 and IVS-I-6 at 16.2% 13.2% and 11% respectively.

Multiplexing of Codon 44 and IVS-II-1 in a single reaction and of Codon 39 and IVS-I-6 in another, which are the four most common mutations in the current study was successful (Figures 6 and 7). These four mutations constitute more than two thirds of the mutations in the current study. This would reduce the number of reactions needed in screening for thal mutations in particular patients.

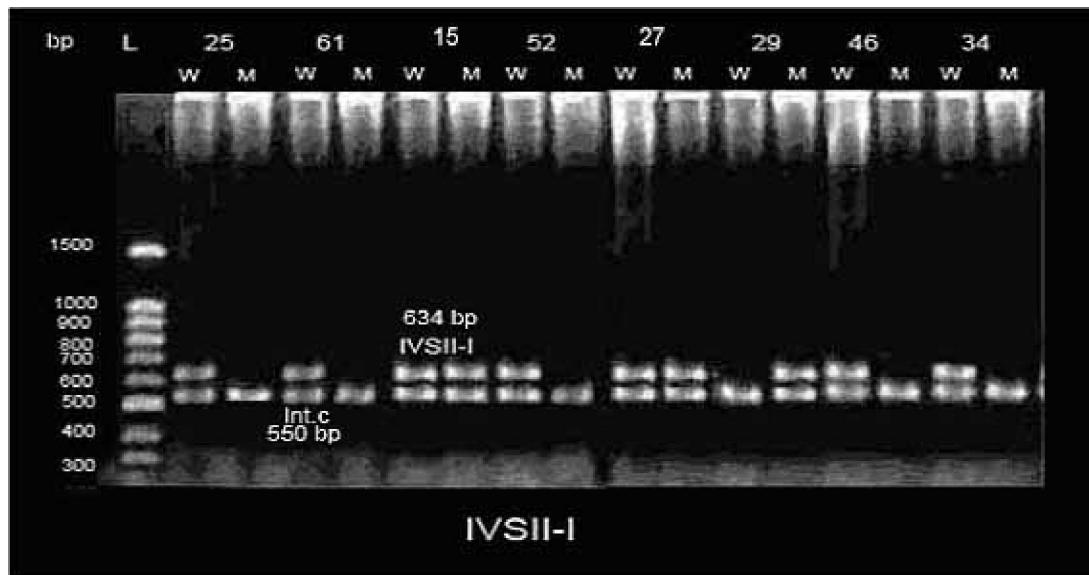


Figure 1. Agarose gel electrophoreses following ARMS-PCR for the wild (W) and mutant (M) IVSII-1 Primer each with internal control primers. The internal control shows a 550 bp band, while a 634 bp band is seen if the mutant or wild alleles are present. Case 29 is homozygous for IVSII-1; cases 15 and 27 are heterozygous, while the others were non-carriers

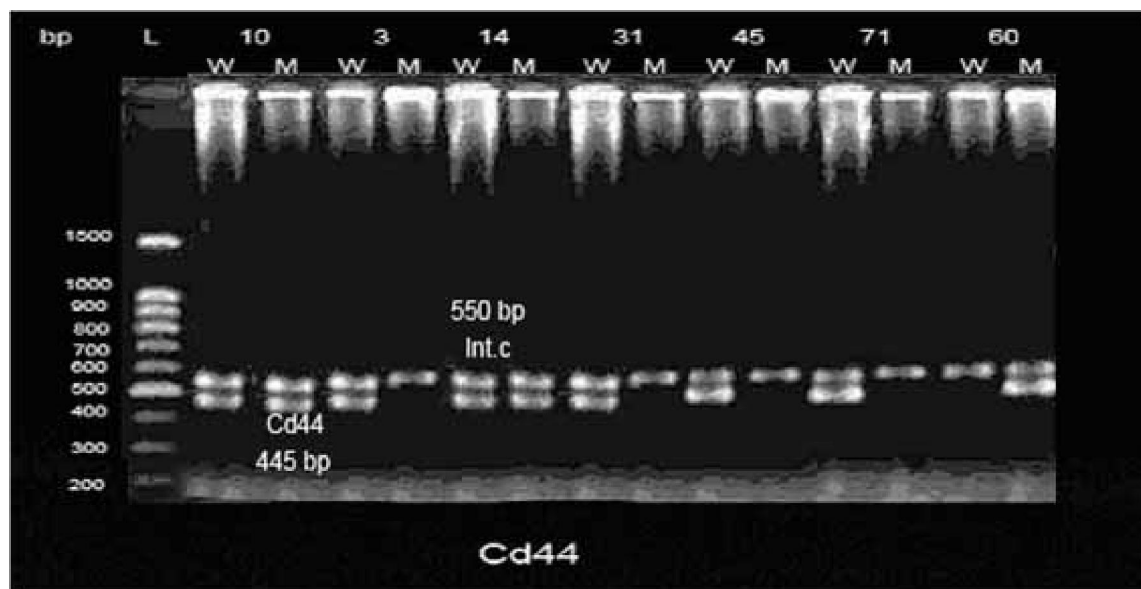


Figure 2. Agarose gel electrophoreses following ARMS-PCR for the wild (W) and mutant (M) Codon 44 primer each with internal control primers. The internal control shows a 550 bp band, while a 445 bp band is seen if the mutant or wild alleles are present.. This Figure shows case 60 is homozygous for Cd44; cases 10, and 14 are heterozygous, while cases 3, 31, 45, and 71 were non carriers

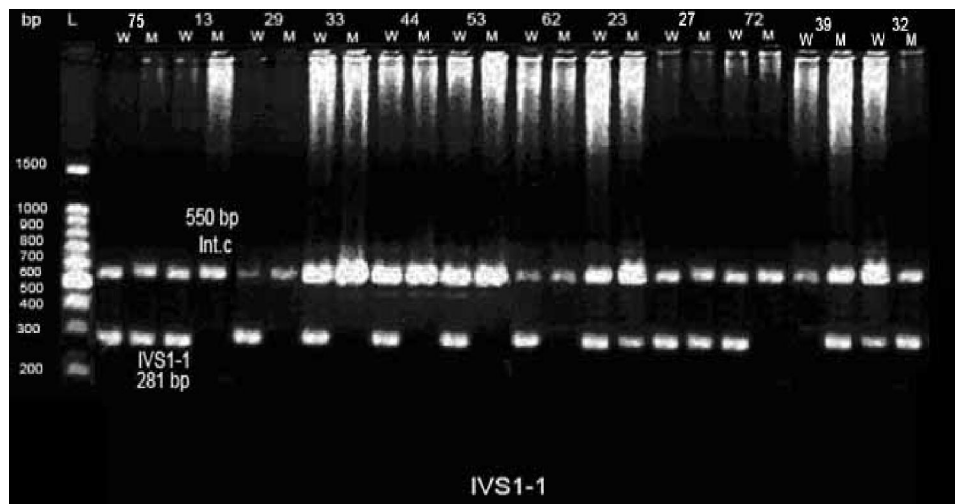


Figure 3. Agarose gel electrophoreses following ARMS-PCR for the wild (W) and mutant (M) IVS-I-I primer each with internal control primers. The internal control shows a 550 bp band, while a 281 bp band is seen if the mutant or wild alleles are present. Cases 75, 23, 27 and 32 are heterozygous for IVSI-1, while case 39 is homozygous. Cases (13, 29, 33, 44, 53, 62, and 72 are non-carriers (normal)

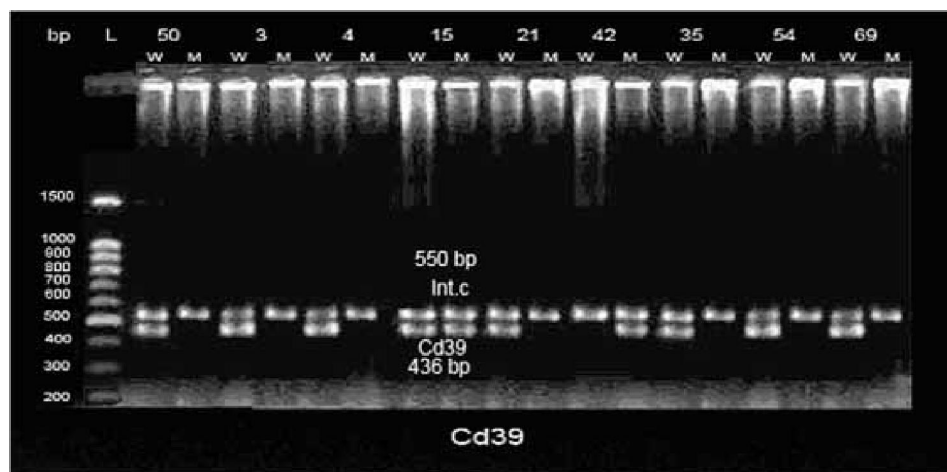


Figure 4. Agarose gel electrophoreses following ARMS-PCR for the wild (W) and mutant (M) codon 39 primer each with internal control primers. The internal control shows a 550 bp band, while a 436 bp band is seen if the mutant or wild alleles are present. This Figure shows case 42 is homozygous for Cd39; case 15 is heterozygous, while the others non carriers

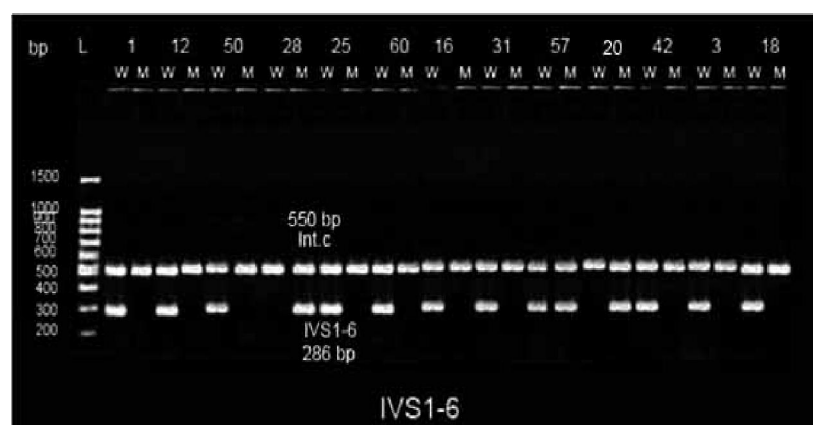


Figure 5. Agarose gel electrophoreses following ARMS-PCR for the wild (W) and mutant (M) IVS-I-6 primer each with internal control primers. The internal control shows a 550 bp band, while a 286 bp band is seen if the mutant or wild alleles are present. This Figure shows cases 28, and 20 are homozygous for IVSI-6; case 57 is heterozygous, while the others non carriers

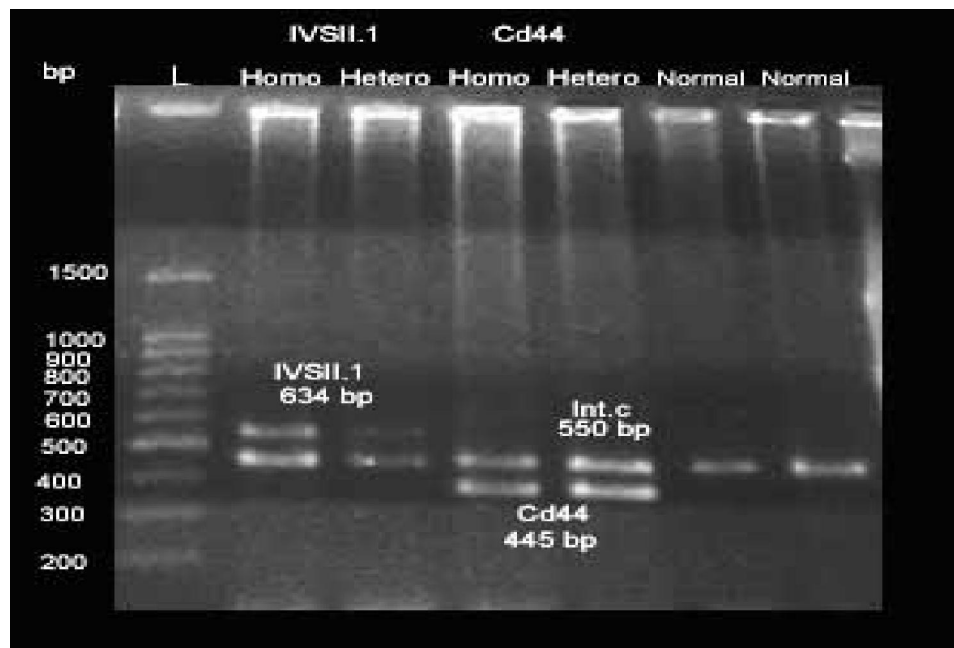


Figure 6. Amplification with the multiplex mutant primer sets for IVS-II-1 and Cd44, applied to homozygotes and heterozygotes for these mutations respectively, compared to their application in non-carriers (Normal)

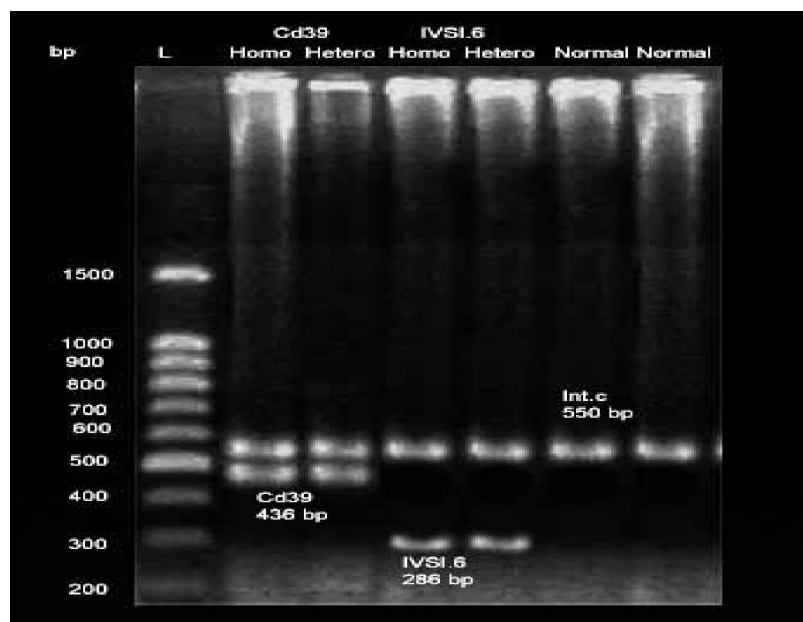


Figure 7. Amplification with the multiplex mutant primer sets for IVS1.6 and Cd39, applied to homozygotes and heterozygotes for these mutation as well as non-carriers (Normal)

Table 1. ARMS-PCR primer sets used for detection of eight main thal mutations in the current study (8,9)

A.	Internal control Primers for all PCR	
Forward	5'-GAAGATCTAGACAGTGGATACATAACAAATGCATG-3'	
Reverse	5'-TTCTCCGAAGGTAATTGCCTCCCAGATCTGAGTCC-3'	
B.	Common Primers	
ARM1	5'-TACGGC TGT CAT CAC TTA GAC CTC ACC CTG-3'	
Common C	5'-ACC TCA CCC TGT GGA GCC AC -3'	
Primer A	5'-CCC CTT CCT ATG ACA TGA ACT TAA-3'	
C.	Forward Primers	Reverse Primers
IVSI-1 (AC) Wild	5'-TTA AAC CTG TCT TGT AAC CTT GAT ACG AAC-3'	ARM1or Common C
IVSI-1 (-AT) Mut	5'-TTA AAC CTG TCT TGT AAC CTT GAT ACG AAT-3'	ARM1or Common C
IVSII-1(-AC)Wild	5'-AAG AAA ACA TCA AGG GTC CCA TAG ACT GAC-3'	ARM1or Common C
IVSII-1(-AT) Mut	5'-AAG AAA ACA TCA AGG GTC CCA TAG ACT GAT-3'	ARM1or Common C
IVSI-5 (-AC) Wild	5'-CTC CTT AAA CCT GTC TTG TAA CCT TGT TAC -3'	ARM1or Common C
IVSI-5 (-AG) Mut	5'-CTC CTT AAA CCT GTC TTG TAA CCT TGT TAG -3'	ARM1or Common C
IVSI-6 (-TA) Wild	5'-TCT CCT TAA ACC TGT CTT GTA ACC TTC ATA-3'	ARM1or Common C
IVSI-6 (-TG) Mut	5'-TCT CCT TAA ACC TGT CTT GTA ACC TTC ATG-3'	ARM1or Common C
Cd5 (-CT) Wild	5'-ACC ACA GAC ACC ATG GTG CAC CTG ACT CCT -3'	Primer A
Cd5 (-CG) Mut	5'-TCA AAC AGA CAC CAT GGT GCA CCT GAG TCG -3'	Primer A
Cd 39 (-TG) Wild	5'-CAG ATC CCC AAA GGA CTC AA GAA CCT GTG-3'	ARM1or Common C
Cd 39 (-TA) Mut	5'-CAG ATC CCC AAA GGA CTC AAA GAA CCT GTA-3'	ARM1or Common C
Cd44 (-GG) Wild	5'-AGC ATC AGG AGT GGA CAG ATC CCC AAT GG-3'	ARM1or Common C
Cd44 (-GA) Mut	5'-CAG CAT CAG GAG TGG ACA GAT CCC CAA TGA-3'	ARM1or Common C
Cd8/9(-CT) Wild	5'-CCT TGC CCC ACA GGG CAG TAA CGG CAC ACT -3'	Primer A
Cd8/9 (-CC) Mut	5'-CCT TGC CCC ACA GGG CAG TAA CGG CAC ACC -3'	Primer A

Table 2. β -thalassemia genotypes among 68 thalassemic patients enrolled in the current study

	Genotype	Number (%)	Characterized by
Homozygous			
1	IVSII.1 (G>A)/ IVSII.1 (G>A)	13	ARMS
2	Codon 44 (-C)/ Codon 44 (-C)	6	ARMS
3	IVSI.6 (T>C) / IVSI.6 (T>C)	6	ARMS
4	Codon 39(C>T)/ Codon 39(C>T)	5	ARMS
5	IVSI.1 (G>A)/ IVSI.1 (G>A)	2	ARMS
6	Codon 8 (-AA)/ Codon 8 (-AA)	2	ARMS>RH
7	Codon 5 (-CT)/ Codon 5 (-CT)	1	ARMS
8	IVSI.5 (G>C) / IVSI.5 (G>C)	1	ARMS
Compound Heterozygous			
9	IVSII.1 (G>A)/ IVSI.1 (G>A)	3	ARMS
10	Codon 8/9 (+G)/IVSI.1 (G>A)	3	ARMS
11	Codon 44 (-C)/ codon 5 (-CT)	3	ARMS
12	codon 44 (-C)/IVSI.5 (G>C)	2	ARMS
13	Codon 44(-C)/Codon 39 (C>T)	2	ARMS
14	IVSII.1 (G>A) / Codon 8 (-AA)	1	ARMS > RH
15	Codon 8/9 (+G)/ Codon 5 (-CT)	1	ARMS
16	IVSII.1 (G>A)/ Codon 44(-C)	1	ARMS
17	IVSII.1 (G>A)/ Codon 8/9 (+G)	1	ARMS
18	IVSII.1 (G>A)/ Codon 39 (C>T)	1	ARMS
19	IVSII.1 (G>A)/ Codon 5 (-CT)	1	ARMS
20	IVSII.1 (G>A)/ IVSI.6 (T>C)	1	ARMS
21	IVS.I.5 (G>C)/codon 8/9 (+G)	1	ARMS
22	IVSI.6 (T>C)/-30	1	ARMS > RH
23	IVS I.6 (T>C)/Codon 8 (-AA)	1	ARMS >RH
24	IVSI.1 (G>A) / Codon39 (C>T)	1	ARMS
25	Codon 39 (C>T) / codon 22 (-7bp)	1	ARMS>RH
26	IVSII.1 (G>A)/codon 30 (G>C)	1	ARMS>RH
27	IVSI.5 (G>C)/ codon 8 (-AA)	1	ARMS>RH
28	Codon 39 (C>T)/ codon 5 (-CT)	1	ARMS
29	Codon 39(C>T)/ Codon 8/9 (+G)	1	ARMS
30	Codon 44 (-C) / codon 8/9 (+G)	1	ARMS
31	Codon 44/Uncharacterized	1	ARMS>RH>*
32	Uncharacterized/Uncharacterized	1	ARMS>RH>*
Total		68	

*sequencing required.

Table 3. The distribution of various β -thalassemia mutations among 136 chromosomes, as characterized by ARMS and RH

Mutation	No. of chromosomes	%
IVSII.1 (G>A)	36	26.5
Codon 44 (-C)	22	16.2
Codon 39 (C>T)	18	13.2
IVSI.6 (T>C)	15	11.0
IVSI.1 (G>A)	11	8.1
Codon 8/9 (+G)	8	5.9
Codon 5 (-CT)	8	5.9
Codon 8 (-AA)	7	5.1
IVSI.5 (G>C)	6	4.4
Codon 22 (-7bp)	1	0.7
Codon 30 (G>C)	1	0.7
Uncharacterized	3	2.2
Total	136	

DISCUSSION

Although there are more than 200 different mutations responsible for β thal, however in any given population, it is not necessary to screen patients for all possible mutations. Most populations or ethnic groups have been found to have only a small number of these mutations.¹⁰ Thus an initial starting point in any thal control program is to determine which mutations are common in that population. Such a study has already been conducted in Duhok, and it was found that 8 mutations were responsible for the more than 80% of thal alleles.⁵ The technique employed for the detection of these mutation by the latter study was Multiplex PCR followed by reverse hybridization, which is reliable but quite expensive procedure. An alternative approach employed in many throughout the world and particularly in the context of thal control program is the amplification Refractory mutation systems (ARMS) PCR. The latter approach is known to be reliable and cost effective and is quite suitable particularly if the most common mutations in the population in question are known.¹⁰ The current study which is the first from Iraq, applied ARMS-PCR for the 8 most common mutations in Duhok and it managed to characterize fully around 85% of patients and partially in another 10%. This observation indicates that this approach is quite appropriate for regular screening and characterization of thal in our population. Moreover, the bands observed and differentiation between homo and heterozygous states was quite clear and in the 40 cases who already had RH done the concordance rate was 100%. The estimated cost of performing ARMS is < 10% of that of RH. The cost would be further cut if multiplexing, which was found to be feasible by the current study, for the 4 most common mutations was done.

The finding that the IVS-II-1 mutation is the most frequent mutation identified in our patients is not unexpected, since it was found to be the most frequent mutation in earlier studies from Duhok and Erbil and in almost all Iranian studies particularly those performed in Northwestern Iran and among Iranian Kurds.^{5,6,12-14} It may be prudent to speculate that the latter mutation may have spread to our region by gene flow from neighboring Iran and actually the higher frequency of IVS-II-1 in Iran, compared to its neighbors has led some investigators to speculate that this mutation may have originated or have undergone more efficient selection there.¹²

The second most common mutation is codon 44, which has been labeled as a Kurdish mutation,¹⁵ which was also the second most common mutation in earlier studies from Duhok but was only sporadically reported in Erbil and among Iranian Kurds.^{5,6,14} This emphasizes the regional variation in mutation distribution among Kurds and supports the notion that the latter mutation maybe of recent origin, originating in the Duhok region, probably in the last 2000+ years, following the Kurdish settlement in the region.

Codon 39 is a Mediterranean β^0 mutation which is common mainly in the Western Mediterranean, and its frequency decreases as we move to the east except for high frequencies in Saudi Arabia and Bahrain,¹⁶ and its high frequency among our patients is not quite expected, as it is not shared by the Kurds of Southeastern Turkey or Western Iran at 2.8% and 1.7% respectively.^{14,17}

Another common mutation characterized was IVS1.6, which is mild β^+ Mediterranean mutation, with frequencies varying in eastern Mediterranean populations between a low of 1.1% in Iranians to 28.7% in Palestinian Arabs.^{12,16,18} Our figure of 11% is higher than our earlier observation and is mainly

due to inclusion of cases of β -thal intermedia in the current study, which contributed all six homozygous IVSI-6 patient included in the current study, while earlier studies focused on transfusion dependent patients or their parents.

This study which is first from Iraq on the application of ARMS-PCR for the characterization of β -thal, revealed that this approach is feasible, cost effective and reliable. Furthermore, applying the various primers sets sequentially and use of multiplexing would further cut costs. We propose and based on the results of the current study that ARMS-PCR would be applied as the first line procedure for characterization of β -thal in Duhok, and that PCR-RH use be restricted to those cases where ARMS fails to achieve full characterization.

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پوخته

کارئینانا ریځا ARMS-PCR ل دهستنیشانکړنا نه خوشیا کیم بوونا خوینی دهریا نافهراست ئیک ل دهقرا دهوکی

پیشه کی و نارمانچ: دهستنیشانکړنا نه خوشیا کیم بوونا خوینی دهریا نافهراست ئیک ل ئاسته نگیټ مه زن لپارېزگه ها دهوکی. بودهستنیشانکړن و چاره سه رکړنا څان ئاسته نگاپوېسته بکارئینانا هندیځ پروگرامیټ باوه رپیځری و هه رزان بیت. ئو پروگرامیټ باوه رپیځری لجهانی بکارئینانا ریځا ARMS-PCR و ریځا Reverse Hybridization ل دهقرا دهوکی.

ریځن څه کولینی: تاقیکرنا شپست و هه شت نه خوشیا کیم بوونا خوینی دهریا نافهراست مه زن و نافنجی لڅیزانیت جیواز دگه ل ده سپیکټ هه شتی (IVSI-1, IVSII-1, IVSI-5, IVSI-6, Cd5, Cd39, Cd44, and Cd8/9) بکارئینانا ریځا ARMS-PCR وه ئو یت نه هاته دهستنیشانکړن بریځا ARMS-PCR دیه یته تاقیکرنا بریځا Reverse Hybridization.

نه نجام: هاته دهستنیشان 85.3% ل نه خوشیا بکارئینانا ریځا ARMS-PCR وه ئو یت نه هاته دهستنیشانکړن بریځا ARMS-PCR هاته دهستنیشانکړن بریځا Reverse Hybridization بقیجوری 97% ل نه خوشیا هاته دهستنیشانکړن. ده رکت کو پتر یا گهورینا به ربه لاف نه څه بوون (IVS-II-1, Codon 44, Codon 39 and IVS-I-6). ریځه ی ریځکه فتنا هه ردو ریځیت ARMS-PCR و Multiplex Reverse Hybridization 100% بوو کاتی بکارئینانا وان لسه ر 40 نه خوش لکوژمی نه خوشا.

دهر نه نجام: بکارئینانا ریځا ARMS-PCR دگه ل ده سپیکټ هه شتی ئو یت نافی وان هاتی لسه رځه باشن، ئه رزان وه باوه رپیځرینه بوو دهستنیشانکړنا نه خوشیا. دهر نه نجام پیشنیار دکه ین بکارئینانا ARMS-PCR بوو کونترول و دهستنیشانکړن څان نه خوشیا ل دهقرا مه.

