

International Peer Review Journal

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# **The New Iraqi Journal of Medicine**

## **The Official Journal of the Iraqi Ministry of Health**

*Volume 3 Number 3 December 2007*

The New Iraqi Journal of Medicine has agreed the use of the uniform requirements of manuscripts submitted to biomedical journals published by the INTERNATIONAL COMMITTEE OF MEDICAL JOURNAL EDITORS (ICMJE) and it's the first Iraqi peer-review medical journal listed by the ICMJE journal list. The first two issues of this journal appeared under the title of Al Karkh journal of Medicine

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# International Peer Review Journal

## The New Iraqi Journal of Medicine The Official Peer Review Journal Of The Iraqi Ministry of Health

December 2007 Volume 3 Number 3

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## Instructions for Contributors

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Guidelines for submission are in accordance with: Uniform Requirements for Manuscripts Submitted to Biomedical Journals (N Eng J Med, 1997; 336: 309-15). Manuscripts should be up to 4000 words in length with a target of no more than 80 references.

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#### The manuscript should include:

**Title page** should include the following information:

- Full names of all authors
- Name of the department and institution in which the work was done

- Affiliations of the authors
- Manuscript full title
- Full name, address, telephone and/or fax number of the author responsible for manuscript preparation.
- **E-mail address to speed up contacts with authors**
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**Abstract Page:** Abstract in structured form not exceeding 300 words should consist of four paragraphs labeled: Background, Material (Patient) and Methods, Results, Conclusion. Each summary section should begin in a new line and briefly describe, respectively, the purpose of the study, how the investigation was performed, the most important results and the principal conclusion that authors draw from the results. **KEY WORDS** (3 to 6) or short phrases should be written at the bottom of the page.

**Text.** The text of the article should be divided to seven paragraphs labeled: Introduction, Material (Patient) and Methods, Results, Discussion, Conclusions, Acknowledgements, References.

**Introduction** should contain scientific rationale and the aim of the study or (in the case of a review) purpose of the article **Material (Patient) and methods** should describe clearly the selection of observational or experimental subjects (patients or laboratory animals) including controls, such as age, gender, inclusion and exclusion criteria, (the circumstances for rejection from the study should be clearly defined), randomization and masking

(blinding)method. The protocol of data acquisition, procedures, investigated parameters, methods of measurements and apparatus should be described in sufficient detail to allow other scientists to reproduce the results. Name and references to the established methods should be given. References and brief description should be provided for methods that have been published but are not well known, whereas new or substantially modified methods should be described in detail. The reasons for using them should be provided along with the evaluation of their limitations. The drugs and other chemicals should be precisely identified including generic name, dose and route of administration. The statistical methods should be described in detail to enable verification of the reported results.

**Results** should concisely and reasonably summarize the findings. Restrict tables and figures to the number needed to explain the argument of the paper and assess its support. Do not duplicate data in graphs and tables. Give numbers of observation and report exclusions or losses to observation such as dropouts from a clinical trial. Report treatment complications. The results should be presented in a logical sequence in the text, tables and illustrations. Do not repeat in the text all the data from the tables or graphs. Emphasize only important observations.

**Discussion** should deal only with new and/or important aspects of the study. Do not repeat in detail data or other material from the Background or the Results section. Include in the Discussion the implications of the findings and their limitations, including implications for future research. The discussion should confront the results

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**Acknowledgements:** List all contributors who do not meet the criteria for authorship, such as technical assistants, writing assistants or head of department who provided only general support. Financial and other material support should be disclosed and acknowledged.

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References should be denoted numerically and in sequence in the text, using Arabic numerals placed in square brackets, i.e., [12]. List references in numerical order in the Reference list. References selected for publication should be chosen for their importance, accessibility. References first cited in tables or figure legends must be numbered so that they will be in sequence with references cited in the text. The style of references is that of Index Medicus. List all authors when there are six or fewer; when there are seven or more, list the first three, then, et al. The following is a sample reference:

Standard journal article

\*Lahita R, Kluger J, Drayer DE, Koffler D, Reidenberg MM. Antibodies to nuclear antigens in patients treated with procainamide or acetylprocainamide. *N Engl J Med* 1979; 301:1382-5.

Book, personal author(s)



Ringsven MK, Bond D. Gerontology and leadership skills for nurses. 2nd ed. Albany (NY): Delmar Publishers; 1996.

Book, editor(s) as author  
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**Figures** should be numbered consecutively according to the order in which they have been first cited in the text. Define in the legend all abbreviations that are used in the figure.

### **Review articles**

Each review article should concentrate on the most recent developments in the field. The Editor-in-Chief may be consulted prior to sending of any review article. These articles aim to summarize and highlight recent significant advances in and ongoing challenges in the field. Authors should strive for brevity and clarity. The final structure of the review will, of course, depend on the title/focus but wherever possible, the following sections should be included.

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## The New Iraqi Journal of Medicine: More goals to achieve

**Aamir Jalal Al Mosawi**

The benefit of scientific medical peer-reviewed writing and publication is to document scientific facts, practices, and new hypothesis and apply proven facts to patient care by challenging the current practices and subjecting them to the judgment of peers. In this way the scientific knowledge is advanced contributing to improved patient care, medical and health practices.

There has been a tremendous need for an independent peer-reviewed medical journal which aims at the advancement of medical knowledge.