الخلاصة

تطبيق تقنية ARMS-PCR و استعمالها في تشخيص حالات الثلاسيميا في محافظة دهوك

خلفية واهداف البحث: يعد مرض الثلاسيميا من المشاكل الصحية الهامة في محافظة دهوك و حل هذه المعضلة يتطلب تثبيت برامج سيطرة مناسبة، تعتمد على المسح، الاستشارة و التشخيص قبل الولادة. مثل هذه البرامج يجب ان تكون معتمدة و قليلة الكلفة. إن الركن الأساسي لمثل هذه البرامج عالميا هو استخدام نظام الممانعة للتضاعف ARMS-PCR علما ان هذه التقنيات لم تحض نصيبا في التطبيق في المنطقة. الهدف من الدراسة هو تطبيق تقنية ARMS-PCR و استعمالها في تشخيص حالات الثلاسيميا في محافظة دهوك.

طرق البحث: تم مسح ثمانية و ستون مريض من عوائل مختلفة مصابون بمرض الثلاسيميا الكبرى و الوسطى باستخدام نظام الممانعة للتضاعف ARMS مع مجموعة ثمانية بادئات (IVSI-1, IVSII-1, IVSI-5, IVSI-6, Cd5, Cd39, Cd44, and Cd8/9) والتي كانت الأكثر شيوعا من انواع طفرات الثلاسيميا من نوع β المسجلة في محافظة دهوك. استخدمت طريقة التهجين العكسي multiplex PCR-Reverse Hybridization للحالات غير المشخصة بطريقة ARMS.

النتائج: نظام الممانعة للتضاعف ARMS-PCR استطاع من تشخيص 85.3% من الحالات بينما استخدمت طريقة التهجين العكسي للحالات لم تشخص بال ARMS-PCR و هكذا تم تشخيص 97% من الحالات. كانت أكثر طفرات شيوعا هم (IVS-II-1, Codon 44, Codon 39 and IVS-I-6). هذا و قد كانت نسبة التوافق بين نظام الممانعة للتضاعف و التهجين العكسي 100% عندما طبق على 40 حالة من مجمل الحالات.

الاستنتاج: ان استخدام تقنية ARMS-PCR للطفرات الثمانية اعلاه كانت ملائمة و ذات كلفة مناسبة و موثوقة و يجب ان تكون لهذه التقنية الاولوية في التشخيص الجزيئي في البرامج المستخدمة للسيطرة و الكشف على هذا المرض في منطقتنا.

VALIDITY AND RELIABILITY OF OSCE IN EVALUATING PRACTICAL
PERFORMANCE SKILLS OF INTERNS IN EMERGENCY MEDICINE

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ABSTRACT

Background and Objectives There is an increasing tendency to use Objective Structured Clinical Examination (OSCE) as an evaluative tool of clinical performance and competence and as a certification tool. However, hesitancy and concerns about its validity, reliability and feasibility do exist in many parts of the world. The objectives of the present study were to determine the validity and reliability of OSCE as an assessment tool in the assessment of interns' emergency medicine performance skills.

Methods A well organized comprehensive nine OSCE stations were chosen to assess the practical skills of an entire cohort of the Duhok College of Medicine 2008/09 graduates serving as interns in Duhok teaching hospitals at the time the study was conducted. The practical performance skill of a randomly selected sample of 21 interns was assessed by OSCE after having subjected to a task-based training course on emergency medicine procedures performance. Both, predictive and concurrent validity, as well as intra- and inter-rater reliability of OSCE as an assessment tool were measured.

Results Both the predictive and concurrent validity of the OSCE were highly significant ($r = 0.784$, $p < 0.001$; and $r = 0.880$, $p < 0.001$ respectively). The intra- and inter-reliability results of the OSCE tool were significant as well ($r = 0.810$, $p < 0.001$; and $r = 0.927$, $p < 0.001$, respectively).

Conclusion The OSCE is valid and reliable practical assessment tool and yields dependable information about the performance capabilities of individual interns. Moreover, it can provide a reasonable feedback about the quality of undergraduate medical education.

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Key words: OSCE, Validity, Reliability, Assessment, Duhok, Emergency medicine procedures

The primary objective of any training program is to produce qualified practitioners. The performance of trainees is mainly judged by subjective faculty evaluation and standardized multiple choice question tests.¹ This type of assessment program is problematic for two reasons. First, subjective faculty evaluations are unreliable² and tend to inflate trainees performance.³⁻⁵ Second, multiple-choice examinations, although very reliable, assess only a single

dimension of clinical competence, that is, knowledge base. Other important aspects of clinical expertise, such as physical examination skills, technical skills, problem-solving abilities, doctor-patient communication skills, decision-making abilities, and patient treatment skills are not assessed objectively.³⁻⁵

Recently, clinicians have focused on the Objective Structured Clinical Examination (OSCE) as a multidimensional practical examination of

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clinical skills, and as a tool for assessing clinical competence.⁶ Although most of the information on the OSCE has been gained from experience with medical students, a handful of studies have shown the value of this tool in assessing the performance of interns.¹ This evaluative method has now become as the premiere method for assessing clinical competence.^{7,8} In Canada, for example, all physicians must now pass the OSCE if they are to be licensed by the Medical Council of Canada.⁸ Nevertheless, there is no universal agreement that conventional assessment methods must be abandoned and replaced by such performance-based tests.⁹

OSCE provides information on graduates' clinical competence different from that provided by conventional assessment tools used by the college. Numerous competency deficits are uncovered by the OSCE. Also, studies found that medical graduates enter their internship with weak clinical skills.¹⁰⁻¹²

The OSCE consists of multiple stations testing examinees for a variety of practical skills. At each station, a rater (examiner) assesses the performance of the examinees using checklists that are uniformly used for examinees.¹³ It links a set of competencies to clinical situations in a simulated form, which makes it easier to measure these competencies.¹⁴

In spite of an intensive search for local studies, such an assessment of an entire cohort of interns has not been performed in medical colleges of Kurdistan Region of Iraq.

The current study was carried out to determine the validity of the OSCE in measuring the performance of interns and the reliability of the OSCE in testing an entire population of interns.

METHODS

The study population included a subset of the cohort of Duhok College of Medicine (DCM) graduates of the academic year of

2008/09. The inclusion criterion was interns who had not attended their internship (rotation) in Emergency Medicine (EM) at the Duhok emergency hospital, the emergency departments of internal medicine and gynecology & obstetrics in Azadi teaching hospital and the emergency department of Heevi pediatric hospital before the conduction of the study.

The eligible subjects were found to be 24 interns. Three of them did not respond because of improper notification and announcement. The remaining 21 were then randomly divided into two groups to get a suitable number of trainees that can cope with logistic limitations such as finding enough space, time, and available trainers. The first group consisted of nine members while there were 12 doctors in the second group.

To fulfill the aim of this study, a training module that encompasses 9 essential emergency medicine procedure tasks and subtasks was developed. The interns were trained on this module through the adoption of an innovative style of a task-based health care oriented learning approach. Before implementation of the module, approval was obtained from the Research Ethics Committee at the Duhok General Directorate of Health to conduct the study.

A post-training course, and practical skills assessment were performed using 9 comprehensive OSCE stations (with an additional three rest stations) using plastic models (mannequins) as the main material for training in 8 of these stations, while in the station of triage and mass casualty management, clinical scenarios, videos, and case management protocols were used (Table 1).

The trainees were graded by DCM faculty according to a given set of predetermined criteria performed by the examination coordination committee and presented in form of a checklist. The items in the checklist were the key tasks and subtasks that had been identified by expert

faculty teaching members to be critical to a competent intern's performance.

Furthermore, the following measurement properties of the OSCE were assessed⁶:

1. Validity: Two main types of validity indicators were assessed:

Predictive Validity: This was ascertained by comparing OSCE final scores with results of investigator subjective ratings of the specific skills for every participant after a period of 2 months from the OSCE assessment. Significant association would be an indication of a good OSCE's predictive validity.

Concurrent Validity: A test is said to demonstrate concurrent validity if there is a significant statistical association between the test results with another test or measure designed to assess the same attributes or behaviors. This was done by comparing OSCE scores outcomes with the results of subjective ratings of the overall performance of practical skills for every participant immediately at the end of rating skills at each station. Agreement between OSCE test scores (objective) and the subjective rating of the overall performance would be an indication of a good OSCE's concurrent validity. The main difference between concurrent and predictive validity was the time element.

2. Reliability: The reliability of an examination refers to the stability of results. Two different types were considered as follow:

Intra-rater reliability: The ascertainment of the consistency of ratings across raters was done by rotating one student at each of the nine OSCE stations twice, and measures the correlation between the rater's score results of that student for each station.

Inter-rater reliability: The ascertainment of this point was carried out by letting one student pass through 9 stations but with different raters at each stations and finding the correlation between OSCE results.

RESULTS

Validity OSCE was found to be a good indicator of assessment of practical skill performance of trainees compared to a subjective assessment by the trainers ($r=0.784$, $p < 0.001$) two months later. Furthermore, there was a statistically significant correlation between the global OSCE rating score of participants for EM practical skills and the subjective rating performed simultaneously at the end of the OSCE assessment by trainers ($r=0.880$, $p < 0.001$).

Table 2 demonstrates the results of an Angoff procedure, which was used to set standards for the OSCE by the examination coordinating committee ($n=12$). All members of the examination coordinating committee agreed that various stations of OSCE used in this program were representative of the curricular goals and objectives from which the stations were drawn. This indicates the content validity of OSCE of this study.

The credibility (face validity) of this OSCE, which refers to whether the instrument is measuring the appropriate construct, was found to be acceptable; since 93% of the examination coordinating committee and 95% of the study subjects subjectively assigned that the formulated clinical cases in the stations measuring communication skills are very similar to the actual clinical cases (Table 3).

Reliability Tables 4 reveals the correlations which were significant between the evaluation of one student twice at each station of the OSCE in the EM practical skills stations done after the end of the training course ($r=0.985$, $p < 0.001$).

Table 5 shows a high correlation between the grades given one student by different raters testing EM practical skills. This significant high correlation indicates a high inter-rater reliability of the OSCE used in this training course.

Table 1. OSCE stations used to assess the practical skills of the interns

Station No.	Title of Emergency Procedure Assessed
Station (1)	Cardiopulmonary Resuscitation and Cardiac Defibrillation
Station (2)	Basics of Wound Management
Station (3)	Male Urethral Catheterization
Station (4)	Triage in Mass Casualty
Station (5), (6), and (7)	Rest Stations
Station (8)	Basics of Airway Management
Station (9)	Endotracheal Intubation
Station (10)	Naso-gastric Intubation
Station (11)	Arterial Blood Gas Sampling and Puncture
Station (12)	Intravenous Cannulation

Table 2. Results of an Angoff procedure to set standards for the OSCE by the Examination Coordinating Committee (n= 12)

Title	Mean of 12 judgments
The station rating as 5 points scale	95%
The stations pass level mark as (60 %)	95%
The OSCE consisted of a sufficient number and variety of stations that were representative of the curricular goals and objectives	89%
The percentage of coverage of the assessed skills by OSCE stations	90 %
The simulated cases (plastic models) were realistic of actual life events	93 %

Table 3. Subjective judgement as to how "Life-Like" the stations were by the Examination Coordinating Committee and the student feedback on the OSCE for intervention group

Type of assessors	Mean results in %
Examination coordinating committee	93 %
Student feedback on OSCE	95 %

Table 4. Intra rater reliability of OSCE assessment scores in EM practical skills

Station title	Correlation coefficient (r)	P value
Cardiopulmonary Resuscitation and Cardiac Defibrillation	0.975	< 0.001
Basics of Wound Management	0.963	< 0.001
Male Urethral Catheterization	0.930	< 0.001
Triage in Mass Casualty	0.680	< 0.001
Basics of Airway Management	0.941	< 0.001
Endotracheal Intubation	0.971	< 0.001
Naso-gastric Intubation	0.899	< 0.001
Arterial Blood Gas Sampling and Puncture	0.958	< 0.001
Intravenous Cannulation	0.943	< 0.001
Overall Correlation Coefficient	0.810	< 0.001

Table 5. Inter rater reliability of OSCE assessment for EM procedure skills based on nine raters

Station title	Correlation coefficient r	P value
Cardiopulmonary Resuscitation and Cardiac Defibrillation	0.968	<0.001
Basics of Wound Management	0.918	<0.001
Male Urethral Catheterization	0.912	<0.001
Triage in Mass Casualty	0.931	<0.001
Basics of Airway Management	0.916	<0.001
Endotracheal Intubation	0.867	<0.001
Naso-gastric Intubation	0.951	<0.001
Arterial Blood Gas Sampling and Puncture	0.952	<0.001
Intravenous Cannulation	0.935	<0.001
Overall Correlation Coefficient	0.927	<0.001

DISCUSSION

Since the introduction of Objective Structured Clinical Examination (OSCE) in 1975, it has emerged as a 'gold standard' of health professional assessment in a variety of disciplines.^{7, 15} The evaluation of interns' performance during the OSCE in this study showed a highly significant correlation (0.960, $p < 0.001$) between the EM OSCE score and the subjective assessment of EM skills performance in a real life situation of the same group after 2 months. This ascertains the high predictive value of the OSCE that was used during this study as an assessment tool. A test has a predictive value if the score measuring any aspect of performance relates to a score from another measure of the aspect of behavior at a later point in time.⁶ The rather low mean of the subjective assessment two months after initial assessment by OSCE can be explained on the basis of declining retention of information that could occur after a period of time, although the students did retain a much considerable amount of information that enabled them to succeed in the examination even after two months. This finding is consistent with the results found by Al-Youzbaki¹⁶ who concluded that communication skills

performance knowledge showed a high level of retention even after 6 months of the first introductory course.

The study also showed very high and significant correlation between the total score obtained during OSCE in each station and the global rating in each station by the examiner. The overall correlation of all stations of OSCE was found to be 0.975 ($p < 0.001$). This clearly indicates that the OSCE of this study had a very good concurrent validity since any test in order to have concurrent validity should demonstrate a significant statistical association between the test results with another test or measure designed to assess the same variable or behaviors at the same time.^{6,9,16} This finding agrees with the finding of Cohen et al¹⁰ and Al-Youzbaki¹⁶ who stated that global rating is a valid and generalizable procedure if it used effectively in OSCE. Furthermore, Hodges et al,¹¹ mentioned that global rating (subjective assessment) of overall performance of students in OSCE station may be more valid than checklist scores in certain circumstances.

The study also revealed high correlations, which were statistically significant, between the evaluations of one participant twice at each EM station. This finding indicated the consistency of ratings

across raters. The intra-rater reliability was found to be 0.810 which was statistically highly significant ($p < 0.001$). A significant correlation of 0.8 or higher is desirable in order to establish intra-rater reliability.^{6,16}

The results also showed a high inter-rater reliability of OSCE. This refers to the stability of results and the consistency among raters, which is very important for any OSCE in order to make its results generalizable. The inter-rater reliability of OSCE used in this study appeared to be lower than that found by Klass et al¹² and Al-Youzbaki¹⁶ but it was still above the acceptable level.

In conclusion, OSCE is a reliable and valid tool for assessing interns' clinical performance in emergency medicine.

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پوخته

بکیرھاتنا شیوازی OSCE یی تاقیکرنی وەك ئامرازەکی هەلسەنگاندنا شیانی پراکتیکی یی نوژدارین نیشته جی و خولا ل نوژداریا تەنگافیا

پیشەکی و ئارمانج: نوکە پتر چاڤ ل شیوازی OSCE یی تاقیکرنی دەیتە کرن وەك ئامرازەکی هەلسەنگاندنا بجهئنانن کلینیکی و باوەرنامەپیدانی. هەرچەندە لگەلەك پارچین جیهانی و ژوان کولیژا پزشکی یا دهوکی هیشتا دوودی و پسیار ل سەر بکیرھاتنا فی شیوازی تاقیکرنی دەیتە کرن زیدەباری کو شارەزایی د کارئینانا OSCE بو هەلسەنگاندنا شیانی کاری نوژدارین نیشته جی و دیرین ل کولیژا پزشکی یا دهوکی یا کیمە. ئارمانجا فی فەکولینی دەستنیشانکرنا بکیرھاتنا شیوازی OSCE یی تاقیکرنی وەك ئامرازەکی هەلسەنگاندنا شیانی پراکتیکی یی نوژداریا تەنگافیا ل دەف نوژدارین نیشته جی و خولا.

رێککین فەکولینی: شیوازی تاقیکرنا OSCE بشیوەکی گەلەك رێک و پێک وب ھویراتی ھاتە بکارئینان ل سەر گروپەکی نوژدارین دەرجوین ساڵا ۲۰۰۹-۲۰۱۰ ژ کولیژا پزشکی یا دهوکی ئەوین کار دکن وەك نوژدارین نیشته جی و خولا لئەخوشخانین فیکرنی ل دەوکی، تاقیکرن پیکھاتبوو ژ ۱۲ پارچان. شیانی بجهئنانا کاری بو ۲۱ نوژدارین نیشته جی و خولا کو ب هەروە ھاتبوونە ھەلبژارتن ھاتنە هەلسەنگاندن ب رێکا تاقیکرنا OSCE پشتی کورسەکی راھینانی ل سەر ئەجامدانا کریارین نوژداریا تەنگافی بو وان ھاتیە فەکرن. لدویدا بکیرھاتنا OSCE وەك ئامرازەکی هەلسەنگاندنی ھاتە پێقان وەك دروستی و دوپاتییا فی تاقیکرنی.

ئەجام: فی فەکولینی دیارکر برێکا پێقانین ئاماری کو دروستیا تاقیکرنا OSCE گەلەك یا بەئزە، ھەروەسا دوپاتییا فی شیوازی تاقیکرنی یا بەئزە بو.

دەرئەجام: تاقیکرنا OSCE یا دروستە و یا دوپاتکەرە وەك ئامرازەکی هەلسەنگاندنی و پێزانینن باوەرپیکری ددەت سەبارەت شیانی کاری نوژدارین نیشته جی و خولا. ھەروەسا ئەف تاقیکرنە ئامازەکی ددەتە ئاستی جوری یی فیکرنی ل کولیژین پزشکی.

الخلاصة

صلاحية ووثوقية الفحص السريري الهادف المنظم

كأداة تقييم للمهارات العملية للأطباء المقيمين الدورين في طب الطوارئ

خلفية واهداف البحث: هناك ميل متزايد لاستخدام الفحص السريري الهادف المنظم كأداة تقييم للمهارات السريرية وكأداة تصديق، ولكن هذا الميل يشوبه بعض التردد والمعوقات حول وثوقيته، صلاحيته، وسهولة استخدامه في العديد من مراكز البحوث في العالم وبضمنها كلية طب دهوك، إضافة إلى ذلك فإن تجربة كلية طب دهوك في استخدام الفحص السريري الهادف المنظم لتقييم المهارات السريرية للأطباء المقيمين لا تزال محدودة. تشمل أهداف الدراسة الحالية تقرير مدى وثوقية وصلاحية الفحص السريري الهادف المنظم كأداة لتقييم المهارات السريرية للأطباء المقيمين في طب الطوارئ.

طرق البحث: لقد اعتمد البحث على إثني عشر محطة فحص سريري هادف منظم لتقييم أداء المهارات السريرية لدفعة خريجي كلية طب دهوك سنة ٢٠٠٨-٢٠٠٩ والذين لا يزالون يمارسون الخدمة بصفة طبيب مقيم دوري في المستشفيات التعليمية في المحافظة، لقد تم الاعتماد على الفحص السريري الهادف المنظم لتقييم أداء عينة عشوائية مؤلفة من واحد وعشرين مقيم دوري بعد أن تم إخضاعهم لدورة تدريبية معتمدة على المهام في كيفية تنفيذ وإنجاز إجراءات طب الطوارئ. لقد تم تقييم الصلاحية المستقبلية والحالية، وكذلك الوثوقية في أداء المقيمين الدورين اعتماداً على الفحص السريري الهادف المنظم كأداة تقييم.

النتائج: لقد وجد أن هناك فرق إحصائي هام في الصلاحية المستقبلية والحالية للفحص السريري الهادف المنظم بين المقيمين ككل وضمن المقيم الواحد أيضاً ($r=0.784, p < 0.001$; & $0.880, p < 0.001$) بالتوالي، وكذلك ظهر أن هناك فرق إحصائي هام في الوثوقية بين المقيمين ككل وضمن المقيم الواحد أيضاً ($r=0.810, p < 0.001$; & $0.927, p < 0.001$) بالتوالي.

الاستنتاج: لقد أثبتت الدراسة صلاحية ووثوقية الفحص السريري الهادف المنظم كأداة تقييم والذي بإمكانه اعطاء معلومات يمكن الاعتماد عليها حول المهارات الأدائية للأطباء المقيمين، وكذلك بإمكانه اعطاء المعلومات الاستراتيجية المعقولة حول نوعية التعليم الطبي الأولي وخاصة فيما يتعلق بمدى تغطية التعليم الطبي الأولي للمهارات الأساسية التي يجب أن تتوفر في الأطباء الخريجين.

**ENDOSCOPIC DILATATION OF ESOPHAGEAL STRICTURES IN CHILDREN:
CAUSES AND OUTCOME IN 47 PATIENTS**

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ABSTRACT

Background and Objectives Esophageal strictures in children have serious effects on the child health; the advances in digestive endoscopy opened the door for many therapeutic options, mainly endoscopic dilatation. The aim of the current study was to assess the causes of esophageal strictures in children and the outcome of endoscopic dilatation in Kurdistan center for gastroenterology and hepatology.

Methods Retrospective study of 47 children with esophageal strictures undergone endoscopic dilatation at Kurdistan center for gastroenterology and hepatology.

Results The predominant cases were corrosive strictures 46.8%, followed by postoperative 25.6% and peptic 21.3% strictures. They were submitted to 257 dilatation sessions, patients with corrosive strictures required more dilatation sessions and were discharged later than the other causes for esophageal stricture. Forty patients 85.1% were discharged; three were referred to surgery, while four are still undergoing the dilatation sessions. Esophageal perforation complicated the course in 2 cases (0.8% per procedure).

Conclusion Endoscopic dilatation of esophageal strictures in children is a relatively safe procedure with good results and low rate of complications.

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Key words: Endoscopy, Esophagus, Stricture, Dilatation

Esophageal strictures in children are almost always benign¹; they are caused by congenital malformations, gastroesophageal reflux disease, corrosives, epidermolysis bullosa, and postoperatively after repair of esophageal atresia, or corrective surgery for stricture.^{1,2}

Benign esophageal strictures result in dysphagia which leads to serious effects such as aspiration, loss of weight, and malnutrition, therefore they should be evaluated and treated promptly.³ The

current treatment of esophageal strictures includes surgery, endoscopic dilatation, and retrievable self-expanding plastic intraluminal stents; however, the indications for surgery are getting less with the availability of the relatively low mortality and morbidity of the interventional endoscopic dilatation.⁴⁻⁶

The aim of the current study was to assess the causes of esophageal strictures in children and the outcome of endoscopic dilatation in Kurdistan center for gastroenterology and hepatology.

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METHODS

This is a retrospective study of 47 children with esophageal stricture undergone endoscopic dilatation between October 1st 2006 and January 31st 2010. The study was conducted at Kurdistan gastroenterology and hepatology center in Sulaimani city/Iraq.

The records of 47 patients were reviewed regarding clinical history, physical examination, contrast enhanced esophagography (Figure 1), instruments used, complications and outcome of endoscopic dilatation. Parents were informed about the procedure and the possible complications, and then a written consent form was signed before the procedure.

The procedures were done under general anesthesia with airway protection and a minimum fasting period of 6 hours. During esophagoscopy the location, diameter, and endoscopic appearance of the stricture and mucosa were assessed (Figure 2).

Biopsies were taken from the edge of the stricture and any suspicious mucosa for histopathology. The guide wire was inserted under endoscopic control and radiographic screening (Figure 3). After dilatation esophagogastrroduodenoscopy

was performed to check the stomach and duodenum and look for any complications (Figure 4). Dilatation sessions were done at two weeks interval, using "the rule of three" with progressively increasing the diameter of the dilators.⁷⁻⁹ After the procedure patients remained under observation for 4-6 hours, while chest X-ray was done 3-4 hours after the procedure.

Response to endoscopic dilatation depended on relief of dysphagia, weight gain, and the interval between dilatation sessions. Patients that did not need dilatation for one year in the absence of dysphagia were discharged.^{10,11} Patients that didn't show progress in the diameter of dilators on subsequent sessions or were difficult in passing the dilators were referred to surgery.

Savary-Gillard bougie dilators 5.0mm-12.8mm (Wilson-Cook, USA) or through the scope Balloon dilators (Boston Scientific, USA) were used according to the endoscopic and radiologic characteristics of the stricture.

SPSS software package (version 15) was used for statistical analysis. The comparison of means was done by ANOVA. P-value less than 0.01 were considered as significant.

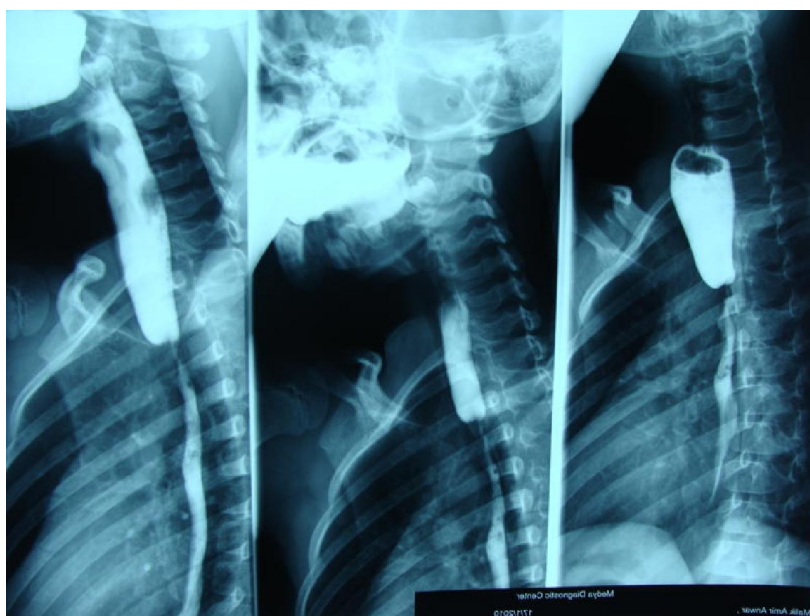


Figure 1. Barium esophagogram of corrosive stricture



Figure 2. Upper esophageal corrosive stricture



Figure 3. Guidewire passed through the stricture proximal end

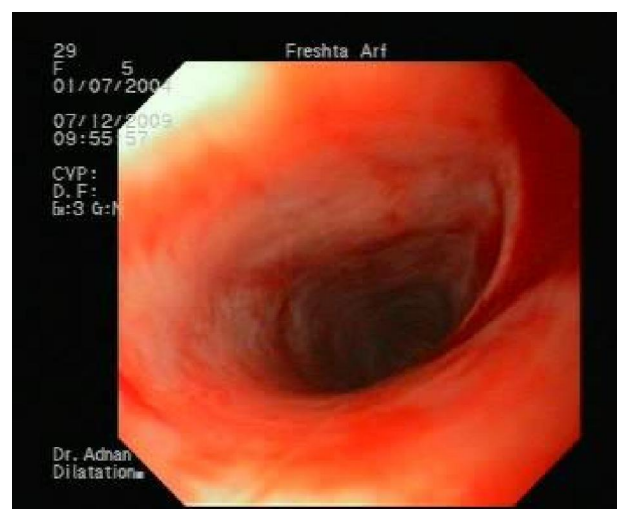


Figure 4. corrosive stricture after dilatation

RESULTS

A total of 47 children were included, age ranged between 1 month and 15 years (mean 61.32 months), 32 (68.1%) were males and 15 (31.9%) were females. They were submitted to 257 dilatation sessions with a range of 1 to 22 sessions per patient (mean 5.47 sessions).

Esophageal strictures secondary to ingestion of corrosive were the predominant cases 22 (46.8%), followed by postoperative 12 (25.6%), peptic 10 (21.3%), congenital 2 (4.3%), and Schatzki ring 1 (2.1%). Patients with corrosive strictures required larger number of dilatation sessions as compared to patients with postoperative or peptic strictures ($p = 0.002$) as shown in table 1.

Complications occurred in 3 (6.4%) patients, including two cases of esophageal perforation (4.3%) and one case of aspiration (2.1%). Esophageal perforation occurred in 0.8% of the 257 dilatation sessions; they were both cases of corrosive strictures and treated conservatively. The aspiration occurred in a case of congenital stricture.

Forty patients (85.1%) were discharged from dilatation sessions before the end of this study, three patients (6.4%) were referred to surgery due to failure of improvement during endoscopic dilatations (2 corrosive and 1 postoperative after fundoplication), and four patients (8.6%) are still undergoing dilatation sessions with satisfactory progress (3 corrosive and 1 congenital). Patients with corrosive strictures were discharged later than patients with postoperative or peptic strictures ($P = 0.007$) (Table 1).

DISCUSSION

Benign esophageal strictures in children are still a challenge to the pediatrician, surgeon and the gastroenterologist in spite of the great advances and different therapeutic options currently in use. The last decade witnessed a shift to more interventional endoscopic dilatation on the expense of surgical replacement.¹²

The finding that corrosive strictures were predominant is similar to reports from other developing countries.^{4,6,13} Corrosive strictures tend to be long,

Table 1. Descriptive analysis of studied variables in relation to the causes of esophageal strictures

Variable	Corrosive (n=22)	Postoperative (n=12)	Peptic (n=10)	Congenital (n=2)	Schatzki ring (n=1)
Age (months)					
Range	24-180	1-84	11-180	24-36	120
Mean	62.2 ± 36.8	41.8 ± 52.3	82 ± 57.9	30 ± 6	0
Gender					
Male/Female	14/8	8/4	8/2	1/1	1/0
No. of Dilatation					
Range	3-22	2-9	1-4	2-6	1
Mean	7.9 ± 5.5*	3.9 ± 2.1	2.7 ± 0.8	4 ± 2.8	1
Type of dilator					
Savary-Gillard	22	8	6	2	0
Balloon	0	4	4	0	1
Complications	2	0	0	1	0
Discharged (%)	17 (77%)*	11 (92%)	10 (100%)	1	1

* $P < 0.01$

tortuous, and rigid and require more sessions of dilatation as compared to postoperative or peptic strictures¹⁴; this is confirmed by the finding that corrosive strictures required more dilatation sessions (7.9 ± 5.5) and lower discharge rate (77%) as compared to other causes of stricture. Further, corrosive stricture carry more risk for perforation as the two cases of perforation both were corrosive strictures, this finding is similar to reports elsewhere.^{6,8,14,15}

Strictures secondary to surgical repair of esophageal atresia or surgical treatment of corrosive strictures usually show better response to endoscopic dilatation, requiring less sessions of dilatation to achieve the desired esophageal intraluminal diameter.^{6,16}

Gastroesophageal reflux is a common disorder in children; however, strictures secondary to severe gastroesophageal reflux are reported to be around 1.5%.¹⁷

Generally peptic strictures show a good response to endoscopic dilatation when combined with proton pump inhibitors.^{18,19} The persistence of esophagitis and associated hiatal hernia are predictive of poor response to endoscopic dilatation.²⁰

In this study 21.3% of strictures were secondary to gastroesophageal reflux disease all responded to endoscopic dilatation and discharged.

Congenital esophageal stricture are rare, the fibromuscular and membranous types are responsive to endoscopic dilatation. Endoscopic ultrasonography has been used to assess the type and choose the appropriate therapeutic option.²¹

Esophageal perforation is the most dreaded complication of esophageal dilatation that is regarded as a serious clinical condition.^{3,22,23} In our report of 257 dilatations we had two cases of esophageal perforation (0.8%), which is in agreement with the literature. Both cases were diagnosed early and recovered with conservative management. Early diagnosis of esophageal perforation with rapid

implementation of treatment is the most important prognostic factor for reducing morbidity and mortality among these patients.²³

Esophageal strictures can be dilated with balloons or bougies without much difference regarding efficacy and rate of complications. However, Balloons are more costly than durable bougies but less traumatic. The decision which type of dilator to use should be individualized for each patient according to the anatomical and endoscopic characteristics of the stricture, the experience of the endoscopist, in addition to the time of presentation of the stricture whether early or delayed.^{7,15,24}

There are other techniques reported in the literature for management of esophageal stricture in children; these include the injection of corticosteroids into the stricture or topical mitomycin C application and temporary nonmetal stents. These have primarily been reported for use in the setting of refractory strictures.^{25,26}

In conclusion, the current study shows that endoscopic dilatation of esophageal strictures in children gives good results with low rate of complications. Patients with corrosive strictures have higher morbidity and need more dilatation sessions. Despite the improvements in interventional endoscopic management, prevention is still the best option against esophageal stricture. Secondary prevention of stricture formation may be amenable using special form of nasogasogastric tubes early after corrosive esophageal injury.²⁷

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پوختە

فراوانکردنی تەسکی سورئىنچك لە منالدا بە ھەناوبىن: ھۆكارەكان و دەرەنجام لە ٤٧ نەخۆشدا

پېشەكى و ئارمانج: تەسكى سورئىنچك لە منالدا كارىگەرئىيەكى زۆرى لە سەر تەندروستى ھەيە. پېشكەوتنەكانى بوارى ھەناوبىنى كۆئەندامى ھەرس دەروازەى بۆ زۆر چۆر چارەسەر ئاوەلا كەردووە، لەمانەش فراوانکردنى تەسكى سورئىنچك بە ھەناوبىن. ئامانجى سەرەكى ئەم لىكۆلىنەوئەيەو خەملاندنى ھۆكانى تەسكبونەوئەى سورئىنچك لە منالدا و ھەلسەنگاندنى دەرەنجامى فراوانكردنە بە ھەناوبىن. كە لە ناوەندى كوردستان بۆ كۆئەندامى ھەرس و جگەرئاسى ئەنجام درا .

رىكئىن ئەكولىنى: بە شىپواى عاوئەژووى، لە ٤٧ كۆلرايەوئە كە تەسكبونەوئەى سورئىنچكيان ھەبوو، بە ھەناوبىن تەسكئىيەكەيان لە ناوەندى كوردستان بۆ كۆئەندامى ھەرس و جگەرئاسى فراوانكرا.

ئەنجام: باوترىن ھۆ سووتئىنە تەسكبونەوئە بوو (٤٦,٨٪)، پاشان دەرەنجامى نەشتەرگەرى (٢٥,٦٪)، تەسكبونەوئەى ھەوى (٢١,٣٪). بە ٢٥٧ جار تەسكئىيەكەيان فراوانكرايەوئە، ئەوانەى لە چۆرى سووتئىنە بوون، پئۆيستىيان بە چەندىن جار فراوانكردن و مانەوئەى ناوئەخۆشخانەى درژتر ھەبوو ز سەرجم ٤٠ نەخۆش (٨٥٪) يان بە باشى نئىردرانە مائەوئە، سى نەخۆش رەوانەى نەشتەرگەرى كرا و چوارىيان ھىشتا پئۆيستىيان بە فراوانكردن ھەيەو لە دوو نەخۆشدا سورئىنچك تەقى.

دەرئەنجام: فراوانكردنى تەسكبونەوئەى سورئىنچك لە منالدا، چارەسەرئىكى رىژەيى بئۆھە و ئەنجامى باشە و ماكى كەمە.

الخلاصة

التوسيع التنظيري لتضيق المريء لدى الأطفال: الأسباب والنتائج في ٤٧ مريضا

خلفية واهداف البحث: تأثيرات تضيق المريء على صحة الطفل خطيرة، وفتحت التطورات الحديثة في تنظير الجهاز الهضمي الباب لعدة خيارات للمعالجة منها لتوسيع التنظيري. الهدف من الدراسة هو دراسة أسباب تضيق المريء لدى الأطفال و نتائج التوسيع التنظيري في مركز كردستان لأمراض الجهاز الهضمي.

طرق البحث: دراسة ارتجاعية لـ ٤٧ طفلا لديهم تضيق المريء، اجري لهم توسيع المريء التنظيري في مركز كردستان لأمراض الجهاز الهضمي .

النتائج: كانت الحالات السائدة هي تضيقات عقابيل تناول المخدرات (الأحماض والقلويات) ٤٨,٦ %، يليها تضيقات عقابيل العمليات الجراحية ٢٥,٦ %، ثم تضيقات نتيجة ارجاع المعدي للمريء ٢١,٣ %. أجرى ٢٥٧ جلسة توسيع لكافة المرضى، احتاج مرضى تضيق المريء جراح المخدرات الى جلسات توسيع أكثر من بقية المرضى كما تأخروا في اكتساب الشفاء. أربعون مريضا اكتسبوا الشفاء التام، ثلاث مرضى احيوا للجراحة فيما يستمر أربعة مرضى في جلسات التوسيع. انتقاب المريء كان الاختلاط في حالتين من المرضى.

الاستنتاج: التوسيع التنظيري لتضيق المريء لدى الأطفال طريقة امينة نسبيا وذات نتائج ايجابية جيدة مع نسبة ضئيلة من الاختلاطات.

DETECTION AND LOCALIZATION OF ANTI-SPERM ANTIBODIES IN
INFERTILE MALES IN DUHOK CITY

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ABSTRACT

Background and objectives Anti-sperm antibodies are the main cause of immunological infertility, as they impair sperm function by binding to the sperm membrane. The aim of the study is to assess the relationship between the presence of anti-sperm antibodies in sera of normozoospermia infertile patient with the localization of anti-sperm antibodies on sperm surface by using ELISA and IIF tests respectively. The current study is an attempt to determine the rate of anti-sperm antibodies in sera and surfaces of sperm among a population of infertile patients in Duhok province which is the first study done in all Kurdistan region/Iraq.

Methods The study was started at the beginning of April 2007 and finished at the end of December 2007. A total of 480 semen samples were collected from infertile males suffering from primary and secondary infertility attending infertility clinic/Azadi teaching hospital. The patients were categorized into 4 age groups ranging from 23-42 years. All semen samples were examined macroscopically and microscopically. The information of each semen samples were recorded in a special form.

Results It was found that only 105 (21.8%) males were normozoospermia, while 375 (78.2%) males with abnormal semen characteristics according to the criteria of World Health Organization. The results of ELISA test revealed that 18 (17.1%) sera samples of infertile males were positive for anti-sperm antibodies, while 22 (20.9%) were equivocal and 65 (61.9%) were negative for the presence of anti-sperm antibodies. The results of indirect immuno-fluorescent test revealed that all the 15 ELISA positive samples were positive for anti-sperm antibodies, whereas the other 15 negative samples were negative for antisperm antibodies.

Conclusion The presence of anti-sperm antibodies was high among infertile males in Duhok province. ELISA and indirect immuno-fluorescent tests were found to be sensitive and rapid for detection of anti-sperm antibodies in infertile males compared with other tests.

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Key words: Anti-sperm antibodies, ELISA, Indirect immuno-fluorescent test

The term immune induced infertility is defined as spontaneously occurring antibodies binding to antigens of the gametes impairing sperm-oocyte interaction. Antisperm antibodies (ASAs) are far more frequent than oocyte antibodies.¹ In the male the presence of ASAs is an autoimmune disease causing

'immune infertility'. ASAs have involved virtually all components of sperm and diminished sperm-oocyte binding and faulty zona pellucida penetration. Antisperm antibodies have also been implicated in decreasing sperm motility, cervical mucus penetration, sperm survival and blocking the initiation of embryo

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cleavage.² The most common male immunologic concern in infertility, however, is antisperm antibodies. It has been shown that both males and females can make antibodies that react with human sperm. In male, for example, ASAs can be detected in seminal plasma and serum, and are also located on the surface of sperm, which cannot be detected in a routine semen analysis. The female may produce ASAs, which may be found in circulating blood, or produced in the cervical mucus.³

There are sufficient evidences that ASAs impair fertility in couples with unexplained infertility. A number of different methodologies are available, which may be used in their detection. However, in many cases, test interpretation is subjective. Although there is no enough evidence to support systemic treatment for ASAs, application of a variety of assisted reproductive technologies improves outcome.² Yeh et al⁴ found that two males antisperm Immunoglobulin isotypes significantly impaired fertilization rates. Immunoglobulin A exerted its impact only when high level of binding was detected on the head of sperm, on the other hand Immunoglobulin M, present in 44% of the males, was the Ig isotype that most significantly affected fertilization rates when localized both at the head and at the tail tip level of sperm.

The aim of the study is to assess the relationship between the presence of ASAs in sera of normozoospermia infertile patient with the localization of ASAs on sperm surface by using ELISA and IIF tests respectively.

METHODS

This study was started at the beginning of April 2007 and finished at the end of December 2007, and conducted in Dohuk city-Kurdistan Region –North of Iraq. Fresh semen samples were collected from 480 infertile patients suffering from primary or secondary infertility.

The patients were attending infertility clinic at Azadi teaching hospital. Some of them were attending Private clinics and laboratories. The age of patients ranged between (23- 42) years. A total of 480 semen samples were collected and examined both macroscopically and microscopically according to the World Health Organization criteria.⁵ Blood samples (3ml) were collected from some patients who are suffering from primary and secondary infertility but with normal sperm count. A total of 105 blood samples were collected for detecting the antisperm antibodies by using enzyme linked immunosorbant assay (ELISA).

Blood samples were collected by using a sterile syringe and put in a sterile clean glass test tube without anticoagulant. The blood left to clot for 30 minutes and then centrifuged at 3000 rpm. for 5 minutes. Then serum sample was collected in plane tube and labeled for each patient. All serum samples were frozen at -20c° until the time of ELISA test and Indirect immunofluorescent test (IIFT). The presence of antisperm antibodies in 105 selected sera of patients suffering from infertility were assessed by using ELISA test. The commercial kit used in this study was obtained from VARELISA ANTIBODIES, Germany. The results were interpreted as shown in table 1.

The ASAs were also assessed on sperm surfaces of 30 patients by IIFT. The commercial kit used in this study was obtained from EUROIMMUN LABORDIGNODTIC, Germany.

The serum samples were selected as 15 samples positive for ASA by ELISA test and 15 samples negative for ASA by the same test and the results were interpreted as shown in table 2.

RESULTS

Of the 480 semen samples analyzed macroscopically and microscopically, it was found that only 105 (21.8 %) persons have normal characteristics and parameters

of seminal fluid samples according to the WHO criteria.

On the other hand, 375 (78.2 %) persons with abnormal parameters, most of them have had oligospermia, azoospermia, asthenozoospermia, teratozoospermia or long liquification time and presence of large number of pus cells. These results are summarized in table 3. The semen samples with abnormal characteristics were excluded from the immunologic study.

The results revealed that 18 (17.1%) sera of infertile men were positive for the presence of ASAs by ELISA test, while 22 (20.9%), 65 (61.9%) were equivocal and negative for ASAs respectively.

In this study the IIF test has been used for the detection of ASAs location on the surface of sperm. A total of 15 positive serum samples tested by ELISA, were selected and screened by IIF were positive when tested by IIF test while a total of 15 negative serum samples when using ELISA, were negative when tested by IIF test. The positive result of IIF test showed that ASAs stained by fluorescent stain and appeared as shiny green color spots on sperm surface.

The intensity of color depends on the titre of antibodies (Figures 1 A and B, 2 A and B, 3, and 4), showing the location of antibodies on the sperm surface. The exact distribution of Ag-Ab complexes on the sperm surface and sperm antibodies load was estimated (Figures 1 B and 2 B). The head of fixed spermatozoa with high fluorescence intensity was uniformly labeled and a spotted type of fluorescence was detected on the tail. The pattern of the localization of ASAs on the head and tail of sperms incubated with sera (ASAs +) of normozoospermia infertile patients was uniform (Figure 1 A and B). On the surface of spermatozoa, which incubated with positive control ASAs sera, the high level of fluorescence intensity was not entirely uniform. (Figures 2 A and B).

The fluorescence intensity of the spermatozoa was much lower after their incubation with ASA-negative serua of the patients and the control negative serum (Figures 3 and 4).

The distribution of presence of ASAs according to age groups in this study is listed in (table 4). The highest number of the presence of ASAs was seen in the age group between 28-32 year.

Table 1. Interpretation of Elisa results

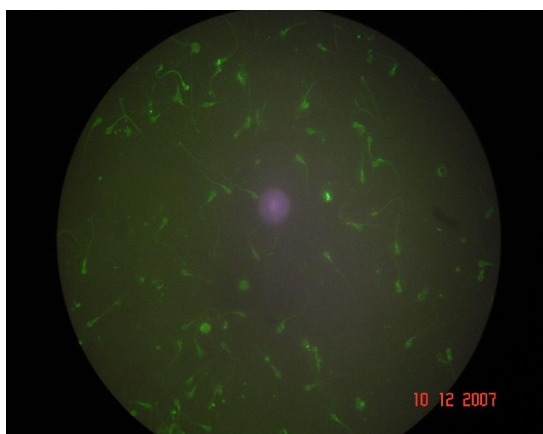
Assessment	Semiquantitative evaluation	Qualitative evaluation
Negative	< 14 U/ml	Ratio < 1.0
Equivocal	14 - 20 U/ml	Ratio 1.0 - 1.4
Positive	> 20 U/ml	Ratio > 1.4

Table 2. Interpretation of spermatozoa reactivity

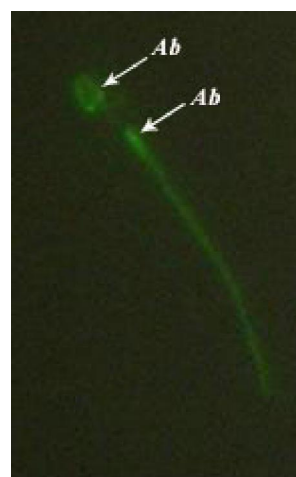
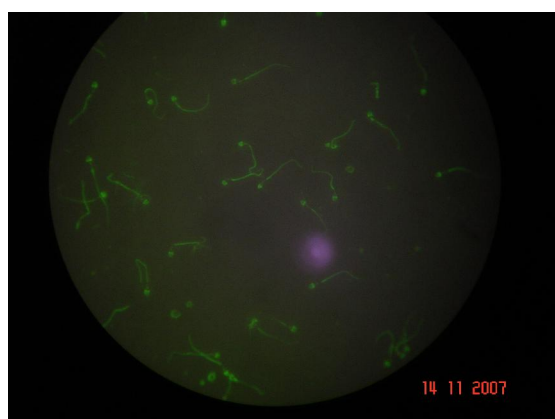
Reactivity of spermatozoa	Evaluation
No reaction at 1:10	Negative. No IgG, IgA and IgM class antibodies against human sperms detected in the patient samples.
Positive reaction at 1:10	Positive. Possible existence of an autoimmune or alloimmune genesis in unclear fertility disorders.

Table 3. Presence of ASA in sera of infertile men examined by ELISA test

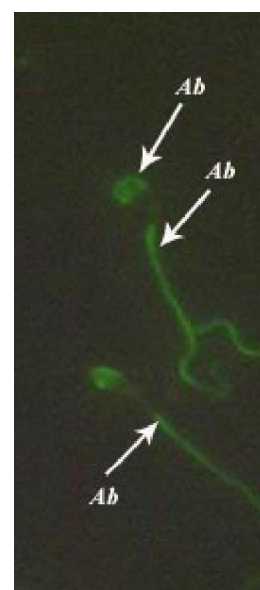
No. of examined sera	No. (%) of ASAs positive sera	No. (%) of ASAs equivocal sera	No. (%) of ASAs negative sera
105	18 (17.1%)	22 (20.9%)	65 (61.9 %)



(A)

**Figure 1. (A) Serum of an infertile patient with positive ASAs by IIF test (100X). (B) Single sperm with spots of ASAs(400X)**

(A)



(B)

Figure 2. (A) positive control of ASAs by IIF test (100X). (B) Tow sperms with greenish spots of ASAs (400X)

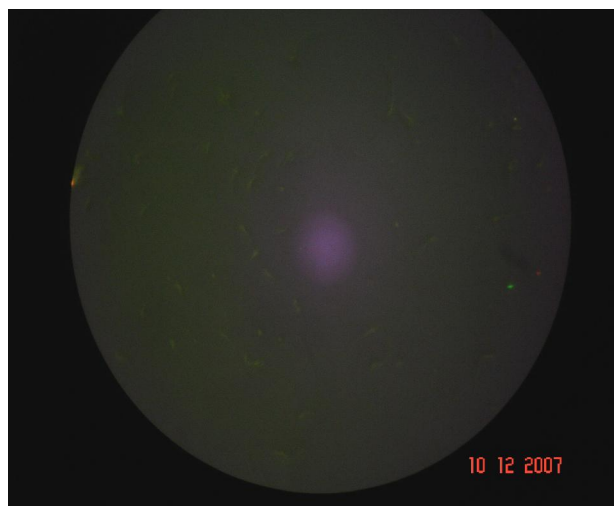


Figure 3. Fluorescence microscopy of normal spermatozoa after their incubation with ASA-negative sera (100X). (Note the low fluorescence intensity pattern on sperm surface

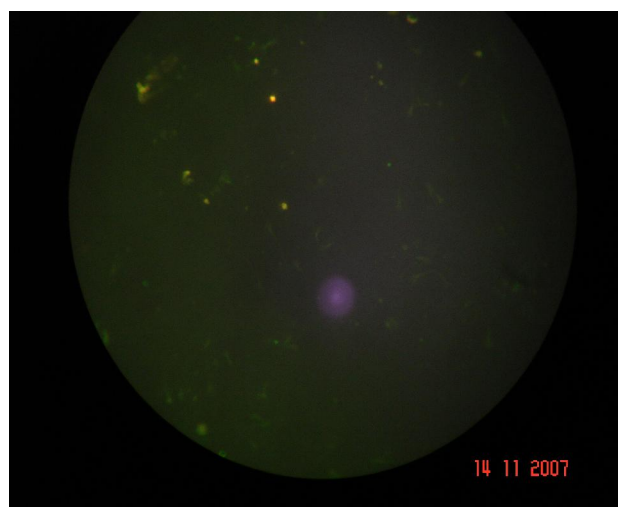


Figure 4. Fluorescence microscopy of normal spermatozoa after their incubation with negative Control of ASAs by IIF test (100X). (Note the low fluorescence intensity pattern on sperm surface

Table 4. Distribution of ASAs by ELISA test according to age groups

Age group	No.	Presence of	Absence of
		ASAs No. (%)	ASAs No. (%)
23-27	40	3 (7.5)	27 (67.5)
28-32	36	9 (50)	21 (58.3)
33-37	23	3 (13)	14 (60.8)
38-42	6	3 (25)	3 (50)
Total	105	18	65

DISCUSSION

This is the first study done in Kurdistan Region, Iraq, using immunohistofluorescent detection of antisperm-antibodies (ASAs) on the surface of sperms, it is an attempt to determine the rate of anti sperm antibodies (ASAs) in the sera and surfaces of sperms among a population of infertile patient in Duhok province.

In our community till now there are little information about immunological infertility cases. The present study was the first trial for determining the sides of this problem since the number of infertile couples are increasing in the last years. The percentage of positive cases for ASAs among sera of 105 infertile men was 17.1% examined by ELISA test. This percentage is considered to be very high compared with other studies done elsewhere such as in Iran (8%),⁶ while it is almost close to our results in other studies. The incidence of immunity to sperm in infertile couples worldwide was estimated to be (9-36 %).² In contrast the prevalence of ASAs in the general population was approximately (0-2%) in UK.⁷ Numerous investigations have reported the identification of specific antigens using sera from immune infertile men. Serum antibodies were adsorbed onto normal motile spermatozoa and subsequently eluted from the sperm membrane⁸. The presence of sperm-antibodies (SpAb) may reduce fertility by affecting sperm motility and acrosomal reaction. The presence of the SpAb was shown to prevent sperm penetration of cervical mucus, inhibit sperm-zona pellucida interaction, and interfere with the sperm-egg fusion. The antigens were identified by bound SpAb, the sources of which were seminal plasma samples of infertile patients or of patients following vasectomy. This research was done in Germany¹ using IIF. Also, Cross and Moore⁹ showed that antibodies bound to both head and tail.

In term of serum ASAs, the percentage of equivocal results in the

tested cases in the present study was 19.1%. this means that percentage of ASAs cases among infertile men, may be more or less than 17.1% because the equivocal results may turn to positive or negative regarding the presence of ASAs. Only 2 patients were suffering from secondary infertility while 16 patients were suffering from primary infertility. This result indicated that immunologic infertility due to presence of ASAs mainly found in those patients with primary infertility.

The percentage of patients suffering from abnormal semen parameters was high (78.2%) among the total number of 480 semen samples. The results of the current study indicated that the rate of immune induced infertile cases were very high among the screened population. Some of these conditions may be due to reversible causes such as ductal obstruction and hypogonadotropic hypogonadism. Other conditions may not be reversible such as bilateral testicular atrophy. Similar high cases of ASAs (30.3%) among infertile men was reported¹⁰ in U.K. by using sperm agglutination technique.

In a study conducted by Andolz et al¹¹ in Spain on 178 infertile men, the percentage of ASAs was high 35%, 21% by using tray agglutination test (TAT) and Immunobead test (IBT) techniques respectively.

Among American infertile men, a study was performed on the presence of ASAs. This study was done by Menge and Beitner¹² on 377 infertile men and found that relatively high percentage (19%) of cases were detected positive for ASAs in their serum samples by using sperm agglutination test.

In France, Mirilas and Almeida¹³ reported very high number of positive cases of ASAs when they tested 183 infertile men, their ages ranging between 21-47 years. This study found that 39% of patients were positive for ASAs. Those results showed that presence of ASAs in sera were disagreeing with many other

studies that were conducted in different countries of the world. One of these studies was done on 400 Italian infertile men.¹⁴ They found a low percentage (13%) of ASAs (IgG & IgM) positive cases when examined their sera by sperm agglutination test. The same study found that 5.7% of ASAs positive cases when examined their semen (IgA) was examined by the same test. On the other hand, Munuce et al¹⁵ in Argentina reported low percentage of ASAs positive cases (15%) when examined 144 infertile patients. A lower percentage of positive cases of ASAs were recorded in Canada.¹⁶ It was found that 38 (8.1%) sera to be positive of males for ASAs by using tray agglutination test on 471 Canadian couples. In Italy also Gandini et al¹⁷ recorded that the number of patients with a clinically significant positivity to direct immunobead test (d-IBT) was 134 (20.1%) male infertility cases from a total of 667 patients. In Bulgaria Fichorova and Boulanov¹⁸ recorded that 72 (18%) of infertile males with normal semen analysis were positive for ASAs in their sera by ELISA test. In USA, another study was done by Devine et al.¹⁹ The authors found that 88 (16.7%) of a total of 520 infertile men were positive to the presence of ASAs by examining their sera with mixed agglutination reaction test (MART) and immunobead tests (IBT). Fertilizing and non-fertilizing sperm populations were not different with respect to the percentage of motility, the normal morphology, the multiple anomalies index, the acrosome abnormalities, and the spontaneous or induced acrosome reaction. If the proportion of spermatozoa coated with either immunoglobulin (Ig)A or IgG antibodies was similar in the two groups, their localization was often different: antibodies were mainly on the sperm heads in the cases of fertilization failure.²⁰

The presence of ASAs was high among infertile males in Duhok province. ELISA and IIF tests proved to be sensitive and rapid for detection of ASAs in infertile males compared with other tests. ELISA

and IIF tests may be used as routine tests in laboratories for detection of ASAs in infertile couples. For more precise results other more developed diagnostic tests like PCR for detection of ASAs are recommended. Further studies are needed to assess the role of ASAs and its frequent distribution among infertile couples.