From the first beginning of this journal in 2005 as Al Karkh Journal of Medicine, the decision was made that

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the journal should adhere to the internationally accepted standards of modern peer-reviewed medical journals. Publication ethics (COPE) All the editorial policies were adapted from the policies of the International Committee of Medical Journal Editors (ICMJE), World Association of Medical editors (WAME), and the Committee on

The first two issues of the journal which appeared under the title Al Karkh Journal of Medicine were introductory issues published reviews, editorials about the journal policies (Authorship and contributorship of medical papers, and The Role of the Editor) and a letter from the former president of the WAME Peush Sahni (WAME aims and Policies). Despite the serious difficulties in publishing a peer-reviewed medical journal here the journal has grown and from the third issue of December 2005 the journal has become The New Iraqi Journal of Medicine the official peer-reviewed medical journal of the Iraqi ministry of health.

Initially, the primary goal of the Journal was to publish research work confined to Iraq, which were of importance for both.



**Bernard Ferguson, JD**  
**President**  
**International Association**  
**of Medical Colleges**



**Aamir J Al Mosawi**  
**Head Copernicus scientists**  
**International panel-Iraq**



**Andre MEGARBANE**

local and international readers. Another aim was to make the research work easily available for international readers. Thus a sincere attempt is being made to disseminate the medical knowledge to all medical fraternity of the world.

A good number of Iraqi authors have published their work in the Eastern Mediterranean health journals and Saudi medical journals. These are available for both local and international readers and researchers. However, adequate data on the practice of medicine and research in Iraq, are still not readily available.

From the September 2007 issue, there would be 5000 copies of the New Iraqi Journal of Medicine distributed for both local and international readers. This achievement wouldn't have been possible without the support of Executive Editor and Senior Deputy Minister of Health, Amir Alkhuza'ie.

The PDF version of the journal has already being distributed throughout the world. Abstracts of all previously published papers are also available at the website of the journal at: [www.newiraqijm.4t.com](http://www.newiraqijm.4t.com)

The web site of the journal is linked to the yahoo and Google search engines. The PDF version of all published papers is available currently for free for every one requesting them.

From September 2007 issue of the journal, various editors from all parts of the world joined our journal. Now we have editors from 4 major continents in the world: American Editor, [Craig Vanderwagen](#), European Editor, Silvio Maringhini, African Editor Adamson S. Muula, and Asian Editor, Srijit Das. Our British editor Ali Kubba is section Editor of Gynecology and obstetrics. He is also an expert in sexual disorder. In addition we have an International Editorial Board that includes Bernard Ferguson, JD, President International Association of Medical Colleges, Daniele Trevisanuto, Andre Megarbane,



SM Kadri, Anurag Tewari, Reza Gharebaghi and is also on the verge of



**Das Srijit**

continuous expansion. International editors including editorial board have the privileges of the Editor in Chief, as they can receive, evaluate manuscripts and provide the journal with an editorial decision.

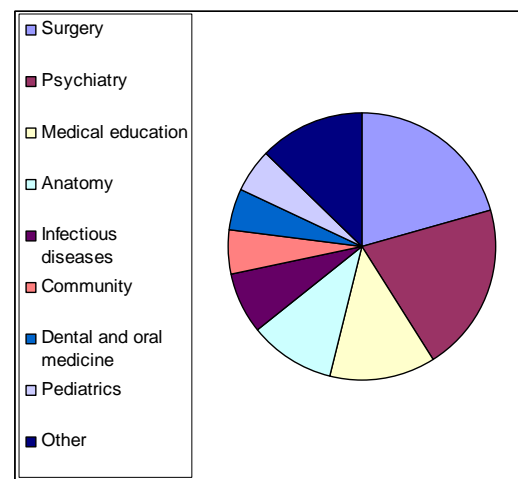


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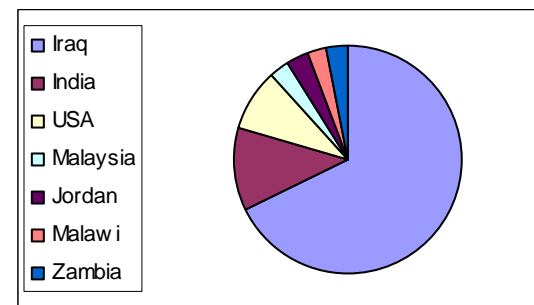
International Editors and International Editorial Board have already contributed to the fulfillment of the main journal goal, which is the publication of internationally peer-reviewed medical papers.

Until now the journal has been successful in publishing papers in more than 15 areas and disciplines of

medicine Figure-1. Authors located in Iraq, USA, India, Malaysia, Jordan, Malawi, and Zambia have contributed to the journal. Figure -2 shows the country distribution of authors who have contributed to the journal



**Figure (1):Discipline distribution of the published papers**



**Figure (2): Country distribution of authors who have contributed to the journal**

I wish that the growth of the New Iraqi Journal of Medicine into an International peer – reviewed medical journal represents an illuminated feature of this dark times witnessed by Iraq. I would also invite and encourage all researchers

all over the world to send their valuable contributions to New Iraqi Journal of Medicine.

Table-1 shows the journal achievements as an Iraqi medical journal.