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پوخته

دياركرنا و ده ستنيشانكرنا جهين دژوكين سپيرميت زهلاميت نه زوك ل باژيري دهوكي

پيشهكي و نارمانچ: Intrauterine دژهكان - دژي سپيرم Antisperm Antibodies دهپته هژمارتن نه گهري سهرهكي بو نه زايانا مناعي Immunological Infertility چونكي نه و كارى سپيرمي تيك ددهت بگريدان ب پهردا سپيرمي. خاندنا نهو دهپته ههلسهنگاندن په يوه دنيا دژهكان - دژي سپيرمي د مصولا ههردوو نه زوكا - بتني (سپيرما) normozoospermia و نه نجاميت (خوجهكرن) Localization يت دژهكان لسهر روي (سپيرمي) ب بكار ئينانا (الاقزاز المناعي) - يي گريداي ب نه نزيمله و ريكا پيك كرنا مناعي يا نه ئيكسهر Indirect Immunofluorescent Assay ل ديف ئيك. خاندنا نو ههوله كه بو ژبو دهست نيشانكرنا هه بونا دژهكان - دژي سپيرمي ل مه صلدا و لسهر روي سپيرمي دناف بهرا ئاكنجيت نه زوك ل باژيري دهوك، نه هه خاندنا ئيكى يه ل هريما كوردستاني.

ريكين نه كوليني: ل نيسانا سالا ۲۰۰۷ دهست بفي خاندني هاته كرن و ل دوماهيا تشرينا دوي ل وي سالي تمام بو و چهند نمونه بژمارا ۴۸۰ نمونه هاتنه كوم كرن ژ ئافا زهلامى ژ وان كه سبت نه زوك يت توشى نه زوكا يه كه م و دووهم يت سهره دانا كلينيك دختورا ددهن كره و هاتنه دابهشكرن بو چار پشكا ژ ته مهنى دنافه را ۲۳-۴۲ سال نه هه نمونه هاتنه كوم كرن و هاتنه تافيكرن بچاڤ و ميكروسكوب و پيزانين هاتنه كوم كرن ل ليسته كي تاييهت.

نه نجام: دياربوو كه ۱۰۵ (۲۱،۸٪) ژ زهلاميت نه زوك بتني خودان ساخله تيت مهنى بيت وهك هه قن به لي ۲۷۵ (۷۸،۲٪) د ساخله تيت مهنى بيت نه وهك يهك ل دويف ساخله تيت ريكرخواو تندرستيا جيهاني. نهو نمونيت مهنى بيت خودان ساخله تيت نه وهك هه ژ في خاندني هاته دوير ئيخستن، مه صلا ۱۰۵ زهلاميت نه زوك بيت وهك يهك ژ ئاقي هاتنه كوم كرن ژبو ديار كرنا دژيت ئافا زهلامى ژ مه صليت وان نه وژي بكار ئينانا تافيكرن ELISA. نه نجاميت تافيكرن ELISA دياربوو كه ۱۸ (۱۷،۱٪) مه صلا زهلاميت نه زوك بيت پوزيتف بوون ژبه هه بونا دژهكان بو سپيرمي به لي ۲۲ (۲،۹٪)، ۶۵ (۶۱،۹٪) يا شيلي بوو Equivocal و نيگه تف بوو ژبه هه بونا دژهكان بو سپيرمي لدويف ئيك. ئافا زهلامى هاته پاراستن ژ بيت وان بيت وهك هه ډگه ل ۱۵ مه صليت پوزيتف ELISA و ۱۵ مه صليت نيگه تف ELISA ژ نه خوشيت نه زوك بيت ئافا وان وهك هه ډه وژي بكار ئينانا تافيكرن IIF و هاته شلوقه كرن ب ميكروسكوبا فلورسنتي وهه وهسا ب تافيهگه ها مجهري يا فلورسنتي ژبو دياركرنا نموني دياركري وريك و پيك ژبه ر دژواريا Intensity په يدا بونا ئاريشا ل سهر سپيرمي. ژ نه نجاميت التالى المناعي يا نه ئيكسهر ديار بوو كه هه موو نمونيت ۱۵ بيت پوزيتف ب تافيكرن ELISA يا پوزيتف بوو ب تافيكرن IIF و ۱۵ نمونيت نيگيتف ب تافيكرن IIF ده رچوو نيگه تف ل دويف كوما ته مهنى وديار بوو كه بلندترين ريژه ۲۵٪ ژبه هه قبونا ASAs و بوو كومه لا ته مهنى ۲۸-۳۲ كه هاتيه پيگيركرن ل دويف ريژا سه دي (۱۳٪) بو كومه لا ته مهنى (۳۳-۳۷).

دهر نه نجام: هه بونا دژهكان - دژي سپيرمي يا بلند بوو لجهم زهلامين توشى نه زوكي بووين. وهسا ديار بوو كه تافيكرن ELISA و IIF زور د هه ساس بوون ژ بوو دياركرنا دژهكان - دژي سپيرمي ل زهلاميت نه زوك.

الخلاصة

الكشف عن وتموضع الأجسام المضادة للنطف لدى الذكور العقيمين في مدينة دهوك

خلفية و أهداف البحث: تُعدُّ الأضداد - المضادة للنطفة Antisperm Antibodies السبب الرئيسي للعقم المناعي Immunological Infertility لأنها تفسد وظيفة النطفة بالارتباط بغشاء النطفة. تُقيّم الدراسة علاقة وجود أضداد النطفة في مصل العقيمين - سوّي النطاف normozoospermia ونتائج تموضع Localization الاضداد على سطح النطف باستخدام الاقزاز المناعي - المرتبط بالانزيم ELISA وطريقة التآلق المناعي غير المباشرة Indirect Immunofluorescent Assay على التوالي. الدراسة الجارية هي محاولة لتحديد وجود اضرار النطفة في المصل وعلى سطح النطفة بين الأشخاص العقيمين في مدينة دهوك، تعد هذه الدراسة هي الأولى في اقليم كردستان العراق.

طرق البحث: تم البدء بالدراسة في مستهل نيسان ٢٠٠٧ وأنهيت في نهاية تشرين الثاني لنفس السنة ٢٠٠٧. جُمعت عينات المني بعدد كلي (٤٨٠ عينة) من ذكور عقيمين يُعانون من العقم الأولي والثانوي المراجعين لعيادات العقم. تم تقسيم المرضى الى أربعة مجاميع عمرية تتراوح بين ٢٣ - ٤٢ سنة. جميع عينات المني فحصت عيانياً ومجهرياً وتمّ تسجيل معلومات كل عينة مني في استمارة خاصة. لقد وجد أنه ١٠٥ (٢١.٨ %) ذكر عقيم فقط بميزات منى سوية بينما ٣٧٥ (٧٨.٢ %) بميزات منى غير سوية وفقاً لمواصفات منظمة الصحة العالمية. أُستبعدت عينات المني ذات الصفات غير السوية من هذه الدراسة. جمعت مصل ١٠٥ رجل عقيم سوّي النطاف للكشف عن أضداد النطف في مصلهم باستخدام اختبار ELISA.

النتائج: أظهرت نتائج اختبار ELISA أن ١٨ (١٧.١ %) مصل لذكور عقيمين كانت موجبة لوجود أضداد النطفة بينما ٢٢ (٢٠.٩ %) ، ٦٥ (٦١.٩ %) كانت ملتبسة (مشبوهة) Equivocal وسالبة على التوالي. قد تم حضن نطاف رجال سوّي النطاف (مجهزة تجارياً) مع ١٥ مصل (+ve ELISA) و ١٥ مصل (-ve ELISA) لمرضى عقيمين سوّي النطاف باستخدام اختبار IIF وحللت بالمجهر الخاص و بالفحص المجهرى الفلورسنتي للكشف عن النمط المبعق تناسقياً لشدة التآلق المعلم على سطح النطفة. ظهرت نتائج التآلق المناعي غير المباشر أنه جميع النماذج الخمسة عشرة الموجبة باختبار ELISA كانت أيضاً موجبة باختبار IIF بينما نماذج ١٥ السالبة باختبار IIF كانت سالبة قياساً بالمجموعة العمرية وُجدَ أن أعلى نسبة (٢٥ %) لوجود أضداد النطف كانت للمجموعة العمرية (٢٨ - ٣٢) والتي أتبعَت بالنسبة المئوية (١٣ %) للمجموعة العمرية (٣٣ - ٣٧). لقد وجد أن اختبار ELISA و IIF كانتا حساستين في الكشف عن الاضداد - المضادة للنطفة في الذكور العقيمين.

الاستنتاج: وجود أضداد النطف كانت عالية بين الذكور العقيمين في محافظة دهوك. استخدام الاقزاز المناعي - المرتبط بالانزيم ELISA وطريقة التآلق المناعي غير المباشرة Indirect Immunofluorescent Assay وجدت بانها سريعة و حساسة للكشف عن أضداد النطف بين الذكور العقيمين مقارنة بالطرق الاخرى.

**IMPACT OF DIABETES ON PHYSICAL AND PSYCHOLOGICAL ASPECTS OF
QUALITY OF LIFE OF DIABETICS IN ERBIL CITY, IRAQ**

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ABSTRACT

Background and objectives Quality of life is an important health outcome of all health interventions and has become a core issue in diabetic care. The objective of this study was to assess the impact of diabetes upon physical and psychological aspects of quality of life.

Methods A case-control study was conducted at Shahid Layla Qassim Health Center for Diabetic Patients in Erbil city. A purposive sample of 150 types 1 and type 2 diabetic patients was selected according to the criteria of the study and compared to 150 age and sex-matched controls free from diabetes. Data were collected through an application of the physical and psychological domains of the World Health Organization Quality of Life (WHOQOL-100) questionnaire.

Results Both physical and psychological domains were significantly lower ($P < 0.001$) for the diabetics than controls, with stronger effects on physical than psychological domain. There were highly significant statistical variations in the physical domain of QOL in relation to age ($P = 0.017$), gender ($P = 0.004$), level of education ($P = 0.003$), marital status ($P = 0.001$), type of work ($P = 0.007$), duration of diabetes ($P < 0.001$) and medications acquisition ($P = 0.040$). A highly significant statistical variations in the psychological domain of QOL in relation to the level of education ($P = 0.016$), marital status ($P = 0.049$), type of work ($P = 0.015$), and medications acquisition ($P = 0.001$) were demonstrated. Gender variation have a borderline statistical significance ($P = 0.052$).

Conclusion Diabetic patients had lower physical and psychological QOL compared to controls. Diabetes had a greater impact on the QOL of females than males. Older diabetics are more affected physically than psychologically. Changes in health related QOL should be a part of management of diabetics.

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Key words: Diabetes, WHOQOL-100 questionnaire, Erbil city

Diabetes mellitus (DM) is a serious disease and a cause for a growing public health concern in both developed and developing countries. In 1985, an estimated 30 million people around the world were diagnosed with diabetes; in 2000, that figure rose to over 150 million, and it is projected to rise further to 380 million by 2025.¹

Diabetes is known to strongly affect the health-related quality of life (HRQOL).

Several studies have demonstrated that diabetes has a strong negative impact on the HRQOL, especially in the presence of complications.^{2,3} In recent years, QOL has been recognized as an important health outcome of all medical interventions and has become a core issue in diabetes care. QOL studies may provide clinicians with important information to support clinical decision making, taking both biomedical and psychosocial aspects into

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consideration.⁴

In Iraq a cross-sectional study on HRQOL of diabetic adolescents (type 1) was conducted in Baghdad in 2001.⁵ No previous study concerning effect of diabetes on QOL was done in Kurdistan Region of Iraq. Assessing the QOL of diabetic patients will identify to what extent those patients are affected by the disease itself. The researchers realized the importance of this problem and designed this study to assess the effect of this disease on the QOL through comparing the QOL of diabetic and non-diabetic adults in Erbil city.

METHODS

A case-control study was conducted from the 1st of June to the end of the 31st of December, 2009 at Shahid Layla Qassim Health Center for Diabetic Patients in Erbil city. Shahid Layla Qassim Health Center is a specialized center for diabetes established in December 2007. The center provides services for 150-250 patients daily as an outpatient clinic. Data were collected by direct interview using the World Health Organization Quality of Life (WHOQOL-100) questionnaire.⁶ For the purpose of achieving the aims of the present study the researchers selected only two domains from the total six domains of WHOQOL-100 questionnaire. The QOL was assessed in a sample of diabetic patients (type 1 and type 2) in comparison with gender and age matched healthy controls from Erbil city. Controls were selected from different settings including, home visits, Hawler Teaching Hospital, and Hawler Medical University. Inclusion criteria for the diabetic patients were: age 18 years and older, established diabetes for at least 1 year according to the WHO criteria,⁷ and patient free from any comorbidity (free from other chronic disorders and complications). For control groups the inclusion criteria were: apparently healthy adults 18 years and older, free from any chronic disorders, and

not on any form of medication. In addition, a blood sample was taken from each non-diabetic controls to assess blood glucose level. Those found to have a random plasma glucose level of ≥ 200 mg/dl, and fasting plasma glucose of ≥ 126 mg/dl were excluded.⁷ Data collected from both diabetics and controls in a specially designed questionnaire which is divided in two parts:

Part I: Socio-demographic and clinical characteristics including age, gender, residence, level of education, marital status, type of work, body mass index (BMI), smoking, alcohol drinking, occupation and family history of diabetes. In addition data about the duration of diabetes, type of diabetes, and medication acquisition whether from private or public sectors were obtained from diabetic patients.

Part II: Physical and psychological domains parameters selected from the WHOQOL-100 questionnaire as shown in Table 1. Each parameter consists of 4 items; all items are rated on a five point scale (1-5). All domain scores are scaled in a positive direction (i.e. higher scores denote higher QOL). Several facets contain negatives items which need to be reverse-scored before facet scores are calculated, using the formula: " $x \text{ (rev)} = 6 - x$ ", where x is the score given for each negative item.⁸

A pilot test of the instruments was performed on 15 diabetic patients in May 2009 to determine the reliability, acceptability, clarity of the questionnaire items and identify logistic problems. The internal reliability was high for both domains. Cronbach's alpha⁹ was 0.76 for the physical domain and 0.82 for the psychological domain. The questionnaire was reviewed by a panel of 19 experts' in the field of diabetes and epidemiology. Changes and modifications were made according to their recommendations. The nature of the study was explained to each participant and a verbal informed consent was obtained from each of them

Table 1. Direction of scaling and reverse-scored items for physical and psychological facets of WHOQOL-100.8

Physical and Psychological QOL facets	Direction of scaling	Reverse-scored items
Physical facets		
Facet 1 (Pain and discomfort)	-	none
Facet 2 (Energy and fatigue)	+	2 items
Facet 3 (Sleep and rest)	+	2 items
Psychological facets		
Facet 4 (Positive feelings)	+	none
Facet 5 (Thinking, learning, memory and concentration)	+	none
Facet 6 (Self-esteem)	+	none
Facet 7 (Body image and appearance)	+	2 items
Facet 8 (Negative feelings)	-	none

before data collection.

Participant's type of work was classified as sedentary, moderate and heavy according to classification of lifestyles in relation to the intensity of habitual physical activity recommended by the report of a joint FAO/ WHO/ UNU expert consultation.¹⁰

Body weight was classified as underweight (BMI: <18.5 kg/m²), normal (BMI: 18.5–24.9 kg/m²), overweight (BMI: 25–29.9 kg/m²), obese (BMI: ≥ 30.0 kg/m²). BMI was calculated using the formula: weight (Kg) / height (m²), as recommended by WHO.¹¹

SPSS software (Version 18; PASW) was used for analysis. Chi-squared (χ^2) test was used to compare proportions and t-test, ANOVA and Least Significant Difference (LSD) test were calculated to determine demographic and medical characteristics factors that affect the QOL of diabetic patients. Both domain scores were scaled in a positive direction, i.e. higher score denotes higher QOL.

RESULTS

A total of 150 attendees of the diabetes clinic met the inclusion criteria during the course of the study. They were age

and gender-matched with 150 healthy subjects as a control group. There was no statistical difference between the mean $\pm$ SD of diabetics mean age (49.65 $\pm$ 11.81) and controls (51.00 $\pm$ 11.44). Table 2 shows the socio-demographic and clinical characteristics of the diabetic patients and controls. There were statistically significant variations between diabetics and controls regarding residence (P= 0.033), type of work (P< 0.001), body weight (P< 0.001), smoking (P= 0.001), occupation (P= 0.012) and family history of diabetes (P < 0. 001).

Both physical and psychological parameters of QOL were significantly lower (P< 0.001) for the diabetic patients than controls. Physical parameters were more affected than psychological parameters in diabetic patients (Table 3).

A high proportion of female diabetics were $\geq$ 60 years of age (25.8%), widowed (24.7%), with $\leq$ primary school education level (79.6%), and having sedentary work (20.4%) in comparison with males (10.5%, 1.8%, 52.6%, and 3.5% respectively). These sex variations are of statistical significance (P= 0.023, P< 0.001, P<0.001, and P= 0.003, respectively). These findings are shown in table 4.

Table 2. Socio-demographic and clinical characteristics of diabetic patients and controls

Socio-demographic and clinical characteristics	Diabetics (n=150) (No). %	Controls (n = 150) (No). %	P – value
Age group (years)			
< 30	10 (6.7)	10 (6.7)	0.973
30 - 39	18 (12)	19 (12.7)	
40 - 49	35 (23.3)	30 (20)	
50 - 59	57 (38)	60 (40)	
≥ 60	30 (20)	31 (20.7)	
Gender			
Male	57 (38)	61 (40.7)	0.636
Female	93 (62)	89 (59.3)	
Residence			
Urban	143 (95.3)	133 (88.7)	0.033
Rural	7 (4.7)	17 (11.3)	
Level of education			
≤ Primary school	104 (69.3)	98 (65.3)	0.76
Secondary school	25 (16.7)	28 (18.7)	
Higher education *	21 (14)	24 (16)	
Marital status			
Single	10 (6.7)	21 (14)	0.063
Married	116 (77.3)	113 (75.3)	
Widowed	24 (16)	16 (10.7)	
Type of work			
Heavy	4 (2.7)	24 (16)	< 0. 001
Moderate	125 (83.3)	126 (84)	
Sedentary	21 (14)	0 (0)	
Body weight			
Normal weight	100 (66.7)	103 (68.7)	< 0. 001
Overweight	28 (18.7)	45 (30)	
Obese	22 (14.7)	2 (1.3)	
Smoking			
Yes	25 (16.7)	26 (17.3)	0.001
No	109 (72.7)	123 (82)	
Ex-smoker	16 (10.7)	1 (0.7)	
Alcohol drinking			
Yes	3 (2.0)	8 (5.3)	0.125
No	147 (98)	142 (94.7)	
Occupation			
House work	77 (51.3)	63 (42)	0.012
Government employee	41 (27.3)	67 (44.7)	
Private sector	19 (12.7)	14 (9.3)	
Retired	13 (8.7)	6 (4)	
Family history of diabetes			
Yes	106 (70.7)	24 (16)	< 0. 001
No	44 (29.3)	126 (84)	
Total	150 (100.0)	150 (100.0)	

* Institute or University

Table 3. Physical and psychological parameters of both diabetic patients and controls

Physical and psychological parameters (facets)	Diabetics (Mean $\pm$ SD)	Controls (Mean $\pm$ SD)	P- value (t - test)
Physical parameters			
Pain and discomfort	13.09 $\pm$ 2.419	16.70 $\pm$ 1.252	< 0.001
Energy and fatigue	12.51 $\pm$ 1.725	15.93 $\pm$ 0.208	< 0.001
Sleep and rest	13.38 $\pm$ 2.182	16.64 $\pm$ 0.189	< 0.001
Overall physical	12.99 $\pm$ 1.707	16.42 $\pm$ 1.008	< 0.001
Psychological parameters			
Positive feelings	13.44 $\pm$ 1.426	16.04 $\pm$ 0.866	< 0.001
Thinking, learning, memory and concentration	13.60 $\pm$ 0.295	15.55 $\pm$ 1.126	< 0.001
Self-esteem	13.30 $\pm$ 1.437	16.43 $\pm$ 0.006	< 0.001
Body image and appearance	12.94 $\pm$ 0.796	16.07 $\pm$ 0.103	< 0.001
Negative feelings	12.01 $\pm$ 1.559	15.43 $\pm$ 0.302	< 0.001
Overall psychological	13.06 $\pm$ 1.044	16.02 $\pm$ 0.392	< 0.001

Table 4. Certain socio-demographic characteristics of diabetic patients by gender

Socio-demographic characteristics	Gender	
	Male No. (%)	Female No. (%)
Age group (years)		
< 30	2 (3.5)	8 (8.6)
30 - 39	9 (15.8)	9 (9.7)
40 - 49	12 (21.1)	23 (24.7)
50 - 59	28 (49.1)	29 (31.3)
$\geq$ 60	6 (10.5)	24 (25.8)
Marital status		
Single	5 (8.8)	5 (5.4)
Married	51 (89.5)	65 (69.9)
Widowed	1 (1.8)	23 (24.7)
Years of formal education		
$\leq$ Primary school	30 (52.6)	74 (79.6)
Secondary school	17 (29.8)	8 (8.6)
Higher education	10 (17.5)	11 (11.8)
Type of work		
Heavy	3 (5.3)	1 (1.1)
Moderate	52 (91.2)	73 (78.5)
Sedentary	2 (3.5)	19 (20.4)

The association of the socio-demographic and clinical characteristics with physical domain of QOL in diabetic patients is shown in table 5. There were highly significant variations in the physical domain of QOL in relation to age (P=

0.017), gender (P= 0.004), level of education (P = 0.003), marital status (P=0.001), type of work (P=0.007), duration of diabetes (P< 0.001) and medications acquisition (P=0.040). No significant association was detected in

relation to body weight. LSD test revealed that diabetic patients ≥ 50 years have a significantly lower physical mean than those less than 50 years. Lower level of education ($\leq$ primary school) has a significantly lower mean than those having higher education (Institute or University). Single participants of both genders have a significantly higher mean than both married and widowed. Married have a significantly higher mean than widowed in both genders. The mean of those with sedentary type of work is significantly lower than both diabetics with heavy and moderate types of work. Diabetic patients for period less than 5 years have a significantly higher mean than those had longer period than 5 years.

Table 6 shows that there was a significant association of psychological domain of QOL with the level of education ($P=0.016$), marital status ($P=0.049$), type of work ($P=0.015$), and medications acquisition ($P=0.001$). The gender difference in the psychological domain does not reach the conventional level of 5% significance but it lies close to that figure ($P=0.052$). LSD shows that diabetic patients with lower level of education ($\leq$ primary school) have a significantly lower mean than those having higher education. Single diabetic patients have a significantly higher mean than both married and widowed and married have a significantly higher mean than widowed patients. The mean of diabetics with heavy type of work is significantly higher than both with moderate and sedentary types of work. Moderate type of work has a significantly higher mean than sedentary type.

DISCUSSION

In this study the physical and psychological parameters of QOL was significantly lower in the diabetic patients than in controls. The physical domain was affected more than psychological domain. These results are similar to results of

similar studies conducted in Gaza strip,² Iran³ and Saudi Arabia.¹²

Regarding diabetic patients age, this study revealed a significant relationship between the age of the diabetic patients and physical domain QOL. Younger patients had better QOL than older patients. LSD analysis clarified that patients less than 50 years of age had better QOL than older. This may be associated with aging process and lower physical activity. This result is similar to that of studies carried out in Saudi Arabia¹² and Estonia.¹³

Concerning gender of diabetic patients, females had lower mean score of QOL than males for physical and psychological domains. This finding could be attributed to gender inequalities, a high proportion of females being 60 years and more, widowed, and with $\leq$ primary school educational level, and sedentary work in comparison with males. Similar gender variations were observed in studies conducted in Gaza strip² and Iran.³

The level of education of diabetic patients had statistical significant effect on physical and psychological domains of QOL in positive direction. High level of education associated with better QOL. LSD test demonstrated that diabetic patients with lower level of education had the lowest QOL and were more affected by both physical and psychological domains of QOL than those with higher education. This finding is similar to that reported in Nigeria,¹⁴ indicating that education is an essential factor in understanding self care and management of diabetes, glycemic control, and perception of self worth.

Regarding marital status, being widows had negative effect on both physical and psychological domains of QOL. LSD test clarified that widowed patients were affected physically more than psychologically. This result may be a reflection of aging process or that widowed face difficulties of life alone.

Type of work of diabetic patients had

statistical significant effect on QOL for both domains in positive direction i.e. heavy work was associated with higher QOL. LSD test revealed that patients with heavy or mild work have better QOL than those with sedentary work in both physical and psychological domains. This result is consistent with those reported in Saudi Arabia ¹² and UK, ¹⁵ which revealed that exercise of 30 minutes for 3 days or more

each week produce positive changes in QOL.