***Table (1) :The journal achievements***

- 1-The first Iraqi journal to be listed by the ICMJE**
- 2-Indexation: EMR index medicus ,and Copernicus journal master list**
- 3- First Iraqi journal in publishing papers for authors from outside Iraq; USA, India, Malaysia, and Jordan, Zambia, and Malawi.**
- 4-The only Iraqi journal displayed at the exhibition of the Third Regional Conference on Medical Journals in The Eastern Mediterranean**
- 5-Committee on publication ethics membership (London)**
- 6-The only internationally peer-reviewed Iraqi medical journal**

## Comparison of 1999 and 2003 current cigarette smoking behavior among Jordanian adolescents: the Global Youth Tobacco Surveys

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### Abstract

**Background:** Adolescent cigarette smoking has received particular attention in the past two decades. Comparison of prevalence estimates trends is likely to inform public health intervention strategies. This study was conducted to compare the prevalence of current cigarette smoking among school going adolescents in Jordan between 1999 and 2003.

**Methods:** Cross sectional, questionnaire-based study among school going adolescents in the Jordanian Global Youth Tobacco Survey 1999 and 2003.

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**Results:** The overall prevalence of smoking in 1999 was 16.9% (95% CI 15.7%-18.1%) versus 15.5% (95% CI 14.5-16.5) in 2003. In terms of gender distribution 26.9% (95% CI 24.5%-29.3%) males were current smokers in 1999, while 20.0% (18.4%-21.6%) were smokers in 2003. 12.4% (95% CI 10.3%-14.5%) females were smokers in 1999 and 10.1% (95% CI 8.9%-11.2%) females were smokers in 2003. Thus comparing the 1999 estimates to the 2003 suggests that there has been an overall drop in prevalence of current smoking among school going adolescents in Jordan.

**Conclusion:** Widespread antismoking public health interventions may have resulted in the observed reduction in current smoking prevalence in Jordan between 1999 and 2003. There is need to continue monitoring the trends in smoking among adolescents.

**Keywords:** adolescents, cigarette, smoking, Jordan, non-communicable diseases



## Background

Tobacco is the single most important preventable cause of cardiovascular morbidity and cancers in the world [1-4]. Many adult smokers initiate the habit as adolescents. Adolescent smoking is also of public health significance as smoking is a marker of many other harmful lifestyles [5-7].

Akpınar et al [8] have reported prevalence of 26.6% among 13 year olds and 43.7% among 17 years olds in Turkey. In Syria, prevalence of adult cigarette smoking was reported at 56.9% and 35.3% among adult males and women [9]. The Centers for Disease Control and Prevention has reported that 21% and 2.1% of male and female adolescents in Kurdistan Region of Iraq were smokers in 2005 [10].

Much of the data on cigarette smoking in Jordan among young people have mostly come from studies in which study participants were university students or patients attending dental services [11,12]. While these studies could be representative of their respective source populations, they are unlikely to be representative of the adolescent general population.

Two waves of the Global Youth Tobacco Survey (GYTS) were done in Jordan (1999 and 2003) using the GYTS standard methodology [13-14] to estimate the prevalence of tobacco use and associated factors among school-going adolescents. The GYTS Collaborating Group and Warren et al. have reported prevalence of current smoking among adolescents in 1999 in Jordan as 16.6% [15,16]. While cross national comparisons of the prevalence

of adolescent cigarette smoking have been conducted before [14, 17,18], there is little information about same country comparison over the years. The objective of this study was to compare the prevalence of cigarette smoking among school going adolescents in Jordan in 1999 and 2003. We also assessed whether there had been changes in the number of cigarettes smoked per day by adolescents who were current cigarette smokers.

## Methods

Our study was secondary analysis of the data obtained from the Jordanian Global Youth Tobacco Survey. A comprehensive description of the GYTS methodology has been reported elsewhere [20-21]. In brief, the GYTS is a cross sectional school-based survey of students aimed at ages 13–15 years. Two-stage sample design strategy is used in which schools are selected proportional to their enrollment size. Within any selected school, random selection of classes is done. All students within the selected classes are eligible to participation regardless of their actual ages. A standardized questionnaire is self-completed anonymously by the students and it takes students between 30 to 40 minutes to complete. The questionnaire is aimed at collecting the following information among young people: cigarette smoking and other tobacco use; knowledge and attitudes of towards cigarette smoking; role of the media and advertising and their use of cigarettes; access to cigarettes; tobacco-related school curriculum; exposure to environmental tobacco smoke (ETS) and cessation of cigarette smoking. For the purpose of this study however, only data related to estimation of prevalence of current cigarette smoking, gender distribution of

current smoking and number of cigarettes smoked per day will be reported.

Current smoking is defined as having ever smoked even one puff in the past 30 days. The question asked was: "During the past 30 days, have you smoked part or all of a cigarette?" The number of cigarettes smoked was assessed by asking the question: "During the past 30 days (one month), on the days you smoked, how many cigarettes did you smoke?"

A weighting factor was used in the analysis to obtain prevalence of the outcome to reflect the likelihood of sampling each student and to reduce bias by compensating for differing patterns of non response. The weight used for estimation is given by the following formula:

$W = W1 * W2 * f1 * f2 * f3 * f4$ , where  
W1 = the inverse of the probability of selecting the school  
W2 = the inverse of the probability of selecting the classroom within the school  
f1 = a school-level non response adjustment factor calculated by school size category (small, medium, large)  
f2 = a class-level non response adjustment factor calculated for each school  
f3 = a student-level non response adjustment factor calculated by class  
f4 = a post stratification adjustment factor calculated by grade.

### **Ethical considerations**

Permission to conduct the study was obtained from the relevant authorities within the Ministries of Health and Education. Participation by the eligible students was voluntary. Data collection was conducted in school by trained assistants and questionnaires were administered without the presence of their teachers.

### **Data Analysis**

Data were analyzed using SUDAAN 9.0 (Research Triangle Institute, Research Triangle Park, Durham, North Carolina, USA). Proportions and 95% confidence intervals (CI) were obtained as estimates of prevalence. Chi-square tests were used to compare the proportions. An  $\alpha$  value was set at 0.05 and so p value of  $<0.05$  was considered statistically significant.

Since the age distribution of study participants between the two survey waves was different, the two study groups were not comparable in this regard. As prevalence of smoking in part is dependent on age, there was need to standardize the estimates before meaningful comparisons could be done. The following formula was used:

$$(\sum P_j * A_j) / N * 100$$

where  $P_j$  = 1999 age specific prevalence of current smoking for age j

$A_j$  = number of participants in age category j in 2003

$N$  = total number of study participants in 2003

The 100 in the denominator is required when prevalence  $P_j$  is reported as %, otherwise if  $P_j$  is reported as ranging from 0 to 1, the 100 in the denominator is not required.

### **Results**

3912 adolescents participated in the 1999 survey. Information of gender was available for 3681 (94.1%). Of those who had data available 1682 (45.7%) were males and (54.3%) were females in 1999. In 2003, 6313 students participated and information on gender was available for 5838 (92.5%) participants. Of these 2874 (51.2%) were males and 2964 (50.8%) were females. The median age in both 1999 and 2003 surveys was 14 years. However, the age distribution of study

participants between the two survey years was different as shown in table 1.

**Table 1: Age distribution of study participants in 1999 and 2003**

Age	Frequency (%)	
	1999	2003
11 or younger	353 (8.9)	403 (7.2)
12	472 (11.8)	295 (5.5)
13	1043 (25.0)	520 (9.2)
14	1059 (26.5)	1640 (26.5)
15	745 (22.1)	1523 (25.2)
16	141 (4.3)	1414 (23.4)
17 or older	49 (1.4)	189 (3.1)
Total	3862	5984

Prevalence of current cigarette smoking .The overall prevalence of smoking in 1999 was 16.9% (95% CI 15.7-18.1) versus 15.5% (95% CI 14.5-16.5) in 2003. In terms of gender distribution 26.9% (95% CI 24.5-29.3) males were current smokers in 1999, while 20.0% (18.4-21.6) were smokers in 2003. 12.4% (95% CI 10.3-14.5) females were smokers in 1999 and 10.1% (8.9-11.2) females were smokers in 2003.

Age-specific current cigarette smoking

We also aimed to compare the age-distributed current cigarette smoking prevalence between 1999 and 2003. The results are reported in table 2.

**Table 2: Age-specific current cigarette smoking prevalence among adolescents in Jordan 1999 and 2003**

Age category in yrs	1999 Prevalence	2003 Prevalence	p value
11 yrs or younger	19.3	20.8	0.08
12	19.6	34.1	<0.01 *
13	13.8	20.5	0.08
14	15.8	14.2	0.02*
15	20.6	20.5	0.45
16	36.2	24.9	<0.01 *
>=17	42.6	35.9	0.54

\*statistically significant at  $\alpha = 0.05$

When the 1999 overall prevalence (18.7%) was standardized to the 2003 age distribution, the prevalence was 22.0% and was statistically significantly different from the 2003 estimate ( $p < 0.01$ ).

We also aimed to assess whether there has been a change in the number of cigarette smoked on each smoking days by the adolescent smoker. There was a statistical difference in the number of cigarettes smoked per day between the 1999 and 2003 surveys as reported in table 3. However there was no general pattern observed.

**Table 3: Number of cigarette smoked per day among current adolescent cigarette smokers in Jordan 1999 and 2003**

Number of Cigarettes per day	1999 Prevalence in %	2003 Prevalence in %	p-value
< 1	46.6	28.3	<0.01
1	28.0	24.8	<0.10
2 to 5	13.9	22.4	<0.01
6 to 10	6.2	11.6	<0.01
11 to 20	3.7	6.4	<0.01
>20	1.7	6.6	<0.01

## Discussion

The prevalence of current cigarette smoking among school-going adolescents in Jordan was 16.9% in 1999 and 24.6% in 2003. Our 1999 current smoking prevalence estimate is different from the 16.6% reported by the Global Youth Tobacco Survey Collaborative Group (GYTSG) in 2002 using the same data [15]. The reason for the difference was that the GYTSG calculated the prevalence figure as number of participants reporting current smoking divided by total number of study participants. In our estimate, the numerator was the same as in the GYTSG but the denominator was only those who completed the question on current smoking. In the 1999 survey 172 (4.4%)



did not the answer the question: "During the past 30 days, have you smoked part or all of a cigarette?" Including these study participants within the denominator was similar to assuming that they were all non-smokers. We chose to use only complete case analysis, and so our estimate is slightly higher, although the difference with the GYTSG was not statistically significant.