Duration of having diabetes had a negative effect on the physical domain of QOL only. LSD test showed that the shorter the duration of the disease the better QOL, indicating that long duration of diabetes reduce the physical domain of QOL. This result agrees with a study done in USA in 2005.¹⁶

Table 5. Association of socio-demographic and clinical characteristics with physical domain of QOL in diabetic patients

Socio-demographic and clinical characteristics	No. Examined	Physical domain (Mean $\pm$ SD)	P- value (ANOVA or t – test)	P- value (LSD Test)
Age group (years)				
a < 30	10	13.77 $\pm$ 1.134	0.017	
b 30 - 39	18	13.46 $\pm$ 1.401		a $\times$ d 0.048
c 40 - 49	35	13.52 $\pm$ 1.624		a $\times$ e 0.040
d 50 - 59	57	12.63 $\pm$ 1.751		c $\times$ d 0.013
e $\geq$ 60	30	12.51 $\pm$ 1.798		c $\times$ e 0.015
Gender				
Male	57	13.50 $\pm$ 1.550	0.004	NA*
Female	93	12.68 $\pm$ 1.733		
Level of education				
a $\leq$ Primary school	104	12.71 $\pm$ 1.661	0.003	a $\times$ c 0.001
b Secondary school	25	13.29 $\pm$ 1.665		
c Higher education	21	14.02 $\pm$ 1.597		
Marital status				
a Single	10	14.53 $\pm$ 1.146	0.001	a $\times$ b 0.006
b Married	116	13.03 $\pm$ 1.594		a $\times$ c < 0.001
c Widowed	24	12.17 $\pm$ 1.978		b $\times$ c 0.020
Types of work				
a Heavy	4	14.33 $\pm$ 1.721	0.007	a $\times$ c 0.012
b Moderate	125	13.11 $\pm$ 1.642		b $\times$ c 0.007
c Sedentary	21	12.03 $\pm$ 1.773		
Duration of DM (years)				
a $\leq$ 5	43	13.98 $\pm$ 1.410	<0.001	a $\times$ b < 0.001
b 6 - 10	67	12.65 $\pm$ 1.630		a $\times$ c < 0.001
c 11- 15	23	12.48 $\pm$ 1.789		a $\times$ d 0.002
d > 15	17	12.51 $\pm$ 1.671		
Medications acquisitions				
Diabetic center	83	12.73 $\pm$ 1.792	0.04	NA
Diabetic center and private sector	67	13.31 $\pm$ 1.551		
Body weight				
Normal weight	100	12.98 $\pm$ 1.790	0.973	NC**
Overweight	28	13.06 $\pm$ 1.542		
Obese	22	12.97 $\pm$ 1.583		
Total	150	12.99 $\pm$ 1.707		

* NA = Not applicable for gender and medication acquisitions

** Not conducted

Table 6. Association of socio-demographic and clinical characteristics with psychological domain of QOL in diabetic patients

Socio-demographic and clinical characteristics	No. Examined	Psychological domain (Mean $\pm$ SD)	P- value (ANOVA or t – test)	P- value (LSD Test)
Age group (years)				
a < 30	10	13.02 $\pm$ 0.696		
b 30 - 39	18	12.67 $\pm$ 0.764		
c 40 - 49	35	13.35 $\pm$ 1.113		
d 50 - 59	57	12.99 $\pm$ 1.113	0.232	NC
e $\geq$ 60	30	13.09 $\pm$ 1.029		
Gender				
Male	57	13.27 $\pm$ 1.048	0.052	NA
Female	93	12.93 $\pm$ 1.026		
Level of education				
a $\leq$ Primary school	104	12.90 $\pm$ 1.073	0.016	a $\times$ b 0.041
b Secondary school	25	13.37 $\pm$ 1.056		a $\times$ c 0.018
c Higher education	21	13.49 $\pm$ 0.641		
Marital status				
a Single	10	13.44 $\pm$ 0.873	0.049	a $\times$ c 0.035
b Married	116	13.12 $\pm$ 1.056		b $\times$ c 0.032
c Widowed	24	12.62 $\pm$ 0.953		
Types of work				
a Heavy	4	13.65 $\pm$ 0.957	0.015	b $\times$ c 0.008
b Moderate	125	13.14 $\pm$ 1.010		a $\times$ c 0.038
c Sedentary	21	12.49 $\pm$ 1.100		
Duration of DM (years)				
a $\leq$ 5	43	13.41 $\pm$ 1.067		
b 6 - 10	67	12.96 $\pm$ 1.027	0.069	NC
c 11- 15	23	12.88 $\pm$.852		
d > 15	17	12.82 $\pm$ 0.157		
Medications acquisitions				
Diabetic center	83	12.80 $\pm$ 1.107	0.001	NA
Diabetic center and private sector	67	13.37 $\pm$ 0.870		
Body weight				
Normal weight	100	13.08 $\pm$ 1.078	0.736	NC
Overweight	28	13.11 $\pm$ 0.980		
Obese	22	12.90 $\pm$ 0.997		
Total	150	13.06 $\pm$ 1.044		

Diabetic patients who receive treatment from both the diabetic center and private sector had better QOL. This result may be attributed to better socio-economic status of patients receiving treatment from both public and private sectors. This subject, however, needs further assessment.

In conclusion, the QOL of diabetics was significantly lower than that of matched controls in both physical and psychological domains of QOL. Physical parameters were more affected than psychological parameters in diabetic

patients. Diabetes had a greater impact on the QOL of females and older patients (50 years and more) than on the QOL of males and the young. Older diabetics (50 years and more) were affected more physically than psychologically. Factors that decrease physical and psychological domains of QOL were gender (being female), age 60 years and more, low level of education, sedentary type of work and long duration of diabetes. Therefore, changes in health-related QOL should be considered in the management of all people with diabetes in all health care settings.

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پوخته

کاریگه‌ری شه‌کره له‌سه‌ر لایه‌نه‌کانی جه‌سته‌یی و ده‌روونی له چۆنیه‌تی ژیا‌نی نه‌خۆشان له شاری هه‌ولێر/ عێراق

پێشه‌کی و ئارمانج: بایه‌خ دان به‌ چۆنیه‌تی ژیا‌ن و پێک‌ه‌ستنی گ‌رینگی دانه به‌ پێش‌كه‌وتنی بواره‌کانی ته‌ندروستی و بۆته به‌ردی بناغه‌ی چاره‌سه‌ری شه‌کره. ئامانجی ئهم توێژینه‌وه‌دا هه‌له‌سه‌نگاندنی کاریگه‌ری شه‌کره له‌سه‌ر بوا‌ری جه‌سته‌یی و ده‌روونی له‌ چۆنیه‌تی ژیا‌نی نه‌خۆشانی شه‌کره.

ریک‌ئین فه‌کولێتی: لیکۆلینه‌وه به‌ به‌راوردی نیوان نه‌خۆش وله‌ش ساغ ئه‌نجام دراوه له‌ بنکه‌ی ته‌ندروستی شه‌هید له‌یلا قاسم بۆ نه‌خۆشی شه‌کره. زانیاریه‌کان کۆکرانه‌وه به‌ به‌کاره‌ێنانی پا‌رسی ناوبراو سه‌ر به‌ پیک‌خراوی ته‌ندروستی جیهانی (WHO) له‌ سه‌ر چۆنیه‌تی ژیا‌ن له‌ سه‌ر ١٥٠ توشب‌وو به‌ شه‌کره به‌رامبه‌ر ١٥٠ توشنه‌بووان به‌ شه‌کره که پیک‌هات‌بوو له ١٠٠ پرس‌یار.

ئه‌نجام: له ئه‌نجامی توێژینه‌وه‌که‌دا ده‌رکه‌وت که کاریگه‌ری شه‌کره له‌سه‌ر هه‌ردوو بوا‌ری (جه‌سته‌یی و ده‌روونی) له‌ چۆنیه‌تی ژیا‌ن که‌م‌ترن له‌ نرخ‌ی) P پ ($0.001 < P$)، له‌ گه‌ل کاریگه‌ری زیاتر له‌ سه‌ر بوا‌ری جه‌سته‌یی به‌م شیوه‌یه: ته‌مه‌نی نه‌خۆش پ (0.0017)، په‌گه‌ز پ (0.004)، ئاستی خوێندن پ (0.003)، لایه‌نی خ‌یزانداری پ ($0.001 < P$)، جو‌ری ئیش کردن پ (0.007)، ماوه‌ی توشب‌وون به‌ شه‌کره ($0.001 < P$)، ده‌رمان وه‌رگرتن پ (0.004). وه‌ کاریگه‌ری شه‌کره له‌سه‌ر بوا‌ری ده‌روونی به‌ جیاوازی له‌ نرخ‌ی پ به‌م شیوه‌یه: ئاستی خوێندن پ (0.006)، لایه‌نی خ‌یزانداری پ (0.049)، جو‌ری ئیش کردن پ (0.015)، وه‌ ده‌رمان وه‌رگرتن پ (0.001).

ده‌رئه‌نجام: له‌ده‌رئه‌نجامی توێژینه‌وه‌که‌دا ده‌رکه‌وت که هه‌ردوو بوا‌ری (جه‌سته‌یی و ده‌روونی) له‌ چۆنیه‌تی ژیا‌ن له‌ ئاستی نزم‌ترن به‌ به‌راورد له‌ گه‌ل توشنه‌بووان به‌ شه‌کره ، وه‌ کاریگه‌ری شه‌کره له‌سه‌ر بوا‌ری جه‌سته‌یی زیاتره وه‌ک له‌ سه‌ر بوا‌ری ده‌روونی . ژنان زیاتر کاریگه‌رن له‌ پیاوان وه‌ به‌سالا چوان له‌ سه‌روی ٥٠ سال‌ زیاتر کاریگه‌ری جه‌سته‌یین وه‌ک له‌ ده‌روونی.

الخلاصة

تأثير السكرى على المجالين البدني والنفسي لنوعية حياة المرضى فى مدينة اربيل / في العراق

خلفية واهداف البحث: تعتبر نوعية الحياة حصيلة صحية هامة لجميع التداخلات الصحية واصبحت قضية جوهرية فى الرعاية بالسكرى. الهدف من الدراسة هو تقييم تأثير السكرى على نوعية الحياة في المجالات البدنية والنفسية.

طرق البحث: تم اجراء دراسة للحالات و الشواهد في المركز الصحى للشهيدة ليلى قاسم لمرضى السكرى فى مدينة اربيل. اختيرت عينة غرضية من النوع الاول و الثانى لمرض السكرى عددهم ١٥٠ مريضاً يقابلها ١٥٠ شخص بدون سكرى مطابقين لهم في العمر و الجنس . استخدم فى جمع البيانات للمجالين (البدني والنفسي) من نوعية الحياة الاستبيان الخاص لمنظمة الصحة العالمية WHO مكون من ١٠٠ فقرة.

النتائج: كلا المجالين البدني والنفسي لنوعية الحياة كان ذات اقل من دلالة ($P < 0.001$) و اظهرت للدراسة وجود اختلاف ذات دلالة احصائية عاليه بين مجال البدني لنوعية الحياة وما يتعلق بالعمر ($P = 0.017$)، الجنس ($P = 0.004$)، مستوى التعليم ($P = 0.003$)، الحاله الزوجية ($P = 0.001$)، نوع العمل ($P = 0.007$)، مدة المرض ($P < 0.001$)، استلام الادوية ($P = 0.040$). تبين ايضا وجود اختلاف ذات دلالة احصائية عاليه بين المجال النفسى لنوعية الحياة وما يتعلق بمستوى التعليم ($P = 0.016$)، الحاله الزوجية ($P = 0.049$)، نوع العمل ($P = 0.015$) و استلام الادوية ($P = 0.001$).

الاستنتاج: كلتا الجوانب البدنية والنفسية لنوعية الحياة كانت متأثرة بالسكرى، المجال البدني متأثر اكثر منه على النفسى و تأثير السكرى على الاناث اكثر منه على الذكور وعلى كبار السن فوق ٥٠ سنة اكثر منه على الشباب خاصة في المجال البدني.

THE GASTROCNEMIUS MUSCLE FLAP USED AS COVER FOR EXPOSED UPPER TIBIA

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ABSTRACT

Background and Objectives Management of exposed tibia as a result of any injury is challenging condition. The difficulties come from poor vascularity of the area with high incidence of infection rate especially in delayed management waiting for the granulation tissue. However the versatility of the gastrocnemius muscle flap for reconstruction of defects in the knee region from upper one-third of the calf to lower third of the thigh is well known. The objective of the study is to evaluate the results of the gastrocnemius muscle flap used as cover for exposed upper tibia and its complications.

Methods Among 20 cases in between 2004-2009 with different type of injuries to the lower limb, the gastrocnemius muscle flap used to cover exposed tibia.

Results All flaps survived, however minor complications such as wound dehiscence, cellulitis, or hematoma, were encountered in 6 cases (30%).

Conclusion The study reports the safe and successful and of exposed upper one – third tibia and shows advantage of gastrocnemius muscle flap as early covering of the exposed upper tibia.

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Key words: Gastrocnemius muscle, Flap, Upper Tibia

Management of compound fracture of tibia Gastelo type III, with involvement of Knee joint, present difficult problem to orthopedic and plastic surgeon. Reconstructive procedure is frequently required to cover the exposed bones or joints, to obliterate the dead space and help eradicate infection and vascularized the wound of subsequent bone grafting. Even in complex wound such as chronic osteomyelitis.¹

Muscle flap have gained wide popularity in this context since their first use by Ger.²⁻⁴ Muscle flaps are also suitable for coverage of open joint and exposed orthopedic implants.⁵ Early cover has been found to reduce the incidence of complication.⁶

The gastrocnemius muscle flap is the workhorse of all muscle flaps for soft tissue coverage around the knee.⁷ This type I

muscle flaps with their unique and independent vascular anatomy, one pedicle(sural artery) at the level of the knee joint situated close to its origin provide blood supply to the heads of the gastrocnemius muscle. These vessels arise from the popliteal artery above the level of the knee joint. Each course a few centimeters with its venae comitantes before entering the anterior aspect of the proximal muscle belly with the innervating branches of the tibial nerve.^{8,9}

The fact that the size of the muscle belly, its location in the dissection field and its transfer does not adversely impair function of the limb make it an ideal flap to cover wound in the region.¹⁰

The purpose of this study was to evaluate the results of the gastrocnemius muscle flap used as cover for exposed upper tibia and its complications.

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METHODS

Between (2004 –2009), twenty cases with exposed upper one – third tibia were treated with gastrocnemius muscle flap in Sulaimani hospital for Burn and Reconstructive Surgery, from the day of admission till the day of discharge from hospital (Table 1).

In all cases of trauma emergency operative procedure include debridement and bony fixation by external fixator done because all associated with Gustilo type III fracture tibia insipid of its exposed and patient's usually required further debridement and preparation of wound for coverage. Swab culture of wound was sent in all cases and any overt infection was treated .Flap coverage was provided after 1- 4 weeks of trauma, most patients were operated on under tourniquet. In osteomyelitis cases the wound thoroughly debrided to ensure complete removal of necrotic tissues and osteomyelitic bone (Figure1 and 2).

For medial gastrocnemius, incision was made 2-3 cm, behind the medial border of tibia from the popliteal fossa to below mid-calf level. Incision was

deepened to deep fascia and medial head of gastrocnemius was identified and separated from under soleus muscle (Figure 3). Distal end of muscle was sharply divided from the Achilles tendon taking care to include some portion of tendinous material with the muscle belly as this improved suture holding. It was then divided and separated from lateral gastrocnemius at the mid line raphe , care should be taken to avoid injury to sural nerve and short saphinous vein, muscle was then interchanged anteriorly to cover the defect flap fixed by suturing (Figure 4), and muscle covered by skin graft (Figure 5).

In lateral gastrocnemius muscle flap the common peroneal nerve need to be positively identified and safe guarded, the rest of the procedure was completed as on the medial side. Suction drain used, wound closed and then supported with splint.

The limb was immobilized for 1 week, flap checked at the 3rd postoperative day and the patient then followed up as inpatient for 1 week and weekly as outpatient for 2 – 3 months. The patient is then discharged after full assurance of success (Figure 6).

Table 1. Patient classification

Patient	No. of the cases	Age	Sex	Type of flap used
Trauma (RTA)	6 cases	24	M	Rt. Medial
		26	M	Rt. Medial
		27	F	Lt. Medial
		32	M	Rt. Medial
		39	M	Rt. Medial
		41	F	Lt. Lateral
		22	M	Lt. Medial
		23	M	Rt. Medial
		28	M	Rt. Medial
		32	F	Rt. Medial
Explosion	6 cases	35	M	Rt. Lateral
		45	M	Lt. Medial
		21	M	Rt. Medial
Bullet injury	3 cases	24	M	Lt. Medial
		35	M	Lt. Medial
		46	M	Rt. Medial
Osteomyelitis	3 cases	50	M	Lt. Medial
		63	M	Lt. Medial
Burn	2 cases	28	M	Lt. Medial
		67	M	Lt. Medial



Figure 1. Chronic osteomyelitis of right upper tibia



Figure 2



Figure 3

Figure 2 and 3. Debridement of Tibia and separation of medial head of gastrocnemius muscle



Figure 4



Figure 5

Figure 4 and 5. Muscle cover the defect and skin graft applied



Figure 6. Complete healing of wound

RESULTS

Age and sex Among 20 cases treated in this study, 17 (85%) were males and the remaining 3 (15%) were female. The commonest age group was between (20–29) years (Figure 7).

Types of injury Fifteen patients had open fracture of tibia Gustilo type III, three patients had osteomyelitis to upper tibia, and two patients had deep burn over tibia that required excision down to and including periosteum and subsequent muscle flap coverage (Figure 8).

Types of muscle flap Medial gastrocnemius was used in 18 cases and lateral gastrocnemius in 2 cases. Both

heads of gastrocnemius muscle were not needed in same patient (Figure 9).

Complications No flap loss was recorded in any of the procedure. Minor complications (e.g. partial wound dehiscence, local cellulitis, partial loss of skin graft, and small hematomas) were encountered in some patients which was treated accordingly and ends with good result. Infection was controlled by use of specific antibiotics on the result of culture and sensitivity. We have noted no functional disturbance when these muscles have been utilized, and generally, we do not hesitate to use either or both. No patient suffered morbidity from the donor site.

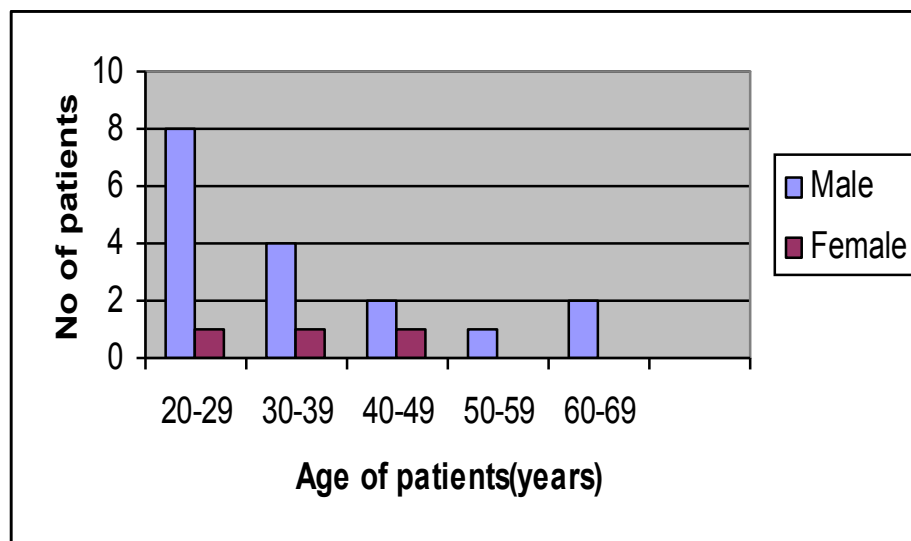


Figure 7. Age and Sex incidence

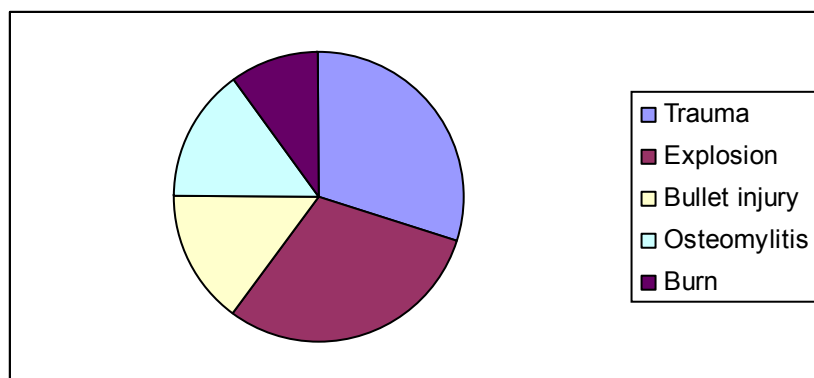


Figure 8. Types of injuries

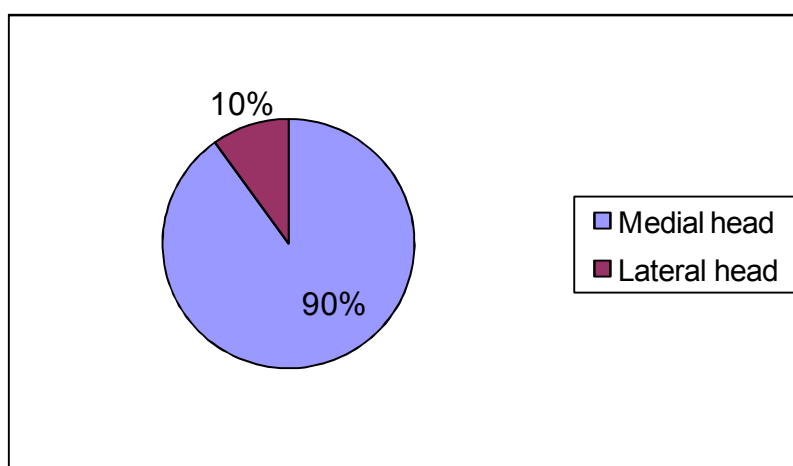


Figure 9. Types of gastrocnemius muscle flap

DISCUSSION

Muscle flaps have been one of the most significant developments in the management of compound fractures.¹ Their importance has increased specially in management of compound tibial fractures because of the poor vascularity of the region and subcutaneous nature of the bone and the time taken waiting for possible closure by granulation tissue generally increase the risk of infection.¹¹ Displaced fractures deprive the bone of its endosteal blood supply and when this is associated with compounding, the periosteal blood supply may also be damaged. This is the most important cause of delayed union and non union of fractures as well as chronic osteomyelitis of tibia.¹² Muscle flaps, by virtue of their excellent intrinsic blood supply and mouldable nature that fills in the irregular cavities of the bone, are the best solution for such defects.⁴ This is reflected in our study in the form of enhanced rate of bony union and cure of chronic osteomyelitis.

When bone is exposed, free tissue transfer has become an accepted method for covering clean or infected soft tissue defects of the lower leg. Myocutaneous flaps, especially the latissimus dorsi flap, have proven to be very reliable in treating these difficult wounds. Simple muscle flaps covered with split skin grafts are

equally effective but are less bulky. They therefore produce less of a bulging contour deformity of the lower leg and also have less donor site morbidity.¹³

An extensive tibial wound of the leg is commonly associated with orthopaedic trauma and the successful soft-tissue coverage of the open fracture site provides a critical means for primary or secondary healing of the tibial fracture and subsequent limb salvage. Aiache¹⁴ has described the use of lateral head of gastrocnemius to fill in osteomyelitic hole in the femur with excellent result. Lateral gastrocnemius, though smaller in size than its medial counterpart, satisfactorily covers the laterally located defect over anterior tibia and knee joint. Smith et al¹⁵ based on a five year experience described the surgical options in the repair of lower extremity soft tissue wounds. In their series of 60 cases, they found the suitability of muscle and musculocutaneous flaps in 35 cases. Out of these there were 14 cases of ipsilateral gastrocnemius muscle transfer and five cases of cross leg medial gastrocnemius muscle flap transfer from the opposite leg. We have not used the cross leg gastrocnemius muscle flap because of difficulties in postoperative immobilization and its attendant morbidity. If ipsilateral gastrocnemius

muscle is not suitable for transfer, then the free flap coverage of the defect is the next best option.

Bashir¹⁶ described the gastrocnemius tenocutaneous island flap that is based on the medial head of gastrocnemius muscle but the skin island is sited over the tendinous portion at the lower end of the muscle. The gastrocnemius muscle flap has been studied in detail and seven maneuvers that will allow the surgeon to gain more versatility with the medial and lateral gastrocnemius muscle have been emphasized.¹⁷

Neale et al¹⁸ have reviewed the complications of muscle flap transposition for traumatic leg defects in 71 patients. Total of 95 muscle flap transpositions were done and only five cases of muscle flap necrosis was found. However they found 31 cases of major and minor complications. Twenty four of these complications were present in the middle 1/3 and lower 1/3 of leg. They agreed that the causes of complications were mainly technical error, inadequate debridement, use of diseased and traumatized muscle and unrealistic objectives. We feel that fewer complications would result with careful preoperative evaluation and surgical planning, adequate debridement of bone and soft tissue and the transfer of healthy, non-traumatized muscle. When these basic surgical tenets are not violated, gastrocnemius muscle provides the best form of coverage for the defects located over upper 1/3 of tibia and knee joint.

In conclusion, muscle flap with axial pattern of blood supply have had significant impact on reconstructive surgery and have revolutionized the management of large composite tissue defects. Also, gastrocnemius muscle flap provides enough volume and length to repair large defects of the upper third of the leg and knee joint, and we believe that this flap is useful to reconstruct such lesions. Finally, twenty gastrocnemius muscle flap performed and evaluated.

Maneuvers and technical points are presented to enable the surgeon to get the most possible use of these two reliable muscle flaps and the donor site is acceptable cosmetically and functionally.

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پوختە

بەکارهێنانی لچیک ماسولکە ی لاق بۆ داپۆشینى پارچە ی دەرکەوتو لە بەشى سەرەوێ قامیشە ئیسک

پێشەکی و ئارمانج: ئەم توێژینە وه هەلسەنگاندنی نەشتەرگەری داپۆشینى دەرکەوتنى بەشى سەرەوێ قامیشە ئیسک بەهۆی بەکارهێنانی لچیک ماسولکە ی لاق.

ریکۆن فەکولینى: ماوه ی ئەنجامدانى توێژینە وه که له نیوان سالانى (٢٠٠٩-٢٠٠٤) بۆ ٢٠ بار له بریندارى پەلى خوارە وه به هۆی جیاوازه وه.

ئەنجام: له هەمو بارەکان لچیکەکان زیندوو بوون له گەڵ بوونی هەندى ماکی لاوهکی وه: کرانه وه ی برین و خانه سو و خوینە ل تەنها له شەش باردا.

دەرئەنجام: تە دەرئەنجامى توێژینە وه که سودى بەکارهێنانى لچیک ماسولکە ی لاق بۆ داپۆشینى دەرکەوتنى بەشى سەرەوێ قامیشە ئیسک دەرکەوت.

الخلاصة

استخدام سدلة عضلة الساق لتغطية الجزء المكشوف من القسم العلوي لعظم الساق

خلفية و أهداف البحث: ان هذا البحث يقيم عملية استخدام سدلة عضلة الساق لتغطية الجزء المكشوف من القسم العلوي لعظم الساق.

طرق البحث: فترة اجراء البحث كانت بين سنة (٢٠٠٤ – ٢٠٠٩) على عشرون حالة من اصابات مختلفة للاطراف السفلية.

النتائج: وكانت السدلة في كل الحالات سليمة مع وجود بعض المضاعفات الثانوية مثل، تفرز الجرح، التهاب خلوي، تجمع دموي، التي ظهرت في ٦ حالات فقط.

الاستنتاج: ان الدراسة خرجت باستنتاج هو مدى فائدة سدلة عضلة الساق لتغطية الجزء المكشوف من القسم العلوي لعظم الساق.

RISK FACTORS SURVEY FOR NON-COMMUNICABLE DISEASES IN DUHOK CITY

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ABSTRACT

Background and Objectives Non communicable diseases are increasing among different communities as a result of several epidemiological, economic and lifestyle changes. Assessment of risk factors for non-communicable diseases in any country is crucial and will provide a valuable economic and social support for the health sector. The objectives of the study establish a baseline non-communicable diseases risk factors profile in Duhok district.

Methods A cross sectional study was conducted. One thousand persons have been interviewed in 50 clusters in Duhok district from 20th of December, 2003 to 14th of January, 2004. The data have been collected according to World Health Organization stepwise approach to non-communicable diseases surveillance. The eligible persons were in the age of 25-69 years. The initial assessment was questionnaire based and done on the first day, then the person was visited on the second day for physical measurements and a blood sample was withdrawn and taken to the laboratory at Azadi general hospital for measurement of fasting plasma glucose and lipid profile. Persons with fasting plasma glucose = 99-125 mg/dl who were not known to be diabetics were asked to visit the hospital for oral glucose tolerance test; the results of which were interpreted according to World Health Organization 1999 criteria.

Results Current smokers constituted 2.2% of females and 46.8 % of males. No alcohol consumption has been recorded in females. In males, 5.4% have consumed a drink that contains alcohol. According to the American Heart Association recommendations, 97% of females and 96.2% of males were consuming low fruits and vegetables. Of those enrolled in the study, 44% of females and 23.2% of males had no physical activity for at least 3 times per week for at least 20 minutes. Using waist to hip ratio to identify android obesity, 57.8% of females had waist to hip ratio >0.85 and 10.6% of males had waist to hip ratio >1. Using the criteria set of systolic blood pressure >140 mmHg and / or diastolic blood pressure > 90 mmHg, the frequency of hypertension was 268 (53.6%) in females and 182 (36.4%) in males and 450 (45%) in general population. The prevalence of diabetes mellitus was 15.2% in females, 11.8% in males and 13.5% in general population. High total cholesterol (≥ 240 mg) has been recorded in 6.6% of females and 5.6% of males. High low density lipoprotein (≥ 160 mg/dl) and low high density lipoprotein (≤ 40 mg/dl) coexisted in 3% of females and 3.4% of males.

Conclusion The prevalence of the risk factors of non-communicable diseases is generally high necessitating establishing a healthy lifestyle program in Duhok governorate. Also periodic non-communicable diseases risk factors surveys or establishing a surveillance system is necessary to monitor the trends of non-communicable diseases risk factors.

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Key words: Non-communicable diseases, Risk factors, Duhok district

In the new millennium, people are facing serious challenges in health care due to rising trends in Non communicable

diseases (NCD) as a result of demographic and epidemiological changes, as well as economic globalization. Dramatic increase

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in life expectancy, combined with profound changes in lifestyles are leading to epidemics of NCD, mainly cardiovascular diseases, cancer and diabetes mellitus (DM), throughout the world. In 1998, an estimated 43% of all Disability Adjusted Life Years (DALYs) were attributed to NCD. In low-and middle- income countries, the figure was 39%, while in high- income countries it was 81%. NCD account for 63% of global deaths. Their share of the disease burden is expected to rise to 73% by 2020.¹ Most of this increase will be accounted for by emerging NCD epidemics in developing countries.²

Assessment of the disease burden and establishing a risk factor profile provide scientific evidence and trend analysis that can be used for effective planning, implementation and evaluation.³ Such efforts are crucial in the context of the emerging NCD disease burden in developing or newly industrialized countries, which will have significant social and economic consequences for governments and health systems. Preventive programs are needed to halt the rapid rise in risk factor levels responsible for increasing disease burdens. Such programs require information on the distribution of major preventive risk factors in populations and regular, ongoing data collection to evaluate and refine interventions.⁴

Without good epidemiological data, it will be impossible to set appropriate and measurable targets for the development of effective and evidence-based programs, or to evaluate the outcomes of programs. However, there are still many barriers to efficient NCD surveillance in the developing countries.³

Although there are diverse classifications for NCD risk factors, the risk factors focused upon in this survey are hypertension, diabetes mellitus (DM), lipid disorders, smoking, alcohol consumption, low vegetable and fruit consumption, physical inactivity and excess weight.

These risk factors are generally studied in the NCD risk factors surveys because they are modifiable (lifestyle-related) and the majority of the NCD cases and deaths are attributed to these risk factors.

The baseline epidemiological information about the NCD risk factors has not been established in this governorate which made planning and assessment of the interventions for NCD very difficult, bearing in mind the diverse distribution of the NCD risk factors and their relation to a lot of local factors including religious, social, economic....etc. From these points of view, planning has been made to do this survey to provide the health administration and clinicians with the data required for better planning and clinical thinking.

METHODS

The population in Duhok district is estimated to be 250000 by 2004 (depending on 1996 population data and a natural growth rate of 3.5%). This district has been selected because of technical issues like availability of laboratory facilities, better health education which makes response easier and better, easier communication with people who need more investigations....etc.

This survey is a cross-sectional population based household prevalence study which has been conducted in Duhok district over the period from 20th of December, 2003 to 14th of January, 2004. The sampling method was multistage sampling. The total sample size has been estimated to be 1000 which has been selected from the general population in Duhok district. The sample has been stratified according to age. At start, 50 clusters have been selected randomly according to the systematic random cluster sampling technique (World Health Organization (WHO) methodology).⁵ In each cluster, 2 females and 2 males were sampled in each of the age groups:- 25-33, 34-42, 43-51, 52-60 and 61-69 years until

a total number of 20 persons was reached. The age was taken according to the age in full years on the date of interview. Each cluster was visited for four days; half of the cluster size (10 persons) was interviewed on the first two days and the other half on the second two days.

Form-2 of the WHO stepwise approach to NCD surveillance⁵ has been used which includes the core and expanded questions with some modifications to fit the regional needs. The questionnaire form included three steps; the first of which included questions about demographic characteristics, tobacco use, alcohol consumption, nutrition according to American Heart Association (AHA) recommendations,⁶ and physical activity. The second step included measurements of height, weight, waist girth, hip girth, pulse rate, blood pressure and questions regarding current pregnancy, history of hypertension and the use of any treatments for hypertension. The third step consisted of biochemical measurements which included asking about the fasting status, history of diabetes and any treatment for DM, fasting plasma glucose (FPG) and the blood lipid profile.

The intensity of smoking was assessed based on the average daily cigarette smoked. It was divided into three groups; light (< 15 cigarettes/day), moderate (15-24 cigarettes/day) and heavy ($\geq$ 25 cigarettes/day).⁷ Respondents were asked to about the average number of serving of fruits and vegetables consumed in a day. According to AHA recommendations, a person should consume 5 or more servings of fruits and vegetables daily.⁶ This cut-off point was also used in this study to identify those who did not consume the recommended servings of fruits and vegetables. The physical activity was assessed by asking the respondents about the time spent doing different kinds of activities and the intensity of the activities. Activities were categorized into three groups. Vigorous-intensity activity was described as activities as heavy lifting,

digging, or construction work for at least 10 minutes at a time. Moderate-intensity activity was described as activities like brisk walking or carrying light loads for at least 10 minutes at a time. Low-intensity activity was defined as activities like sitting and walking less than 10 minutes.⁶

The height was checked using special height rules according to the Multinational MONItoring of trends and determinants in Cardiovascular diseases (MONICA) project recommendations.⁵ The weight was checked using digital scales after testing with standard weights. Body mass index (BMI), calculated by dividing the weight in kilograms by the height in squared meters, was used to identify those with overweight and obesity. They were divided into 5 classes: underweight (BMI < 18.5), Normal (BMI = 18.5 – 24.9), overweight (BMI = 25-29.9), obesity (BMI= 30-39.9), and morbid obesity (BMI $\geq$ 40).⁸ Android obesity (abdominal obesity) is defined by a Waist to hip ratio (WHR) > 1 in males and > 0.85 in females.⁹ Lately, researches had indicated that measurements of waist circumference (WC) alone might suffice to define disease risk of intra-abdominal fat.⁸ The waist and hip circumferences were checked using a plastic metric tape. The height was approximated to the nearest centimeter and the waist and hip circumferences were approximated to the nearest 0.0 or 0.5 centimeters, while the weight was approximated to the nearest 200 grams.⁵

The blood pressure was checked in sitting position with the patient and examiner sitting on chairs so that the patient's heart and arm, sphygmomanometer and examiner's eye are at the same level. The blood pressure was checked three times with 30 seconds among using the standardized mercury sphygmomanometer. The blood pressure was approximated to the nearest 2 mmHg (reading from the top of the rounded meniscus).⁵ Persons who found to be have systolic blood pressure (SBP) > 140 mmHg and / or diastolic blood pressure

(DBP) > 90 mmHg^{6,10} at the time of the interview and those who have been previously told by a doctor that they are hypertensive and are currently on treatment lines for hypertension were considered to be hypertensive. The already diagnosed hypertensive patients have been subdivided into controlled hypertension (SBP < 140 mmHg and/or DBP < 90 mmHg) and uncontrolled hypertension (SBP > 140 mmHg and/or DBP > 90 mmHg).⁶

In the field, at least 3 ml of the blood were withdrawn from each person after confirming fasting status and the blood was placed in a plain tube which was placed in a container that prevents shaking of the sample to avoid hemolysis and were taken into Azadi general hospital laboratory department where the biochemical measurements were carried out using spectrophotometric enzymatic method for measurements of total cholesterol (TC), high density lipoprotein (HDL) and triglyceride (TG). The very low density lipoprotein (VLDL) level was calculated by dividing TG by 5 and then the low density lipoprotein (LDL) level was calculated by subtracting the sum of HDL and VLDL from the TC. When the TG level was more than 400 mg/dl, the person was asked to come on another day to repeat the measurements of lipid profile using special LDL kits (depending on precipitation / enzymatic method) for measurement of LDL level,¹¹ and the response rate for this was 84%. The cut points used for definition of the high or warning levels of lipid profile are those published recently by the National Health Education Program that has been developed by the Nation Institute of Health's Lung and Heart Department in USA.¹² The FPG was checked using the enzymatic colorimetric method (GOD / POD). When the FPG was between 99-125 mg/dl. in a person who has not been diagnosed previously to be diabetic, the person was asked to visit the hospital for Oral glucose tolerance test (OGTT) and

the response rate for this was 80% (84% for females and 76% for males). The results of OGTT were interpreted according to the WHO 1999 criteria.⁷ Diabetic patients have been categorized into newly diagnosed (those who have not been told previously that they are diabetic) and already diagnosed (those who have already been told by a doctor that they have diabetes and are currently on treatment for diabetes). The already diagnosed diabetic patients have been subdivided into controlled diabetes (FPG < 126 mg/dl) and uncontrolled diabetes (FPG > 126 mg/dl). Although clinical diagnosis needs retesting, the assessment of FPG on a single occasion is considered to be sufficient in surveys.¹³ The spectrophotometric measures were done using the Bioteck and the S250 analyzers.

The data were entered using the MS-excel spreadsheet and the SPSS software version 11.0.0 was used to analyze and tabulate the data.¹⁴ For continuous variables, the mean and the standard deviation (sd) were calculated as well as the frequencies of the subjects above or below specified cut-off points for the risk factors. The survey data were generally weighted by gender.

RESULTS

Socio-demographic characteristics The environment of the interviewees was urban in 860 (86%) and rural in 140 (14%). This was exactly the same as that stated in the records of the planning department of DOH-Duhok for the population distribution in Duhok district. A total of 500 males and 500 females were involved in the sample. In each of the 50 clusters, 2 males and 2 females were selected from each of the five age groups.

Figure 1 shows the level of education of the interviewees. It shows that 50% (n=250) of the females had never attended the school compared to 26.8% (n=134) for males. The percentage of male or female interviewees decreased as the education

level increases.

Tobacco use The interviewees had been classified into current smokers, exsmokers and non-smokers as shown in figure 2 which compared the females and males. The current smokers were 2.2% (n=11) of females and 46.8% (n=234) of males.

Of current smokers, 36.3 % (n=4) of females and 88 % (n=205) of males had started smoking when they were in their teen ages. The mean age at which current smokers had started smoking was 30 years for females and 17 years for males. Most (72%) of the current male smokers were moderate and heavy smokers.

Alcohol consumption Alcohol consumption was recorded in females, while only 27 (5.4%) of males consumed a drink that contains alcohol in their life. This was in the last 12 months in 20 (4%) of them. Of these, 9 (1.8%) were consuming at least one drink on 5 or more days per week, 2 (0.4%) on 1-4 days per week, 3 (0.6%) on 1-3 days per month and 6 (1.2%) less than once a month. The number of drinks consumed was one drink in 15 (3%) and 2 drinks in 5 (1%). Alcohol consumption was found in 14 (50%) of the Christian males and 13 (2.8%) of Muslim males.

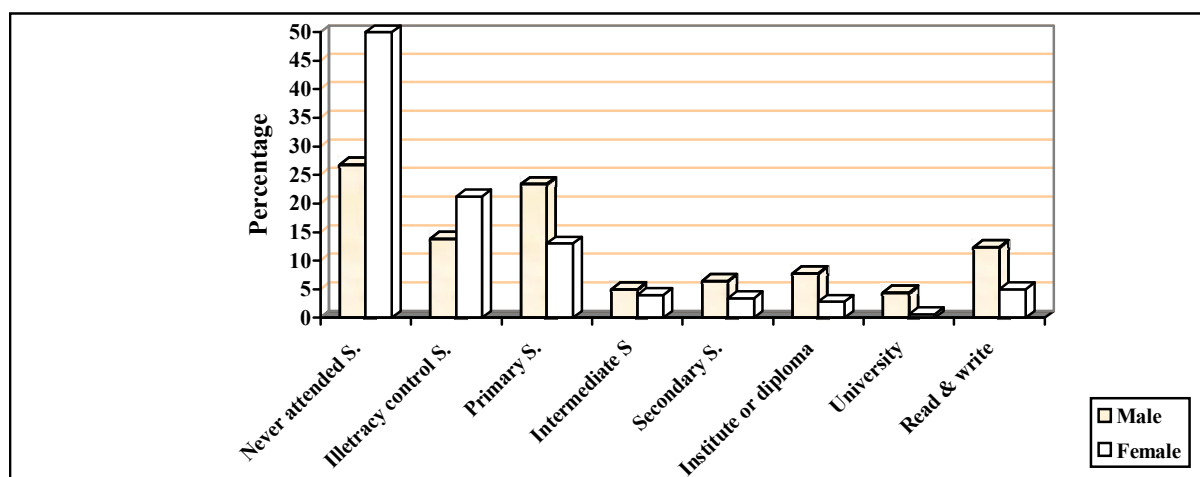


Figure 1. The level of education completed by the interviewees

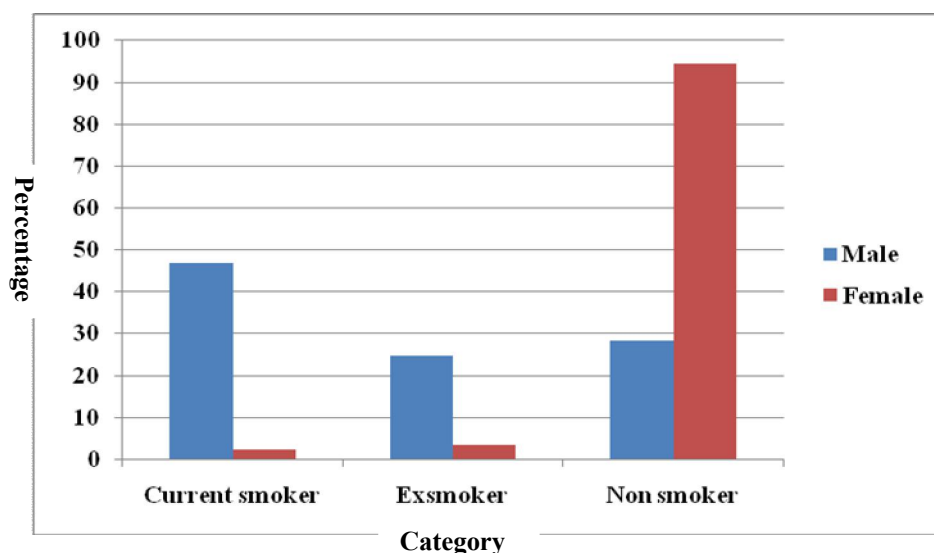


Figure 2. Categories of interviewees regarding smoking

Nutritional assessment According to the AHA recommendations, 485 (97%) of females and 481 (96.2%) of males were consuming low fruits and vegetables. Among females, 497 (99.4%) were preparing meals at home compared to 491 (98.2%) of males. The type of the oil or fat used by females was vegetable oil in 153 (30.6%) and vegetable fat in 347 (69.4%), while for males, it was vegetable oil in 131 (26.2%) and vegetable fat in 369 (73.8%).

Physical activity The typical work day for females ranged between 0.5-14 hours with a mean of 5 hours (sd=3.2) while for males, it ranged between 2-14 hours with a mean of 4.9 hours (sd= 4.1). Of females, 77.4% (n=387) were working in the households compared to 0.8% (n=4) of males. The categories of physical activity of interviewees are shown in table 1. Females were more likely to be involved in moderate activities than males (31.8% versus 18.2%). On the other hand, males were likely to do vigorous activities than females (10.4% versus 1.8%). Of those enrolled in the study, 220 (44%) females and 116 (23.2%) males had no physical activity for at least 3 times per week for at least 20 minutes each time in their occupation, travel and recreation, leisure and sport (RLS) time. The physical activity in those who have such activity is mostly travel related. The range of the sitting (reclining) time in males was 0.5-14 hours with a mean of 5.3 hours (sd=2.7) while in females, the range was 0.5-15 hours with a mean of 5.5 hours (sd=3.1).

Anthropometric measurements Table 2 shows BMI measurement of both males and females. Most of the interviewees, both males and females, were belong in the overweight and obesity categories.

Android obesity (abdominal obesity) was found in 53 (10.6%) of males and 289 (57.8%) of females. Using WC measurements, 95 (19%) of males have $WC \geq 102$ cm and 328 (65.6%) of females have $WC \geq 88$ cm.

Hypertension Using the criteria set of SBP >140 mmHg and / or DBP > 90 mmHg, the prevalence of hypertension was 53.6% in females and 36.4% in males and 45% in general population. Of hypertensives, 205 (76.5 %) females and 151 (83%) males were above the age 45 years. The BP profile of the participants is illustrated in table 3.

The newly diagnosed hypertensive patients constituted 78 (29%) of hypertensive females and 102 (56%) of hypertensive males; of these, 48 (62%) females and 51 (50%) males have checked their blood pressure in the last 12 months. Of female hypertensives, 190 (71%) have already been already diagnosed; of these, 139 (52% of hypertensive females) had uncontrolled hypertension while 51 (19% of hypertensive females) had controlled hypertension. Of male hypertensives, 80 (44%) have already been already diagnosed; of these, 59 (32% of hypertensive males) had uncontrolled hypertension while 21 (12% of hypertensive males) had controlled hypertension.

The use of different current treatment lines in the controlled and uncontrolled hypertensive individuals have been listed in table 4. Most of the hypertensives were using drugs and diet as the current treatment lines. The prevalence of controlled hypertension among hypertensives was more in females (19%, n=51) than in males (12%, n=21).

Table 1. Categories of physical activity during occupation or RLS time

Category	Females	Males
Sitting or walking < 10 min.	332 (66.4%)	357 (71.4%)
Moderate activities for at least 10 min.	159 (31.8%)	91 (18.2%)
Vigorous activities for at least 10 min.	9 (1.8%)	52 (10.4%)

Table 2. Categories of BMI of the interviewees

Category	Females	Males
Underweight (<18.5)	2 (0.4%)	6 (1.2%)
Normal (18.5 – 24.9)	85 (17%)	165 (31.2%)
Overweight (25 – 29.9)	140 (28%)	186 (37.2%)
Obesity (30 – 39.9)	232 (46.6%)	139 (27.8%)
Morbid obesity (≥ 40)	41 (8.2%)	4 (0.8%)

Table 3. Blood Pressure Profile of the participants

Parameters	Female	Male
Systolic blood pressure (mmHg)		
Mean	140	133
Sd	27	21
Diastolic blood pressure (mmHg)		
Mean	87	85
Sd	14	11

Table 4. The use of different current treatment lines in the controlled and uncontrolled hypertensive individuals

Current treatment line	Controlled hypertension		Uncontrolled hypertension	
	Females (n=51)	Males (n=21)	Females (n=139)	Males (n=59)
Drugs, medicines	17 (33%)	13 (62%)	92 (66%)	33 (56%)
Special prescribed diet	30 (59%)	19 (90%)	113 (81%)	34 (58%)
Advice or treatment to lose weight	8 (16%)	7 (33%)	57 (41%)	24 (41%)
Advice or treatment to stop smoking	3 (6%)	9 (43%)	9 (6%)	25 (42%)
Advice to exercise	4 (8%)	10 (48%)	22 (16%)	14 (24%)
Herbal or traditional remedy for hypertension	6 (12%)	2 (10%)	23 (17%)	6 (10%)

Diabetes mellitus Of those examined, 76 (15.2%) females and 59 (11.8%) males had DM. The prevalence of DM in both sexes was 13.5% (n=135). The mean FPG in females was 90.7 mg/dl (sd=33) and in males, it was 90.6 mg/dl (sd=36). Those who have checked their blood sugar in the last 12 months constituted 128 (25.6%) of females and 88 (17.6%) of males. Of those who were indicated for OGTT (n=94), 51 were females and 43 were males. Of the females, 43 have responded to the request of visiting hospital for OGTT (response rate= 84%); while of the males, 33 have responded to the request (response rate=

77%). The results of the OGTT in the respondent are shown in table 5. DM has been diagnosed in 49% (n=21) of females and 36% (n=12) of males of those who have a FPG= 99-125 mg/dl on initial measurement.

Of those who have been diagnosed as diabetics, 37 (49%) females and 35 (59%) males were newly diagnosed; of these 10 (27%) females and 8 (23%) males had checked their blood sugar in the last 12 months. Of female diabetics, 39 (51%) were already diagnosed; 23 (30% of diabetic patients) of them had uncontrolled DM while 16 (21% of diabetic patients) of

them had controlled DM. Of male diabetics, 24 (41%) were already diagnosed; 15 (26% of diabetic patients) of them had uncontrolled diabetes; while 9 (15% of diabetic patients) of them had controlled diabetes.

The use of different current treatment lines in the controlled and uncontrolled diabetics have been listed in table 6. Most of the interviewees were using oral drugs and diet for control of their diabetes. 12% (n=9) of diabetic females and 10% (n=6) of diabetic males have insulin dependent DM.

DM coexisted with hypertension in 11.4% (n=57) of females, 6% (n=30) of males and 8.7% (n=87) of general population. DM, high LDL (≥ 160 mg/dl) and low HDL (≤ 40 mg/dl) had coexisted in 4 (0.8%) of females and 2 (0.4%) of

males.

Hypertension and diabetes were not significantly associated with any of the religious groups included in this survey.

Lipid profile For lipid profile, the mean, sd and the cut points which considered high or warning with their frequencies and percentages for both male and female interviewees are shown in table 7. High TC (≥ 240 mg) has been recorded in 6.6% (n=33) of females and 5.6% (n=28) of males. Those with high LDL (≥ 160 mg/dl) constituted 7.6% (n=38) of females and 5.8% (n=29) of males. Although high percentages of the interviewees had low HDL alone, only 15 (3%) of females and 17 (3.4%) of males had combined high LDL (≥ 160 mg/dl) and low HDL (≤ 40 mg/dl).

Table 5. The results of OGTT in the respondent interviewees

Category	Females	Males
Normal	11 (25%)	15 (46%)
Impaired fasting glucose	2 (5%)	1 (3%)
Impaired glucose tolerance	9 (21%)	5 (15%)
Diabetes mellitus	21 (49%)	12 (36%)
Total	43	33

Table 6. The use of different current treatment lines in the controlled and uncontrolled diabetics

Current treatment line	Controlled DM		Uncontrolled DM	
	Females (n=16)	Males (n=9)	Females (n=23)	Males (n=15)
Insulin	3 (19 %)	3 (33 %)	6 (26%)	3 (20%)
Oral drugs, medicines	10 (63%)	6 (67%)	18 (78%)	11 (73%)
Special prescribed diet	10 (63%)	5 (56%)	15 (65%)	12 (80%)
Advice or treatment to lose weight	4 (25%)	2 (22%)	7 (30%)	7 (47%)
Advice or treatment to stop smoking	2 (13%)	2 (22%)	3 (13%)	7 (47%)
Advice to exercise	1 (6%)	1 (11%)	6 (26%)	5 (33%)
Herbal or traditional remedy for DM	4 (25%)	2 (22%)	2 (9%)	1 (7%)

Table 7. The lipid profile of interviewees

Constituent	Females Mean (sd)	Males Mean (sd)	High or warning level		
			Cut points	Females No. (%)	Males No. (%)
T.G.	119 (68.7)	149.8 (99)	≥400 mg/dl	5 (1)	14 (2.8)
T. C.	183.7 (34.1)	181.6 (32)	≥240 mg/dl	33 (6.6)	28 (5.6)
HDL	45.6 (23)	38.2 (9.2)	≤ 40 mg/dl	194 (39)	335 (67)
LDL	114.6 (30)	114.5 (28.7)	≥ 160 mg/dl	38 (7.6)	29 (5.8)
TC/HDL	4.2 (1.2)	5 (1.34)	≥ 4.3	213 (43)	340 (68)
LDL/HDL	2.7 (1.0)	3.1 (1.1)	≥ 2.6	242 (48)	343 (69)

DISCUSSION

The objective of this survey was to establish a baseline NCD risk factors profile to assess the current NCD risk factors situation and to aid in the future effective planning, implementation and evaluation of NCD risk factors modification programs. The sampling method used was multistage sampling (combination of stratified, cluster (area) and systematic random sampling methods) which helped us to address our sampling in the most efficient and effective manner possible. Form-2 of WHO stepwise approach to NCD surveillance has been used which includes the core and expanded questions in three steps. The form has been modified especially in regard to alcohol consumption. The first step was questionnaire based and here, misreporting is expected as underreporting of alcohol and smoking and overreporting of physical activity and vegetable and fruit consumption. This has been minimized by making the interviews in privacy as possible. The second step included anthropometric measurements and here the weight and height scales were checked periodically for errors. Misclassifications of blood pressure status were minimized by taking the readings three times with 30 seconds in between. The response rates for OGTT and LDL measurements were generally acceptable for a household survey; they were higher for females than males and this is expected as men are more likely to work outside the home and are

less able to take time off work in order to participate in a study.

The current smokers were 2.2% (n=11) of females and 46.8% (n=234) of males. Studies in Oman and Kuwait showed lower rates of smoking. For instance, the study in Oman indicated that the prevalence of current smoking was 13.4% in males and 0.5% in females.¹⁵ In Kuwait, prevalence of current smoking among Kuwaitis aged 15 years and older was 31.7% in males and 1.4% in females.¹⁶ On the other hand, smoking prevalence in this study is less than that recorded in a study in Soussa in Tunisia in 1997, where the prevalence of current smokers was 4.2% of females and 61.4% in males.¹⁰ This may be explained by the fact excluded from this survey which is the relatively high percentage of exsmokers in the last 15 years which may be attributed to the increased awareness about the hazards of smoking and the double economic sanctions on Duhok governorate which resulted in high cost of living in general. After the removal of the sanctions on Iraq, smoking is expected to increase especially with the low prices of cigarettes resulting from nominal taxes, the lack of ban over cigarette advertises and the general improvement in incomes. The male to female ratio is more than twenty and this is expected to decrease with the global rising trend of smoking among females. An intervention against smoking is very important especially to protect our governorate from this trend with all of its consequences that affect the life of the

mother and siblings. As most of the current smokers are either heavy or moderate cigarette smokers, any intervention should be either intercategory (changing the current smokers to exsmokers) or intracategory (changing the heavy and moderate smokers to light smokers).

Although alcohol consumption is expected to be underreported, the very high prevalence of alcohol consumption in Christian males and the zero reporting in females (apart from underreporting) can be attributed to religious and social reasons.

The very low prevalence of consumption of vegetables and fruits may be due to the lack of awareness about the AHA recommendations to consume 5 or more servings of vegetables and fruits daily and the high cost of fruits and vegetables.

Although 56% (n=280) of females and 76.8% (n=384) of males have physical activity for at least 3 times per week for at least 20 minutes; most of this physical activity is travel related. For this reason, the physical inactivity is expected to rise in the future with the horizontal expansion of Duhok city.