The prevalence of smoking in 1999 at 16.9% was only slightly higher than 15.5% estimated in 2003,  $p = 0.40$ . However if the 1999 prevalence was age-standardized to the 2003 sample, the prevalence of cigarette smoking rises to 22.0% ( $p < 0.01$ ). This suggests that the prevalence estimate in the earlier sample was statistically different from the 2003 sample, if the age distributional differences between the samples are considered.

The Centers for Disease Control and Prevention (CDC) has reported an overall current smoking prevalence

among school going adolescents in the Eastern Mediterranean region as 15.3% [14]. Our estimates are not far different from the 'average' prevalence for the region. This suggests that most countries in the region have relatively high prevalence of smoking.

The decrease in current smoking prevalence in Jordan could be explained, partly if not to a great extent by the public health interventions that the Kingdom of Jordan has taken over the past several

years [22]. In 1998, the Jordanian government put in place anti-smoking legislation to prohibit smoking in public places, it has banned the advertisement of cigarettes in the media, and a national committee has been established to draw-up strategies and programs to combat smoking. In 2001, the government used postage stamps to carry adolescent relevant antismoking messages. The committee on the prevention of smoking in Jordan has wide representation including Health Ministry, UNICEF, the Public Security Department, Jordan Bar Association, the National Anti-Smoking Society and the Ministry of Awqaf and Islamic Affairs.

We also aimed to assess whether there was a change among current cigarette smokers with regard to number of cigarettes smoked per day. The proportion of smokers smoking less than a cigarette a day to 5 cigarettes a day were higher in 1999 as compared to 2003. However the proportion having at least 6 cigarettes per day were significantly higher in 2003. This may suggest that although overall smoking prevalence in 2003 was lower than in 1999, the proportion of smokers taking higher numbers of cigarettes increased over the period. Considering that there is an increasing dose-response association between the number of cigarettes and adverse health outcomes, a significant proportion of adolescents were exposing themselves to greater potential harm in 2003. It is also important to recognize that adolescents who smoke cigarettes may also be engaging in other unhealthy behaviours [23]. A holistic approach to overall healthy living is therefore likely to be of greater public health significant than individual behaviour approach.

This study has a number of limitations. The data used were obtained through self-completed questionnaire. There is a possibility that some study participants may have misreported their exposure status. However, Brener et al has assessed a method of data collection the GYTS in the United States and they have reported high reliability [24]. While reliability of data collection instrument was acceptable in the United States, we are not aware as to whether the methodology also has high reliability in the Eastern Mediterranean region. We suggest that future studies assess such issues.

Also by asking how many cigarettes the adolescent smoked on the days s/he smoked assumed that the adolescent would smoke a regular number of cigarettes each day. This may result in mis-classification based due to recall problems. It is also not known whether all or some study participants responded thinking that the researchers were asking for the 'average' number of cigarettes per smoking day. Obviously some study participants may have smoked more on certain days and not much on others.

Another limitation of the GYTS methodology is that self reported history of current smoking is not verified by biomarkers such as salivary or blood cotinine level or exhaled carbon monoxide [25-27]. We suggest that the Global Youth Tobacco Survey Collaborating Group consider validating the questionnaire with biomarkers in future surveys. As the GYTS methodology only allows recruitment of students who are present in school on the day that the survey is administered, our findings may not be applicable to all students. Also the findings may not be applicable to out-of school adolescents.

In between the two initiatives, the Jordanian National Anti-Smoking Strategy has been launched [28]. It is expected that such initiatives will support the reduction in the prevalence of smoking among all age groups in Jordan.

## **Conclusion**

We find that the overall prevalence of current cigarette among adolescents who participated in the Jordanian Global Youth Tobacco Survey in 1999 was much higher than that obtained in 2003. We suggest that public health interventions aimed to prevent smoking in Jordan may have started bearing fruit.

## **Conflict of Interest**

The authors declare no conflict of interest.