The prevalence of overweight and obesity is higher than that recorded in comparable surveys in many countries. An example is the prevalence of obesity which is 46.6% (n=232) in females and 27.8% (n=139) in males compared to Tunisia (Soussa) where the prevalence of obesity was 34.3% in females and 12.4% for males.¹⁰ A higher rate of overweight and obesity was noticed in other studies. For example a study in Saudi Arabia found that 29.94% of adult males and 49.15% adult females were overweight.¹⁷ In Jordan, a study among adults 25 years and older indicated that the overall prevalence of obesity was 35.0% for men and 60.8% women.¹⁸ Also, a nationwide cross-sectional study among adults in Kuwait reported a prevalence of obesity of 53% in females and 39.2% in males.¹⁹ Android obesity was higher in females than males

defined by both sets of criteria (i.e. the WHR and WC). Using WHR, the prevalence of android obesity in our survey was 57.8% (n=289) among females and 10.6% (n=53) among males compared to 40% among females and 8% among males in a survey done in Philippines, in which the same criteria have been used.⁹ In a cross sectional study among Iranian who were 30-70 years old, prevalence of central (android) obesity was 72.2% in females and 26.2% in males using WHR and WC cut-points where males with $WHR \geq 0.9$ or $WC \geq 102$ cm and females with $WHR \geq 0.8$ or $WC \geq 88$ cm were considered to have central obesity.²⁰

Although the newest criteria used in MONICA data book for definition of hypertension are $SBP > 160$ mmHg and / or $DBP > 95$ mmHg²¹; this set of criteria has been used just for determination of the prevalence of hypertension while the other data analysis related to hypertension like the use of treatments for controlled and uncontrolled hypertension has based upon the criteria $SBP > 140$ and / or $DBP > 90$ mmHg as this set of criteria is still used for clinical definition and management of hypertension.¹⁰ The prevalence of hypertension was more in females by both criteria. The prevalence of hypertension was 28.4% in females and 18.2% in males (> 160 mmHg and / or $DBP > 95$ mmHg) compared to 18.9% in females and 18.6% in males in Tunisia (Soussa). With the use of other set of criteria (> 140 mmHg and / or $DBP > 90$ mmHg); it was 268 (53.6%) in females and 182 (36.4%) in males compared to 28.4% in females and 30% in males in Tunisia (Soussa).¹⁰ A community based survey of adults aged 30-70 years in Saudi Arabia found that prevalence of hypertension was 28.6% in males and 23.9% in females.²² The prevalence of controlled hypertension among hypertensives was more in females (19%, n=51) than in males (12%, n=21). The majority of patients lie in the uncontrolled hypertension category; this may be due to several factors like lack of awareness

about the importance of control of high blood pressure, the drugs given to hypertensive patients depend largely on the availability and lack of regular follow up. Most of those who have controlled and uncontrolled hypertension were using dietary measures and/or drugs. This indicates that the effectiveness of these two lines depend on their proper use by the patients and the need to educate the patients about all of the lines that can be used for the treatment of hypertension. Although the outpatient clinics in Azadi General Hospital and the primary health centers in Duhok take care of hypertensive patients, the establishment of an effective independent hypertension clinic that can provide treatment and health education to the patient (at least on initial diagnosis) is necessary in Duhok Governorate as the prevalence of hypertension is high and most of the already hypertensive patient are not under control. Most of those who have never checked their blood pressure were males (the male to female ratio is 3:1) and this is expected as the males are generally less careful about the regular checking of their health.

The prevalence of DM was 15.2% in females and 11.8% in males. This is compared to 8.4% in females and 7.7% in males in a study in Singapore in 1998²³. Also, the rate was lower in a national cross sectional study among adults aged 25-64 years in 2005 in Iran where 8.3% of females and 7.1% of males had diabetes.²⁴ In a cross sectional study between November 2003 and February 2004 in Turkey among individuals ≥ 30 years, Özdemir et al²⁵ reported diabetes prevalence of 7.9% and 4.8% in males and females, respectively. In more than half of the diabetic patients, there was coexistent hypertension which puts them at even more high risk as the effect of the NCD risk factors is multiplicative rather than additive. This necessitates more concentration on regular blood pressure checking in diabetic patient. In a study comparing the ADA 1997 criteria and the

WHO 1999 criteria in Arizona in USA, the prevalence of DM was 15.3% with WHO 1999 criteria.¹³ The WHO 1999 criteria were used in our study as they are the newest set of criteria and because they are essentially the same as the ADA criteria if the 2-hour plasma glucose is included. Impaired fasting glucose defines a smaller number of patients who are at higher risk of developing DM than those with impaired glucose tolerance. It is very important to identify those with impaired fasting glucose and impaired glucose tolerance as they are indications for annual checking of blood sugar.⁷ The prevalence of controlled DM among the already diagnosed diabetes was slightly more in females (41%, n=16) than in males (37.5%, n=9). The majority of patients have uncontrolled DM. Most of the already diagnosed diabetics were using dietary measures and / or oral drugs. This indicates the need for orienting the patients about the use of all the lines of treatment of DM and the consequences of non compliance with these treatments.

The incorporation of effective health education measures to the services provided by the diabetes clinic at Azadi general hospital can be an appropriate initial measure.

The cut points used for definition of the high or warning levels of lipid profile are those published recently in April 2003 by the National Health Education Program that has been developed by the Nation Institute of Health's Lung and Heart Department in USA.¹² The prevalence of high TC (≥ 240 mg/dl) 6.6% (n=33) of females and 5.6% (n=28) of males compared to 21.3% in females and 25.6% in males in a study in Singapore (1998).²³ The more important indicators are the TC/HDL index and LDL/HDL index which are generally used recently. Although the prevalence of high levels of TC and LDL were more in females, the prevalence of low HDL was more in males and this has resulted in making the prevalence of warning levels of both

indices (TC/HDL index and LDL/HDL index) more in males.

In conclusion, the prevalence of the risk factors of NCD is generally high necessitating establishing a local healthy lifestyle program in Duhok governorate to change these risk factors. Also periodic NCD risk factors surveys or establishing a surveillance system is necessary to monitor the trends of NCD risk factors in Duhok governorate. The following were recommendation of the survey

- 1- initiation of a local healthy lifestyle health education program that is best to be:
 - a. multisectoral: involving private and public sectors.
 - b. involves fiscal measures (e.g. increasing tobacco taxes) and legislative measures (e.g. banning over cigarette advertise, banning over smoking in public places...etc).
 - c. Continuous in all its activities.
 - d. Involves periodic campaigns to enforce the existing continuous program.
 - e. Uses the mass media as one of its main tools.
 - f. Concentrates upon the most important modifiable risk factors:
 - i. Hypertension: concentrating on the importance of regular treatment and follow up.
 - ii. DM: - focusing on treatment, complications, and self care.
 - iii. Lipid disorders: Enhancing the use of vegetable oil and eliminating foods high in cholesterol.
 - iv. Smoking: Increasing awareness about the hazards of smoking and how smokers can quit smoking.
 - v. Alcohol consumption: Modifying the drinking behavior.
 - vi. Low vegetables and fruits: Explaining the AHA recommendations and the benefits of healthy diet.
 - vii. Physical inactivity: Encouraging regular physical activity.

- viii. Excess weight: Discouraging obesity and illustrating how people can reduce their weight.
- 2- Introduction of an effective independent hypertension clinic
- 3- Strengthening the routine checking of blood pressure by doctors in the PHC and clinics.
- 4- Incorporation of effective health education measures in the existing diabetes clinic for patients with DM.
- 5- Establishment of periodic surveys or surveillance system for evaluation and update of the knowledge on NCD risk factors.

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پوخته

فهكولینا فاكتهرین هاریكار بو به لافه بوونا نه خوشییښ نه فهگر ییښ دووم دریژ ل باژیری دهوكی

پیشه کی و ئارمانج: نه خوشییښ نه فهگر ییښ دووم دریژ بهر به لافه دن دناڤ کومه لگه ها دا ژ بهر فاکتهر ییښ به لافه بوونی و ئابووری و گوهرینیښ د بواری ژیاڼی دا. هه لسه نگاندا فاکتهرین هاریكار بوغان نه خوشیان یا پیټفیه لهه می وه لاتان و دی هاریکاریه کا ئابووری وجفاکی ددهته کهرتی ته ندروستی. ئارمانج ژ فهكولینی دیارکرن و دامه زراندا ژماره و پیژانین بهرته تی ییښ فاکتهرین به لافه بوونا فان نه خوشیان ل دهوكی.

ریکین فهكولینی: فهكولینه کا نه فه وژار بو چه نداتیا به لافه بوونی دناڤ کومه لی دا هاته کرن. دیتن هاته کرن دگه ل هه زار که سان ژ پینجی کومه لگه هیښ سه ر ب دهوكی فه دناڤه را ۲۰۰۳/۱۲/۲۰ هه تا ۲۰۰۴/۱/۱۴. پیژانین هاتنه کومکرن لدویف ریڼمایین ریڅخراوا ته ندروستی یا جیهانی بو دیارکرن به لافه بوونا نه خوشییښ نه فهگر ییښ دووم دریژ. ژییښ که سیڼ دناڤ فهكولینی دا دناڤه را ۶۹-۲۵ سال بوون. هه لسه نگاندا ده سپیکی هاتنه کرن بریكا پرکرن فورمان. لدویف دا سه ره دانا فان که سان هاته کرن ژبو پشکینا کلینکی و وه رگرتنا خوینی و شروقه کرنا (FPG, Lipid profile). ئه و که سیڼ ریژا FPG دناڤه را ۹۹-۱۲۵ ملغم/۱۰۰ مل و نه خوشیا شه کری نه بووی هاتنه ره وانه کرن بو نه خوشخانا ئازادی بو چیکرنا GTT. ئه نجام هاتنه هه لسه نگاندا لدویف ریڼمایین ریڅخراوا ته ندروستی یا جیهانی ییښ ۱۹۹۹.

ئه نجام: ریژا که سیڼ به رده وام ب چکاره کیشانی ۲،۲٪ دناڤ مییاند بوو و ۶،۸٪ دناڤ زهلاماندا بوو. فه خوارنا کحولی دناڤه را ژناندا نه هاتنه تومارکرن به لی ئه ژ ریژه ۵،۴٪ بوو دناڤ نیراندا. لدویف ریڼمایین ۹۷٪ AHA ژ مییان و ۹۶،۲٪ ژ نیران ریژین کیم ییښ فیقی و که سکاکی دخارن. ۴۴٪ ژ مییان و ۲۳،۲٪ ژ زهلاماندا نه راد بوون ب شیوی وهرزهشی هه ر سی رووژا وچه فتیی دا و بوو ده می ۲۰ چرکا هه ر جاره کی. بکارئینانا WHR بو دیارکرن زیده باریا نافته نگی، ۵۷،۸٪ ژ مییان ریژ WHR پتر ۸۵،۰ و ۱۰،۶٪ ژ نیران WHR پتر بوو ژ ۱. بکارئینانا قه بارین باوه ر پی کری بو فشارا خوینی، ریژا به لافه بوونا نه خوشیا به رزبوونا فشارا خوینی ۵۳،۶٪ دناڤ مییاند و ۶۳،۴٪ لده ژ نیراندا بوو. ریژا به لافه بوونا نه خوشیا شه کری ۱۵،۲٪ بوو لده ژ مییاند و ۱۱،۸٪ لده ژ نیراندا و ۱۳،۵٪ لده ژ خه لکی. به رزبوونا ریژا TG ژ ۲۴۰ ملغم/۱۰۰ مل یان پتر هاته تومارکرن ل ۶،۶٪ لده ژ مییان و ۵،۶٪ لده ژ نیران. به رزبوونا ریژا LDL ژ ۱۶۰ ملغم/۱۰۰ مل یان پتر و کیمبوونا ریژا HDL ژ ۴۰ ملغم/۱۰۰ مل یان پتر هاته دیتن لده ژ ۳٪ ژ مییاند و ۳،۴٪ ژ نیراندا

دهرئه نجام: ب شیوه کی گشتی ریژا به لافه بوونا فاکتهرین به لافه بوونا نه خوشییښ نه فهگر ییښ دووم دریژ یا به رزه و داخازا دانانا پروگرامه کی دکه ت بو دیارکرن شیوین ژیاڼی ل پاریزگه ها دهوكی بو گوهرینا فان فاکته ران. هه ره سا پیرابوونا فهكولینیښ خوله کی لسه ر فان فاکته ران و دانانا سیسته مه کی سه ره رشت یی پیټفیه ژ بو هشیارکرنی لسه ر گوهرینیښ تیڼه ئه نجام دان دناڤ فان فاکته راندا.

الخلاصة

دراسة عوامل الاختطار للأمراض الغير الانتقالية في دهوك

خلفية واهداف البحث: ان الامراض المزمنة الغير الانتقالية في ازدياد مابين المجتمعات المختلفة نتيجة عوامل وبائية، اقتصادية، وتغيرات في اسلوب العيش. ان تقييم عوامل الاختطار لهذه الامراض هو ضروري في أي بلد، وسوف توفر اسناد مادي واجتماعي مفيد لقطاع الصحة. الهدف من الدراسة هو دراسة البيانات الاساسية لعوامل الاختطار للأمراض المزمنة غير الانتقالية في دهوك.

طرق البحث: تم اجراء دراسة مقطعية لمدى الانتشار بين السكان. تم اجراء مقابلة مع الف شخص في خمسين مجتمعاً سكنياً تابعاً لدهوك (الذين مثلو محافظة دهوك) بين الفترة ٢٠/كانون الاول /٢٠٠٣ الى ١٤/كانون الثاني ٢٠٠٤. تم جمع البيانات بموجب طريقة منظمة الصحة العالمية في الرصد الوبائي للأمراض غير الانتقالية. تراوحت اعمار المشمولين بالدراسة بين ٢٥-٦٩ سنة. أجرى التقييم الاولى من خلال ملء استمارة معلومات وفي اليوم التالي تم زيارة الشخص لغرض الفحص السريري وسحب نموذج الدم و نقل النماذج الى مستشفى آزادي العام لأجراء الفحوصات البايوكيميائية (lipid profile, FPG). الاشخاص الذين تراوحت لديهم FPG بين ٩٩-١٢٥ ملغم/١٠٠ مل ممن ليس لديهم داء السكري سابقاً تم توجيههم لزيارة م. آزادي لأجراء فحص GTT. النتائج تم تقييمها حسب أسس منظمة الصحة العالمية ١٩٩٩.

النتائج: نسبة الاشخاص المستمرين بالتدخين حالياً كانت ٢.٢% في الاناث و ٦٤.٨% في الذكور. لم يتم تسجيل حالات تناول الكحول بين الاناث، بينما كان ٥.٤% من الذكور من متناولي المشروبات التي تحتوى على الكحول. إستناداً الى توصيات AHA ان ٩٧% من الاناث و ٩٦.٢% من الذكور كانوا يتناولون نسبة قليلة من الفواكه والخضروات. من بين المشمولين بالدراسة، ٤٤% من الاناث و ٢٣.٢% من الذكور لا يمارسون الفعاليات الرياضية أو الجسدية بمعدل ثلاث مرات في الاسبوع ولمدة لا تقل عن ٢٠ دقيقة. استخدام WHR لتحديد السمن الخصرى ٥٧.٨% من الاناث كانت لديهم WHR اكثر من ٠.٨٥ و ١٠.٦% من الذكور لديهم WHR اكثر من ١. استخدام المعايير المعتمدة لضغط الدم الانقباضى اكثر من ١٤٠ ملم زئبق و/أو ضغط الدم الانبساطى اكثر من ٩٠ ملم زئبق، نسبة انتشار إرتفاع ضغط الدم الشرياني كانت ٥٣.٦% في الاناث و ٣٦.٤% في الذكور و ٤٥% في عموم السكان. نسبة داء السكر كانت ١٥.٢% في الاناث و ١١.٨% في الذكور و ١٣.٥% في عموم السكان. داء السكر صاحب إرتفاع ضغط الدم الشرياني في ١١.٤% من الاناث و ٦% من الذكور و ٨.٧% في عموم السكان. لم يكن هنالك فرق معنوي جدير بالملاحظة من حيث نسبة إنتشار داء السكر و إرتفاع ضغط الدم بين الأديان المختلفة. إرتفاع TC (≥ 240 mg/dl) تم تسجيله في ٦.٦% من الاناث و ٥.٦% من الذكور. إرتفاع LDL (≥ 160 mg/dl) وإنخفاض مستوى HDL (≤ 40 mg/dl) وجد في ٣% من الاناث و ٣.٤% من الذكور.

الاستنتاج: بصورة عامة إن نسبة انتشار عوامل الاختطار للأمراض المزمنة الغير الانتقالية هي عالية و يتطلب وضع برنامج لانماط الحياة في محافظة دهوك لتغيير هذه العوامل. كذلك إجراء مسح دوري أو تثبيت نظام رصد وبائي هو ضروري للتحذير من التحولات في عوامل الاختطار في محافظة دهوك.

PREVALENCE AND HEMATOLOGIC PROFILE OF $\delta\beta^0$ -THALASSEMIA TRAIT IN SULAIMANI PROVINCE/ IRAQI KURDISTAN

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ABSTRACT

Background and Objectives $\delta\beta^0$ thalassemia is a rare form of hemoglobinopathies in Eastern Mediterranean region, including Iraq. Few studies have focused on the prevalence and hematological profile of this hemoglobinopathy and most included rather small number of cases. The study aimed to study the prevalence and hematological profile of $\delta\beta^0$ thalassemia among a large number of premarital couples in Northern Iraqi province of Sulaimani.

Methods A total of 52370 subjects attending Sulaimani Provincial Premarital Screening Clinic were screened for $\delta\beta^0$ thalassemia trait using red cell indices, followed by Hb HPLC (High Performance Liquid Chromatography) and iron status estimation. The study also included a comparison between the hematologic parameters in the latter group and comparable numbers of age and sex matched β -thalassemia trait, iron deficiency anemia and a healthy control group.

Results Based on the above investigations, 51 (0.1%) of screened individuals were found to have $\delta\beta^0$ thalassemia trait, with age range from 17-47 years, including 23 males and 28 females. The $\delta\beta^0$ thalassemia carriers showed reduced MCV, MCH like β thalassemia and iron deficiencies and although Hb, PCV, MCH, MCV and RBC values showed no statistically significant difference between $\delta\beta^0$ thalassemia carriers and β thalassemia carriers, the mean RDW (Red Cell Distribution Width) value was significantly higher in $\delta\beta^0$ thalassemia (20.8 ± 2.7) compared to β thalassemia (14.9 ± 0.8) and iron deficiency anemia (15.7 ± 1.5). Moreover it was observed that 62.7% of $\delta\beta^0$ thalassemia carriers had raised RDW above 20%, while only 1.9% of individuals with iron deficiency had such high RDW values.

Conclusion The prevalence of $\delta\beta^0$ thalassemia trait in Sulaimani province is comparable to reports from other parts of Iraq and some of the Mediterranean countries. Furthermore, it appears that the RDW would be a useful parameter to differentiate this hemoglobinopathy from β thalassemia trait and Iron deficiency.

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Key words: $\delta\beta^0$ thalassemia, β thalassemia, Iron deficiency, RDW, Sulaimani

The $\delta\beta^0$ thalassemias are heterogeneous conditions characterized by a loss of both δ and β gene expression accompanied by increased γ gene output. However, the increased synthesis of γ chain does not fully compensate for the lack of production of β chain giving rise to mild imbalance in α to non α globin chain synthesis and a thalassemic phenotype.^{1,2} The vast majority of $\delta\beta^0$ thalassemia that have been studied at the molecular level are associated with extensive deletions in the β globin gene cluster that usually

remove all or part of the δ and β globin genes in addition to varying amount of adjacent sequences. At least nine mutations give rise to $\delta\beta^0$ thalassemia have been implicated namely: the Sicilian, Indian, Japanese, Spanish, Black, Eastern European, Macedonian/Turkish, Laotian and Thai deletions.³

The heterozygotes for $\delta\beta^0$ thalassemia ($\delta\beta^0$ thal) have reduced red cell indices similar to those of β thalassemia trait (β thal) with normal or low levels of HbA2 and raised HbF levels of 5-20%.^{3,4}

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Homozygotes have anemia with moderately severe clinical course (thalassemia intermedia) and 100% HbF. There are no significant differences in the hematological findings in the different molecular forms of the condition.⁵ This study aimed to assess the prevalence and hematological profile of $\delta\beta^0$ thalassemia among a large number of the attendees of Premarital Screen Center in Northern Iraqi province of Sulaimani.

METHODS

This study was conducted from January 2007 to December 2009. The participants were consecutive couples attending Sulaimani Provincial Premarital Screening Clinic for routine premarital tests.

Peripheral blood samples (2ml) were collected in EDTA containing tubes. A sample of at least 4ml blood has been collected as well for the estimation of iron status. The red cell indices were determined within 24 hours from collection by electronic hematology analyzer (Beckman Coulter, Fullerton, CA, USA). Further testing was performed if $MCV \leq 80$ fL and/or $MCH \leq 27$ pg. These tests included: HbA2 and HbF quantitation performed using the automated ion exchange high performance liquid chromatography system on the Bio Rad variant instrument (Bio Rad Laboratories, Hercules, CA, USA) as well as serum iron and total iron binding capacity performed using BIOLABO Kit (France). All the tests were performed according to manufacturers' recommendations.

$\delta\beta^0$ thalassemia trait ($\delta\beta^0$ thal) diagnosis was made by an elevated HbF (5-20%), normal or reduced HbA2 level and normal transferrin saturation.⁴ The hematological profile of the $\delta\beta^0$ thal trait diagnosed as stated above was compared with those of an almost equivalent number of age and sex matched subjects belonging to three other groups diagnosed during the study period

including: β thal minor (51 case), iron deficiency (IDA) anemia (54 cases), and a healthy control group (50 cases).

This study was approved by the research council of the college of medicine at the University of Sulaimani and informed consent was obtained from all participants.

Statistical analysis utilized the Mann – Whitney *U*-test, and $p < 0.05$ was considered significant.

RESULTS

Out of the 52,370 individuals, 51 (0.1%) were diagnosed as carriers of $\delta\beta^0$ thal. Their ages ranged from 17 to 47 yrs (mean 26 yrs). They included 23 males and 28 females. Their hematological parameters are outlined in table 1, while table 2 outlines the main hematological parameters in the age and sex matched β thal minor, Iron deficiency and healthy controls as well as the above 51 $\delta\beta^0$ thal minor subjects.

Statistical analysis revealed that the Hb, hematocrit, MCV, MCH and RBC values in $\delta\beta^0$ thal minor were statistically different from those seen in IDA and the control ($p < 0.0005$) but not from those in β thal. However, the RDW was significantly higher in $\delta\beta^0$ thal ($20.8\% \pm 2.7$) in comparison to β thal ($14.9\% \pm 0.8$) ($p < 0.0005$) and Iron deficiency ($15.7\% \pm 1.5$) ($p < 0.0005$). Moreover, it was observed that while 62.7% of $\delta\beta^0$ thal trait individuals had raised RDW above 20%, only 1.9% of iron deficient subjects and none of β thal minor had such high RDW values. (Figure 1).

DISCUSSION

Well documented cases of $\delta\beta^0$ thalassemia were reported in many ethnic groups. These included Italians, Greeks, Afro-Americans, Thais, Chinese, Indians, Yugoslavians, Jamaicans, Britons, Mexicans, Turks and Sardinians.^{2,5} One of the difficulties in assessing the

Table 1. Hematological data of $\delta\beta^0$ thalassemia cases identified by the study (n=51)

Parameter	Minimum	Maximum	Mean	Std. Deviation
Hb (g/dl)	10.5	16	12.9	1.5
PCV (L/L)	30.7	49.6	39.8	4.8
MCHC (g/dl)	29.7	34.8	31.6	4.1
MCV (fl)	57.5	79.6	67.6	5.1
MCH (pg)	18.9	26.5	22.4	1.8
RBC $\times 10^{12}/L$	4.4	7.31	5.8	0.7
RDW %	13.9	26.6	20.8	2.7
HbF %	5.5	20	11.6	3.7
HbA2 %	1.8	3.2	2.6	0.4

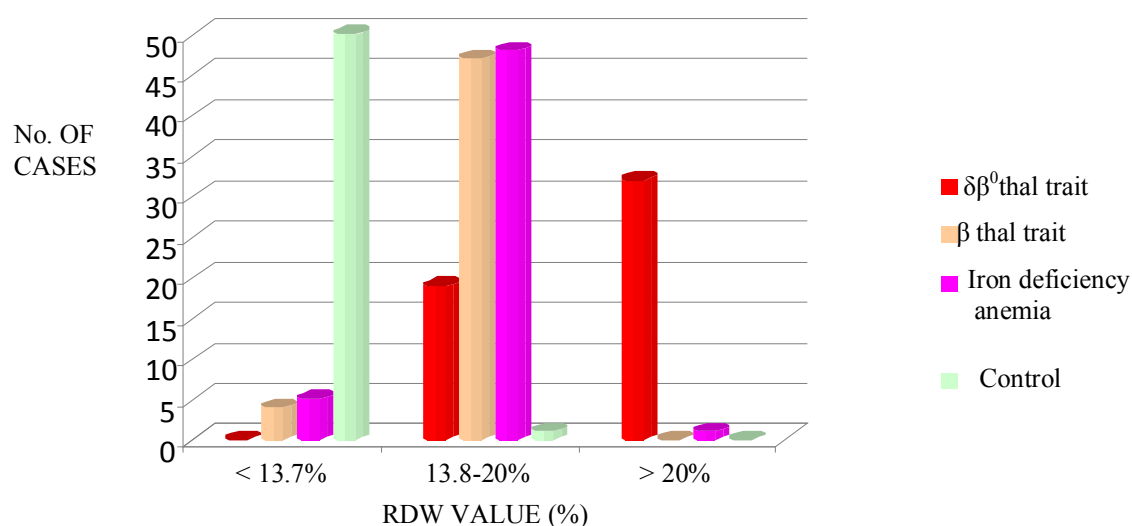
Table 2. Means (+ SD) of some of the hematologic parameters of $\delta\beta^0$ thalassemia minor, β -thalassemia minor, iron deficiency anemia and control

	Hb	HCT	MCV	MCH	RBC	RDW
β thal (n=51)	12.8 $\pm$ 0.9	40.6 $\pm$ 3.4	65.7 $\pm$ 3.4	20.7 $\pm$ 1.3	5.9 $\pm$ 0.7	14.9 $\pm$ 0.8
$\delta\beta^0$ thal (n=51)	12.9 $\pm$ 1.5	39.8 $\pm$ 4.8	67.6 $\pm$ 5.1	22.4 $\pm$ 1.8	5.8 $\pm$ 0.7	20.8 $\pm$ 2.7
IDA(n=54)	10.7 $\pm$ 1.1	33 $\pm$ 3.1	71.3 $\pm$ 5.1	23 $\pm$ 1.8	4.3 $\pm$ 0.4	15.7 $\pm$ 1.5
Control (n=50)	14.7 $\pm$ 1.2	43.9 $\pm$ 3.8	90.1 $\pm$ 3.9	30.3 $\pm$ 1.5	4.9 $\pm$ 0.4	12.5 $\pm$ 0.5

HCT Hematocrit, MCV Mean Corpuscular Volume, MCH Mean Corpuscular Hemoglobin, RDW Red Cell Distribution Width

* $\delta\beta^0$ thal vs. IDA $P < 0.0005$, $\delta\beta^0$ thal vs. Control $P < 0.0005$ (Hb, HCT, MCV, MCH, RBC)

** $\delta\beta^0$ thal vs. β thal , $\delta\beta^0$ thal vs. IDA, $\delta\beta^0$ thal vs. Control $P < 0.0005$ (RDW)

**Figure 1. RDW categories among included cases**

frequency of this disorder is that the screening techniques employed in many population surveys for thalassemia may not detect it. This would certainly be the

case if osmotic fragility screening technique was used, and only those surveys which include a quantitative estimation of HbF or hemoglobin

electrophoresis using a system which separates HbA from HbF would provide an accurate data about $\delta\beta^0$ thalassemia frequency.⁴

By far the oldest data is from a survey in Greece in the early sixties of the last century of 1600 individual with thalassemia like blood picture, that reported an incidence of 0.6% for $\delta\beta^0$ thal (6). A later Italian survey in the early seventies of 43000 screened persons reported the overall frequency of $\delta\beta^0$ thal as 0.13%.⁷ While a very recently reported longitudinal study from Germany of 23330 individuals screened for thalassemia and hemoglobinopathies found that 2.2% were $\delta\beta^0$ thal carriers.⁸ On the other hand, several population studies from Iran, Saudi Arabia, Qatar or Jordan didn't report $\delta\beta^0$ thalassemia carriers.⁹⁻¹² Studies from Iraq on much smaller samples reported frequencies ranging from 0.2% in Baghdad,¹³ 0.1% in Dohuk,¹⁴ and 0% in Basrah¹⁵ (table 3). An earlier much smaller study from Sulaimani¹⁶ reported an incidence of 0.14%, thus it appears that the findings of the current study, which is actually the largest study ever reported from Iraq, of a frequency of 0.1% in Sulaimani support these earlier reports.

Because of many similarities in red cell indices, red cell distribution width (RDW) was introduced as an important parameter in the differential diagnosis of thalassemia trait and iron deficiency anemia. The RDW value actually reflects the variation between the sizes of red cells and thus the degree of anisocytosis¹⁷⁻¹⁹ In β and α thalassemia traits, almost all red cells are microcytic, because deficient synthesis of the globin chain resulting from thalassemia mutation expresses itself in all of the red cell precursors. Consequently, RDW values are relatively low, unlike the case in iron deficiency where the values are higher reflecting the varied distribution of red cell size. Our observation of increased RDW in $\delta\beta^0$ thal is interesting since it is in contrast to the

more common β and α thalassemia traits where RDW is low but is consistent with at least two previous studies that also showed increased RDW in $\delta\beta^0$ thalassemia^{20,21} Heterogeneous distribution of HbF among red cells in $\delta\beta^0$ thal minor was observed and this led to the presence of mixed cell population consisting of microcytic cells with uncompensated reduction in β globin synthesis as well as a normal population. The latter is reflected by an increase in RDW^{2,3,20,21} The current study documented that 62.7 % of the individuals with $\delta\beta^0$ thal had RDW > 20% compared to <2% of IDA and none of β thal. This means that in a mild hypochromic anemia were the differential diagnosis lies between Iron deficiency, $\delta\beta^0$ -thal, β -thal and α -thal traits, an increased RDW (particularly above 20%) would be an indicator favoring $\delta\beta^0$ thal trait rather than these other differential diagnoses and would help the hematologist to focus on estimating the concentration of Hb F as a priority in his search for a definitive diagnosis.

Finally it should be remembered that despite the fact that $\delta\beta^0$ thalassemia is much less common in Sulaimani, as well as the rest of Iraq, than β -thalassemia, its inheritance with β^0 or severe β^+ thal would result in thal intermedia or major phenotypes, thus its detection is important in the screening program. Accordingly the premarital hemoglobinopathy screening programs should include Hb F estimation at least in patients with hypochromia, normal Hb A2 and iron studies. Furthermore, and as documented in the current study an increased RDW may be quite useful as an early indicator for this rare hemoglobinopathy carrier state.

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Table (3) Prevalence of $\delta\beta^0$ thalassemia minor reported in different studies

Study	Ref	Year	Included Individuals	Reported $\delta\beta^0$ thal
Greece	6	1962	1600	0.6%
Italy	7	1970	43000	0.13%
Germany	8	2010	23330	2.2%
Iran	9	2007	13,879	NR
Saudi Arabia	10	2000	488,315	NR
Qatar	11	2003	3275	NR
North Jordan	12	1992	1000	NR
Baghdad/Iraq	13	1996	502	0.2%
Dohuk/Iraq	14	2010	1182	0.1%
Basra/Iraq	15	2003	1064	NR
Sulaimani/Iraq	16	2008	1472	0.14%
Current Study		2010	52370	0.1%

*NR Not Reported***REFERENCES**

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پوخته

پلهی بوونی و پزوفاییلی خوینی سالاسیمیای بچوک جوړی $\delta\beta^0$ له سلیمانی/هزیمی کوردستانی عیراق

پیشهکی و نارمانج: $\delta\beta^0$ سالاسیمیای بچوک جوړیکی دهگمهنی گرفتهکانی هیموگلوبینه له روژهلای دهریای سپی ناوهندی که عیراق بهشیکه له و ناوچهیه. هندیک توپژینهوه تیشکی خسته سهر ریژهی بوون وپزوفاییلی خوینی ئەم گرفته وهژینهوی توپژینهوهکان ژمارهیهکی کهم له حالاتی $\delta\beta^0$ سالاسیمیای بچوکی وهرگرتووه. ئەم توپژینهوهیه بهمهبهستی لیکولینهوهله ریژهی بوون و پزوفاییلی $\delta\beta^0$ سالاسیمیا بچوک له ناو ژمارهیهکی زۆر له خوازیری هاوسهری له باکورری عیراق/سلیمانی ئەنجام دراوه.

ریکتن فکولینی: لهکوی ۵۳۷۰ خوازیری هاوسهری کهسردانی کلینیکی هاوسهرگریان کردووه گهران کرا بو سالاسیمیای بچوکی جوړی $\delta\beta^0$ به گۆیرهی پارامیتهرهکانی خروکه سوردهکان لهگهل هیموگلوبین HPCL و ریژهی ناسن. ئەم توپژینهوهیه سالاسیمیای بچوکی جوړی $\delta\beta^0$ بهراورد کرد لهگهل سالاسیمیای بچوکی جوړی β ، کهم خوینی بههوی کهمی ناسن لهگهل کروپی کوتترول (N=۵۰).

ئهناجم: به پیی ئەنجامهکانی شیکاریهکان ۵۱، کهس واته (۰،۱٪) دهركهوت که له سالاسیمیای بچوکی جوړی $\delta\beta^0$ هیهله گروپی تهمهنی (۴۷-۱۷) سال که پیک هاتووه له ۲۳ نیر و ۲۸ می. ههچهند بههاکانی (Hb, PCBR, VCM, HCM, VC) له سالاسیمیای بچوکی جوړی $\delta\beta^0$ هیچ جیاوازیهکی بهرچاوی نیه لهناماری سالاسیمیای بچوکی جوړی β بهلام WDR زیاتر بوو بهشیوازیکی دیار له سالاسیمیای بچوکی جوړی $\delta\beta^0$ (۲۰،۸+۲،۷) به بهراورد لهگهل سالاسیمیای بچوکی جوړی (۱۴،۹+۰،۸) و به شیوازیکی دیاریش لهگهل کهم خوینی بههوی کهمی ناسن (۱۵،۷+ ۱،۷). لهگل ئەوهشدا دهركهوت که ٪ ۶۲،۷ کهس لهههلهگری سالاسیمیای بچوکی جوړی $\delta\beta^0$ ریژهی WDR له ٪ ۲۰ زیاتر بهبهراورد لهگهل٪ ۱،۹ له کهم خوینهکان بههوی کهمی ناسن.

دهرئهناجم: ریژهی بوونی $\delta\beta^0$ سالاسیمیا بچوک له سلیمانی بهبهراوردکردن بو راپورت وتوپژینهوه له پارچهکانی تری عیراق وبهشهکانی تری دهریای سپی ناوهندی. لهم توپژینهوهیه دهركهوت که RDW پارامیتهریکی سوودمهنده بو جیاکردنهوهی ئەم جوړه گرفتگی هیموگلوبین $\delta\beta^0$ سالاسیمیا بچوک له β سالاسیمیا بچوک و له کهم خوینی بههوی کهمی ناسن.

الخلاصة

درجة الانتشار و المظاهر الدموية لحاملي فقر دم البحر الابيض المتوسط (نوع $\delta\beta^0$) في محافظة السليمانية/كوردستان العراق

خلفية واهداف البحث: يعد فقر دم البحر الابيض المتوسط (نوع $\delta\beta^0$) احد اضطرابات الهيموكلوبين النادرة في منطقة شرق البحر الابيض المتوسط ومنها العراق. ركز القليل من البحوث السابقة على درجة الانتشار و المظاهر الدموية لهذا النوع من اضطرابات الهيموكلوبين وقد شملت غالبية هذه البحوث عدد قليل من الحالات.

الهدف من الدراسة هو لمعرفة درجة الانتشار والمظاهر الدموية المميزة لحاملي صفة فقر دم البحر الابيض المتوسط (نوع $\delta\beta^0$) ضمن عدد كبير من مراجعي مركز فحوصات ما قبل الزواج في السليمانية شمال العراق.

طرق البحث: شملت هذه الدراسة مسح ٥٢٣٧٠ شخص من المراجعين لفحوصات ما قبل الزواج في السليمانية لغرض تشخيص حاملي صفة فقر دم البحر الابيض المتوسط (نوع $\delta\beta^0$) اعتمادا على دلائل كريات الدم الحمراء متبوعة بترحيل الدم بجهاز HPLC مع قياس نسبة الحديد. كما شملت هذه الدراسة ايضا مقارنة المظاهر الدموية لهذا النوع من اضطرابات الهيموكلوبين مع المظاهر الدموية لحاملي صفة فقر دم البحر الابيض المتوسط (نوع β)، المصابين بفقر الدم بسبب نقص الحديد وفئة الاشخاص السالمين (n=50).

النتائج: اعتمادا على الفحوصات اعلاه، وجد ٥١ شخص (٠.١%) حامل لصفة فقر دم البحر الابيض المتوسط (نوع $\delta\beta^0$) و فيهم ٢٣ رجل و ٢٨ امرأة. لم يوجد اختلاف مهم احصائيا في معدل $Hb, PCBR, VCM, HCM, VC$ بين الاشخاص الحاملين لصفة فقر دم البحر الابيض المتوسط (نوع $\delta\beta^0$) مع حاملي صفة فقر دم البحر الابيض المتوسط (نوع β) فيما عدى معدل نسبة تباين حجم الكرية الحمراء (WDR) حيث كان الفرق مهم احصائيا (2.7 ± 20.8) بالمقارنة مع حاملي صفة فقر دم البحر الابيض المتوسط (نوع β) (14.9 ± 0.8) وكذلك مع معدل نسبة تباين حجم الكرية الحمراء في المصابين بفقر الدم بسبب نقص الحديد (10.5 ± 10.7)، وقد بينت هذه الدراسة ايضا ان % ٦٢.٧ من حاملي صفة فقر دم البحر الابيض المتوسط (نوع $\delta\beta^0$) اظهروا ارتفاع في معدل نسبة تباين حجم الكرية الحمراء اكثر من ٢٠% بالمقارنة مع ١.٩% من المصابين بفقر الدم بسبب نقص الحديد.

الاستنتاج: لقد بينت هذه الدراسة ان درجة انتشار حاملي صفة فقر دم البحر الابيض المتوسط (نوع $\delta\beta^0$) في محافظة السليمانية هي مقارنة لنتائج البحوث السابقة من العراق و بعض دول البحر الابيض المتوسط. كما اظهرت الدراسة ايضا انه يمكن الاستفادة من معدل نسبة تباين حجم الكرية الحمراء (WDR) عند التفريق بين الاشخاص الحاملين لصفة فقر دم البحر الابيض المتوسط (نوع $\delta\beta^0$) ونوع β وفقر الدم بسبب نقص الحديد.

A PROSPECTIVE STUDY OF RUBBER BAND LIGATION OF HEMORRHOIDS IN SULAIMANY, KURDISTAN REGION, IRAQ

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ABSTRACT

Background and Objectives Hemorrhoids is a common disease. There are different lines of treatment of hemorrhoids. The objective of the study is to determine the effectiveness and the safety of rubber band ligation of hemorrhoids as an outpatient surgical clinic procedure.

Methods A prospective study was done over a period of one year, from 1st July 2007 to 31st June 2008, during that period, 322 patients with symptomatic hemorrhoids were seen in a private outpatient surgical clinic. Out of those 322 patients, 108 patients were selected whom they had second and third degree hemorrhoids. Data were collected about their presenting symptoms, physical examination and proctoscopic appearance. They were treated with rubber band ligation, and were followed up for a period of one year. Out of those 108 patients, 9 patients failed to complete the follow up and they were excluded from the study. Outcome data were recorded from the remaining 99 patients and studied for success of the treatment and complications.

Results Out of those 99 patients treated with RBL, 89 (89.89%) patients became free from symptoms and cured, 10 patients (10.1%) remained symptomatic and treated with conventional hemorrhoidectomy.

Conclusion From this study it was found that the RBL of hemorrhoids performed as an outpatient surgical clinic procedure, is easy, convenient and successful procedure for treatment of 2nd and 3rd degree symptomatic hemorrhoids.

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Key words: Hemorrhoids, Rubber band ligation, Hemorrhoidectomy

Hemorrhoids is a common disease. Epidemiological studies reported prevalence varying from 4.4% in adults in the United States to over 30% in general practice in London.¹ The prevalence of haemorrhoids in the general population is equal between the sexes,² but men seek treatment more readily.³

The peak in prevalence is noted between 45 and 65 years of age.² The majority of hemorrhoids are primary, only small proportions are secondary to other conditions, such as carcinoma of rectum, pregnancy, straining at micturition and constipation. The most common clinical presentation is passage of painless bright blood per rectum. The physical examination includes inspection and digital rectal examination.

Anoproctoscopy is performed, rigid sigmoidoscopy is required to exclude proximal diseases and additional flexible sigmoidoscopy, barium enema or colonoscopy may be required to exclude malignant diseases or inflammatory bowel disease.^{4,5} There are different lines of treatment of symptomatic hemorrhoids such as dietary regulation, topical soothing ointments and suppositories, rubber band ligation, injection sclerotherapy, cryotherapy, infrared coagulation, laser therapy and various hemorrhoidectomy techniques. Blaisdell in 1954 invented the first automatic ligator⁶ of hemorrhoids which was modified by Barron⁷ in 1962. A meta-analysis by Mac Rae and McLeod⁸ has shown RBL to be the most successful ambulant measure for treating

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haemorrhoids.

The purpose of the study is to show the effectiveness and safety of the rubber band ligation of grade 2 and grade 3 hemorrhoids as an outpatient surgical clinic procedure.

METHODS

A prospective study was done from 1st July 2007 to 31st June 2008, during that period, 322 patients with symptomatic hemorrhoids were seen in a private outpatient surgical clinic, in Sulaimany, Kurdistan Region, Iraq. Classification of hemorrhoids was done according to the traditional classification of hemorrhoids, based on bleeding and prolapse, published in 1985 by Banov et al⁹ Grade 1 hemorrhoids accounted for 103 patients and were treated conservatively with dietary regulation, topical ointments and bulking agents. Grade 4 hemorrhoids accounted for 111 patients had and were treated with conventional hemorrhoidectomy. Both grade 1 and grade 4 hemorrhoids were excluded from the study. Out of those 322 patients, 108 patients had grade 2 and grade 3 hemorrhoids (68 patients had grade 2 and 40 patients had grade 3), they were selected for the study and treated with rubber band ligation.

After taking history, all patients underwent digital rectal examination, anoproctoscopy and rigid sigmoidoscopy. The possible complications were explained. Half an hour before the procedure, the patient told to take dulcolax suppository and to walk around and empty the rectum. The method of treatment described by Barron⁷ was used, consisting of ligating the internal hemorrhoid at its base, 2 centimeters above the dentate line, as banding at or below the dentate can cause severe pain.¹⁰ For the ligation, the St Marks' Hospital ligator (Seward) was used,¹¹ with curved Ellis forceps and a metallic proctoscope. The procedure does not take more than few minutes. No

anesthesia required. To decrease discomfort only one ligation per session was applied, usually of the largest hemorrhoid¹¹ with repeat bandings at monthly intervals until the patients were symptom free.¹²

After the procedure the patient sent home and were told that there may be some discomfort, feeling of tenesmus or pain and occasional bleeding. They were advised to take plenty of liquids, high fiber diet, bulk forming stoolsoftener (Bran tab 500 mg 3 tablets 3 times daily), local xylocain ointment to relieve local discomfort and burning sensation, and paracetamol tablet 500 mg eight hourly. They were cautioned not to strain at stool and not to stay for long time at toilet. All patients were followed up after 1 month, 3 months, 6 months and 1 year after the completion of the treatment. The treatment outcome was based on symptomatic cure i.e. stoppage of bleeding and reduced mucosal prolapsed.¹³ Out of those 108 patients, 9 patients (8.33%) were failed to complete the follow up period and they were excluded from the study, and the study was continued on the remaining 99 patients. Out of those 99 patients, 4 patients (4.04%) had treatment history of hemorrhoidectomy before RBL procedure.

Statistical analysis was done by SPSS 16 (Statistical package for the social sciences).

RESULTS

Those 99 patients that has been treated with RBL and completed the follow up period of one year, has been studied and we found the age distribution of the patients was as shown in table 1. The mean age of the patients was 35.33 years (SD 14.358), the youngest patient was 15 years old and the oldest patient was 87 years old. Sixty eight patients (68.70%) were males, 31 patients (31.3%) were females.

The most common presenting symptom was bleeding per rectum which was found in 49 patients (49.50%), as

shown in table 2. Overlap of symptoms occurred in 75 patients (75.75%), the most common combination of symptoms were bleeding and discomfort (41 patients, 41.41%), followed by bleeding, discomfort and swelling (34 patients, 34.34%).

The duration of the presenting symptom were variable ranged from 2 days to 2 years, the mean period was 184.45 days.

Out of the total 99 patients, 53 patients (53.53%) needed 2 treatment sessions of RBL, 36 patients (36.36%) needed 3 sessions as shown in table 3.

Table 4 shows the rate of complications. Most often complications were minor and no hospitalization needed. The most common complication was pain that was treated with oral analgesic tablets. One case of rectal bleeding was treated conservatively with bed rest at home and

analgesia. Another case of rectal ulcer healed spontaneously over a period of 6 weeks. Two cases of fall of the band the next day after the procedure were seen and were treated by reapplication of the band in a new session and are included in table 3 (the number of sessions).

Out of those 99 patients treated with rubber band ligation, 89 patients were symptom free and cured (success rate 89.89%), only 10 patients remained complaining from the symptoms of hemorrhoids and repeated rubber band ligation failed to relieve the symptoms (failure rate of 10.11%) and they were treated with conventional hemorrhoidectomy. During the follow up period of one year, 5 patients (5.05%) had symptomatic recurrence of the hemorrhoids which were successfully treated with repeated rubber banding.

Table 1. Age distribution

Age	No. of patients	Percentage
12-20	6	6.06%
21-30	36	36.36%
31-40	31	31.32%
41-50	13	13.13%
51-61	7	7.07%
61-70	3	3.03%
71-80	2	2.02%
81-90	1	1.01%
Total	99	100.00%

Table 2. The presenting symptoms

Symptom	No. of patients	Percentage
Bleeding per rectum	49	49.50%
Discomfort during defecation	34	34.34%
Swelling	8	8.08%
Itching	7	7.07%
Discharge	1	1.01%
Total	99	100%

Table 3. No of treatment sessions

No. of sessions	No. of patients	Percentage
1	5	5.05%
2	53	53.53%
3	36	36.36%
4	4	4.05%
5	1	1.01%
Total	99	100.00%

Table 4. Complications

Complication	No. of patients	Percentage
Pain	9	9.09%
Bleeding	1	1.01%
Rectal ulcer	1	1.01%
Fall of the RB	2	2.02%
Total	13	13.13%

DISCUSSION

Although RBL of hemorrhoids is a well known ambulatory method of treatment of hemorrhoids, it is not practiced widely in Sulaimany, and up to our knowledge this study is the first study of this kind to be done in this city. It was found that RBL of hemorrhoids is easy, convenient, and successful procedure for grade 2 and grade 3 hemorrhoids. It is quick and time saving procedure. It has high cure rate, good patient acceptance after explaining the procedure to the patient and no anesthesia required thus avoiding discomfort and complications of different types of anesthesia. The patient returns home after the procedure, no sick leave required thus saving days of work compared with conventional hemorrhoidectomy which needs the patient to be out of his job for about 3 weeks. No hospitalization required, thus providing beds free in the surgical wards for other cases. Most patients needed 2 or 3 treatment sessions.

The success rate with this procedure is 89.89%, which is consistent with most other studies ranging between 79-91.8%.¹⁴⁻¹⁸

The rate of complications was 13.13%, most of them were minor like pain and fall of the rubber band, they needed no hospitalization and are well recognized complications and mentioned in other studies.¹⁹⁻²²

Symptomatic recurrence occurred in 5.05% of our patients during the follow up period of one year, although further recurrences may occur at longer term as shown in other studies,¹⁸ but there were good symptomatic relief and healing provided by this procedure without considerable complications.

In conclusion, we found that RBL of hemorrhoids is an easy, convenient, and successful outpatient surgical clinic procedure for treating grade 2 and grade 3 hemorrhoids. Complications are minor and can be easily treated.

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پوخته

لێکۆڵینه‌وه‌یه‌کی پیش‌وه‌ختی پلان بۆدانراو له باره‌ی به‌ستنی مایسیری به شریتی لاستیکی له سلیمانی، هه‌ریمی کوردستان، عێراق

پێشه‌کی و ئارمانج: مایسیری نه‌خۆشییه‌کی به‌ریلاوه‌ . چه‌ندین رێگا بۆ چاره‌سه‌رکردنی مایسیری هه‌یه‌ . لێکۆڵینه‌وه‌که بۆ ئه‌وه‌یه‌ که کاریگه‌ری و سه‌لامه‌تی به‌ستنی مایسیری به شریتی لاستیکی له کلینیکی تایبه‌تدا بخاته‌په‌روو .

رێکا فه‌کولینی: لێکۆڵینه‌وه‌که پیش‌وه‌خت پلان بۆدانراو بوو و له ماوه‌ی دوو ساڵدا له ١ ته‌موز ٢٠٠٧ تا ٣١ حوزه‌یران ٢٠٠٨ به‌ئه‌نجام گه‌یه‌ندراو تیایدا (٣٣١) نه‌خۆشی مایسیری له کلینیکی نه‌شته‌رگه‌ری تایبه‌تدا بێنران و له کۆی ئه‌و ژماره‌یه‌ (١٠٨) یان که مایسیری پله‌ دوو و سییان هه‌بوو بۆ لێکۆڵنه‌وه‌که هه‌لبژێردران . داتاکانی: نیشانه‌، پشکنینی نه‌خۆشییه‌که و نه‌خۆش، نیشانه‌کانی پشکنین به ئامیری کۆمبێن و پله‌ی نه‌خۆشییه‌که کۆکرانه‌وه‌ . ئه‌م (١٠٨) نه‌خۆشه‌ به به‌ستنی مایسیری به شریتی لاستیکی به تیکنیکی بارپۆن چاره‌سه‌رکران: (٩) یان نه‌یانتوانی له چاره‌سه‌رکردنه‌که‌دا به‌رده‌وام بن بۆیه‌ له لێکۆڵنه‌وه‌که ده‌ره‌یتران و زایارییه‌کانی سه‌باره‌ت به (٩٩) یان تۆمارکران و سه‌رکه‌وتوویی و ما‌که‌کانی چاره‌سه‌رکردنه‌که هه‌لسه‌نگێندر .

ئه‌نجام: له‌و (٩٩) نه‌خۆشه‌ی که به به‌ستنی مایسیری به شریتی لاستیکی چاره‌سه‌رکران (٨٩) یان واته (٨٩، ٨٨٪) به ته‌واویی چاک‌بوونه‌وه‌و (١٠) یان واته (١١، ١٪) چاک‌نه‌بوونه‌وه بۆیه نه‌شته‌رگه‌ری لێک‌دنه‌وه‌ی مایسیریان بۆ کرا .

ده‌رئه‌نجام: له‌م لێکۆڵینه‌وه‌یه‌وه‌دا بۆمان ده‌رکه‌وت که به‌ستنی مایسیری به شریتی لاستیکی له کلینیکی تایبه‌تدا کارێکی ئاسان، باش و سه‌رکه‌وتووه بۆ چاره‌سه‌رکردنی مایسیری پله‌ دوو و سی .

الخلاصة

دراسة مستقبلية حول عقد البواسير بالحلقة المطاطية في محافظة السليمانية، العراق

خلفية و أهداف البحث: البواسير من الامراض الشائعة. هنالك عدة طرق لعلاج البواسير. هدف البحث هو تقدير كفاءة و سلامة عقد البواسير بالحلقة المطاطية في العيادات الجراحية.

طريق البحث: دراسة مستقبلية تمت على مدار سنتين من ١ تموز ٢٠٠٧ الى ٣١ حزيران ٢٠٠٨ حيث شملت ٣٣١ مريضاً شوهدوا في عيادة جراحية خاصة. من هؤلاء المرضى أختيرت ١٠٨ مريضاً يعانون من البواسير من الدرجة الثانية و الثالثة. جمعت البيانات حول أعراض المرض، الفحص السريري، فحص الناضور الشرجي و درجة البواسير. المرضى عولجوا بطريقة عقد البواسير بالحلقة المطاطية مستخدماً طريقة بارون، مع وضع حلقة مطاطية واحدة في كل زيارة. من هؤلاء المرضى، ٩ منهم فقدوا أثناء المتابعة و حذفوا من الدراسة. أخذت البيانات من بقية ٩٩ مريضاً و أجريت الدراسة عليهم لبيان نسبة النجاح و الاختلاطات.

النتائج: ٨٩ مريضاً من مجموع ٩٩ مريضاً (٨٩,٨٩ %) عولجوا عن طريق العقد بالحلقة المطاطية كانوا بدون أعراض و قد اكتسبوا الشفاء. و ١٠ مريضاً استمروا في الشكوى من اعراض المرض و تم إحالتهم الى العملية الجراحية.

الاستنتاج: أظهرت نتائج الدراسة أن عقد البواسير بالحلقة المطاطية في العيادات الجراحية عملية سهلة، ملائمة و ناجحة لعلاج البواسير من الدرجة الثانية و الثالثة.

ERRATUM

The editorial board regrets omission or disorganization of parts of the article entitled “The association between anemia and first febrile seizure: A case-control study” published in volume 4 issue 1 in 2010, page 60-66.

The last line of the first column in page 60 should be moved to the second column of page 60 before the last line.

In the results section, the following part was missing: “RESULTS: The study group consisted of 67 (59.8%) boys and 45 (40.2%) girls; a total of 112 children. The control group consisted of 70 (58.3%) boys and 50 (41.7%) girls; a total of 120 children.

The age groups and the number of patients and controls with IDA are shown in table 1. There was a significantly higher rate of IDA among children with febrile convulsions than in controls (31.2% vs. 11.6%), $p = 0.003$.

The hematological indices of patients and controls with IDA are shown in table 2. The development, family history of FC or epilepsy, the cause of fever and the mean of temperature peak on admission in patients and controls are shown in table 3. The differences were not statistically significant.”