## **Acknowledgements**

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## References

- 1- Ansary-Moqhaddam A, Huxley R, Barzi F et al. The effect of modifiable risk factors on pancreatic mortality in populations of the Asia Pacific region. *Cancer Epidemiol Biomarker Prev* 2006; 15: 2435-40.
- 2- Brand RM, Jones DD, Lynch HT, Brand RE, Watson P, Ashwathnayan R, Roy HK. Risk of colon cancer in hereditary non-polyposis colorectal cancer patients as predicted by fuzzy modeling: influence of smoking. *World J Gastroenterol* 2006; 12: 4485-91.
- 3- Kaur J, Bains K. A study of the risk factor profile of cardiovascular diseases in rural Punjabi male patients. *Indian J Public Health* 2006; 50(2):97-100.
- 4- Toustad S, Andrew-Johnston J. Cardiovascular risks associated with smoking: a review for clinicians. *Eur J Cardiovasc Prev Rehabil* 2006; 13(4): 507-14
- 5- Rudatsikira E, Siziya S, Kazembe LN, Muula AS: Prevalence and associated factors of physical fighting among school-going adolescents in Namibia. *Ann Gen Psychiatry* 2007; 6:18.
- 6- Dierker LC, Sledjeski EM, Botello-Harbaum M, Ramirez RR, Chavez LM, Canino G: Association between psychiatric disorders and smoking stages within a representative clinic sample of Puerto Rican adolescents. *Compr Psychiatry* 2007; 48:237-44.
- 7- Haddad LG, Malak MZ. Smoking habits and attitudes towards smoking among university students in Jordan. *Int J Nurs Stud* 2002; 39: 793-802.
- 8- Akpınar E, Yoldascan E, Saatci E. The smoking prevalence and the determinants of smoking behaviour among students in Cukurova University, Southern Turkey. *West Indian Med J.* 2006;55:414-9.
- 9- Ward KD, Eissenberg T, Rastam S, Asfar T, Mzayek F, Fouad MF, Hammal F, Mock J, Maziak W. The tobacco epidemic in Syria. *Tob Control.* 2006 ;15 Suppl 1:i24-9
- 10- Centers for Disease Control and Prevention (CDC). Tobacco use among students aged 13-15 years--Kurdistan Region, Iraq, 2005. *MMWR Morb Mortal Wkly Rep.* 2006 26;55:556-9.
- 11- Alomari Q, Barrieshi-Nusair K, Said K. Smoking prevalence and its effect on dental attitudes and behaviour among dental students. *Med Princ Pract* 2006; 15: 195-9.
- 12- Kyrlesli A, Soteriades ES, Warren CW, Kremastinou J, Papastergiou P, Jones NR, Hadjichristodoulou C. Tobacco use among students aged 13-15 years in Greece: the GYTS project. *BMC Public Health.* 2007;7:3.
- 13- Arora M, Reddy KS. Global Youth Tobacco Survey (GYTS) - Delhi. *Indian Pediatr* 2005;42:850-1.
- 14- Centers for Disease Control and Prevention (CDC). Use of cigarettes and other tobacco products among students aged 13-15 years--worldwide, 1999-2005. *MMWR Morb Mortal Wkly Rep.* 2006;55:553-6.
- 15- Global Youth Tobacco Survey Collaborative Group. Tobacco use among youth: a cross country

- comparison. *Tob Control* 2002;11:252-70.
- 16- Warren CW, Riley L, Asma S, Eriksen MP, Green L, Blanton C, Loo C, Batchelor S, Yach D. Tobacco use by youth: a surveillance report from the Global Youth Tobacco Survey project. *Bull World Health Organ* 2000;78:868-76.
  - 17- Global Youth Tobacco Survey Collaborating Group. Differences in worldwide tobacco use by gender: findings from the Global Youth Tobacco Survey. *J Sch Health* 2003;73:207-15.
  - 18- Muula AS, Mpabulungi L. Cigarette smoking prevalence among school-going adolescents in two African capital cities: Kampala Uganda and Lilongwe Malawi. *Afr Health Sci* 2007;7:45-9.
  - 19- Global Tobacco Surveillance System Collaborating Group. Global Tobacco Surveillance System (GTSS): purpose, production, and potential. *J Sch Health*. 2005;75:15-24.
  - 20- Centers for Disease Control and Prevention (CDC). Use of cigarettes and other tobacco products among students aged 13-15 years--worldwide, 1999-2005. *MMWR Morb Mortal Wkly Rep* 2006;55: 553-6.
  - 21- Rudatsikira E, Abdo A, Muula AS. Prevalence and determinants of adolescent tobacco smoking in Addis Ababa, Ethiopia. *BMC Public Health* 2007;7:176.
  - 22- Kandela P. Jordan starts campaign to tackle high rates of smoking. *Lancet* 2000; 355: 1800
  - 23- Miller JW, Naimi TS, Brewer RD, Jones SE. Binge drinking and associated health risk behaviours among high school students. *Pediatrics* 2007; 119: 76-85.
  - 24- Brener ND, Kann L, McMannus T, Kinchen SA, Sundberg EC, Ross JG. Reliability of the 1999 youth risk behaviors survey questionnaire. *J Adolesc Health* 2002;31: 336-42.
  - 25- Hung J, Lin CH, Wang JD, Chann CC: Exhaled carbon monoxide level as an indicator of cigarette consumption in a workplace cessation program in Taiwan. *J Formos Med Assoc* 2006; 105: 210-3.
  - 26- Jenkins RA, Counts RW: Personal exposure to environmental tobacco smoke: salivary cotinine, airborne nicotine, and nonsmoker misclassification. *J Expo Anal Environ Epidemiol* 1999; 9: 352-63.
  - 27- Low EC, Ong MC, Tan M: Breath carbon monoxide as an indication of smoking habit in the military setting. *Singapore Med J* 2001; 45:578- 82.
  - 28- Jordan Times. National Anti-smoking strategy to be announced today. May 2, 2002 accessed on 26 September 2007 from <http://www.jordanembassyus.org/05302002006.htm>



## Variation in the Lobes and Fissures of the Right Lung: An Anatomical Perspective

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<sup>1</sup>

### Abstract

**Background:** The right lung is known to exhibit variations regarding the presence of fissures and lobes. Often the anomalies pertaining to the lungs remain undetected if they are asymptomatic. The variations may be detected incidentally in routine autopsies and cadaveric dissections.

**Methods:** We studied thirty five cadaveric right lungs (n=35) to detect any anomalies pertaining to fissures and lobes.

**Results:** Out of thirty five specimens studied, anomalous fissure and lobe was detected in a single lung specimen. The anomalous lung exhibited a single oblique fissure which did not extend to the inferior border, rather it extended to the anterior border of the right lung. The presence of the single oblique fissure resulted in formation of two lobes in the right lung.

**Conclusion:** Anatomical knowledge of the abnormal fissures and lobes of the lungs may be important for surgeons performing lobectomies. The presence of the anomalous lobes and fissures may also result in erroneous interpretation of skiagrams.

**Keywords:** Lung; Lobes; Anomaly; Variation; Anatomy.

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### Introduction

According to standard anatomy textbook, the right lung has two fissures i.e. the oblique fissure and the horizontal fissure which divides it into three lobes: superior, middle and the inferior [1]. The oblique fissure (OF) can be traced, traversing a downward course thereby meeting the inferior border of the lung at a distance of 7.5 cm behind the anterior end [1]. The horizontal fissure (HF) passes from the OF at the level of the midaxillary line to the anterior border of

the lung at the level of the sternal end of the fourth costal cartilage. An OF, passing to the anterior border of the right lung, is a rare entity.

In the present study, we describe the gross anatomical features of an anomalous lung with an OF traversing a horizontal course to terminate at the anterior border of the right lung, thereby resulting in the formation of unusual two lobes instead of the usual two lobes. Anatomical knowledge of the normal and abnormal fissures and lobes of the lung may be important for surgeons and radiologists in day to day clinical practice and the present study is made to highlight such.

## Materials and Methods

We observed thirty five right lungs (n=35) for the presence of anomalous fissures and lobes. No information regarding the history of the individuals were available. The right lungs were carefully studied, morphometric measurements were taken and the specimen was photographed (Fig.1). The anomalous specimen was also compared to a normal specimen (Fig.2).

## Results

Out of thirty five specimens studied, we observed anomalous fissures and lobes in a single specimen (2.84%). The posterior border of the right lung was traced from above and a distance of 13 cm from the apex, an OF was traced to traverse a course towards the anterior border ('OF' in Fig.1). The OF on its origin from the posterior border was

prominent over a distance of 7 cm, thereby becoming faint while reaching the anterior border. The extent of the posterior border from the origin of the OF till the inferior border, measured 12.5 cm. There was only a single fissure i.e. the OF with the HF being absent. Only two lobes i.e. superior and the inferior, were observed in the present case.

## Discussion

The anomalous fissures and the lobes may be due to defective development of the lungs. It has been reported that the fissures are the spaces which separate individual bronchopulmonary buds or segments and there is obliteration except along the two planes which give rise to the HF and the OF [2]. Whenever there is non obliteration of these spaces, the accessory fissure arises [2].

Many past research studies have focused on the accessory fissures. A past research study had reported an accessory fissure in the right lung between the superior and the basal segments of the lower lobes [3]. Studies performed by high resolution CT examinations on 30 healthy individuals found that in 87% and 77% cases, there were incomplete fissures in the right and the left lung, respectively [4]. Incompleteness of fissures (fusion between the lobes) has been reported to have 70% incidence [5]. A past study had even attempted to classify the pulmonary fissures [6]. The grades were classified as :- Grade 1- complete fissures, separate lobes; Grade 2- complete visceral cleft but parenchymal fissure at base of fissures; Grade 3- visceral cleft evident for part of the fissure; Grade 4- complete fusion of the lobes with no evidence of fissural

lobes. The same study had defined the pulmonary artery to be centrally located to the OF and termed the displacement of the artery in anterior and the posterior directions as ‘imbalance’

In CT scans, the major fissures may be visualized as lucent band, less often a line and least often as a dense band [7]. Localization of tumor or any mass in the lung along the fissures may be important. Often, the abnormal fissures may result in erroneous interpretation of skiagrams. It has been found that incomplete fissures often give an atypical appearance of the pleural effusion [8]. An incomplete major fissure has been identified to be linked to the spread of any disease and causing collateral drift [8]. Some radiologists have termed it as ‘incomplete fissure sign’ [8]. In the present case, the abnormal course of the OF will definitely cause an imaging conflict.

An incomplete fissure has been found to be the cause for post operative leakage [6]. It has been found also that accessory fissure acts as a barrier to the infection spread causing a sharply margined pneumonia which can be mistaken as atelectasis or consolidation [9]. An earlier anatomical study had defined the presence of an accessory fissure in the right lung with the presence of four lobes [10]. Thus, it is an accepted fact that the right lung may exhibit variations regarding the number of fissures and lobes.

## Conclusion

Although, presence of two lobes and an accessory ‘azygos lobe’ in the right lung is not an uncommon finding as described in anatomy textbook [11], the awareness

of the same may be beneficial for surgeons performing lobectomies and radiologists interpreting skiagrams. The present anatomical finding is a sincere attempt to highlight such.

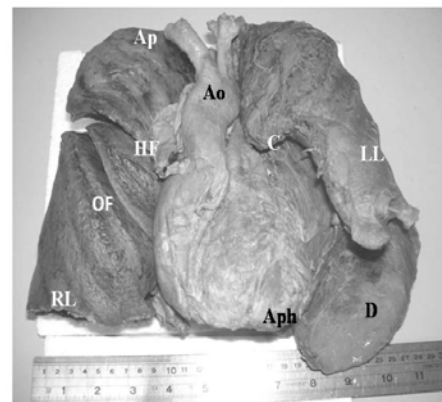
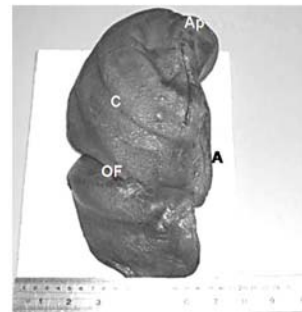
## Figure legend

**Fig.1. Photograph of anomalous right lung showing:**

**Ap:**Apex ; **A:**Anterior border ; **C:**Costal surface; **OF:**Oblique fissure

**Fig.2. Photograph of normal right and left lungs showing:**

**AP:**Apex of lung ; **HF:**Horizontal fissure; **OF:**Oblique fissure; **RL:**Right lung; **Ao:**Arch of aorta; **Aph:**Apex of heart; **C:**Cardiac notch; **LL:**Left lung; **D:**Diaphragmatic surface



## References

- 1- Standring Susan. Gray's Anatomy. The Anatomical Basis of Clinical Practice. 39<sup>th</sup> edition 2005, Philadelphia, Elsevier Churchill Livingstone; pp-1067-1070.
- 2- Meenakshi S, Manjunath KY, Balasubramanyam V. Morphological variations of the lung fissures and lobes. Indian J Chest Dis Allied Sci. 2004;46 :179-82.
- 3- Aldur MM, Deck CC, Celik HH, Tasçioğlu AB. An accessory fissure in the lower lobe of the right lung. Morphologie. 1997 ; 81: 5-7.
- 4- Frija J, Naajib J, David M, Hacein-Bey L, Yana C, Laval-Jeantet M. [Incomplete and accessory pulmonary fissures studied by high resolution x-ray computed tomography]. J Radiol ; 69 : 163-170.
- 5- Raasch BN, Carsky EW, Lane EJ, O'Callaghan JP, Heitzman ER. Radiographic anatomy of the interlobar fissures: a study of 100 specimens. AJR Am J Roentgenol 1982; 138: 1043-9.
- 6- Craig SR, Walker WS. A proposed anatomical classification of the pulmonary fissures. J R Coll Surg Edinb 1997; 42: 233-4.
- 7- Proto AV, Ball JB Jr. Computed tomography of the major and minor fissures. AJR Am J Roentgenol 1983; 140: 439- 48.
- 8- Hayashi K, Aziz A, Ashizawa K, Hayashi H, Nagaoki K, Otsuji H. Radiographic and CT appearances of the major fissures. Radiographics 2001; 21: 861-74.
- 9- Godwin JD & Tarver RD. Accessory Fissures of the Lung. AJR Am J Roentgenol 1985; 144: 39-47.
- 10- Modgil Vishal, Das Srijit & Suri Rajesh. Anomalous Lobar Pattern of Right Lung: A Case Report. International Journal of Morphology 2006; 24: 5-6.
- 11- Moore KL, Agur AMR. Essential Clinical Anatomy. 2<sup>nd</sup> edition 2002, Baltimore, Lippincott Williams & Wilkins, pp-77.



## Depression in spinal cord injured patients

Amir.A.Hussain

### Abstract

**Background:** Physical illness is one of the etiological factors in mental illness. The physically disabling conditions, including spinal cord injury, are frequently accompanied by significant psychological conditions.

Spinal cord injury results in alteration and/ or losses of bodily functions, family and social relationships, vocation, and future plans, imposes unusual psychological efforts for coping to the new situations.

Depressed mood and depression are common psychological reactions that are accompanied the changes by spinal cord injury, may be prolonged and severe. Knowing the factors that play a role in establishment of depression in such patients, and the high risk group who are more prone to depression is an essential issue. Early detection of depression may assists in identification of factors that help adjustment and prevention of maladaptation.

**Objectives:** To determine the prevalence of depression in spinal cord injured patients and its severity and correlation with some sociodemographic variables.

**Methods:** In a study of 52 patients with spinal cord injury carried out in Abdullah Ibn Maktoom centre for spinal cord injuries and rehabilitation in Baghdad from May to September 1997. The diagnosis of depression was approached via clinical examination, interview and the application of DSMIII-R criteria for depression. The severity of depressive

state was determined by applying the Beck Depression Inventory scale. SPSS (8.0) has been used for descriptive and inferential statistical analysis.

### Results:

Fifty-two patients, age range from 22-60 years were studied. The mean age  $\pm$  standard deviation was  $35.6 \pm 6.6$ .

The results were that 45 (86.5%) of the patients were depressed, 14 (26.9%) had severe depression and 25 (48.1%) were moderate and 6 (11.5%) scored mild depression. while 7 (13.5%) patient were non-depressed.

Statistical analysis showed that age, marital status, educational level, type of the military service, and duration of the injury were significantly associated with depression. While previous personal history of depression, family history of depression, pressure bed sores, alcohol and drug abuse although present but were not approaching to a significant level.

**Conclusion:** The study shows that more than three quarters of spinal cord injured patients had significant depression with varying severities, which denoted that this is a major problem that needs focusing and treatment to prevent the complication and sequels aiming for healthy coping and adjustment with this major disability..

Key word: Depression, Spinal cord injury, Rehabilitation centre, Baghdad

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## Introduction

World Health Organization (WHO) defines impairment as an abnormality in body structure, appearance, or organ or system function resulting from any cause [1].

Spinal cord injury (SCI) represents a catastrophic interruption and alteration not only in physical functioning but psychological functioning as well, that affect rehabilitation potentials and the opportunity of returning to previous, familiar social life and work [2,3].

Since World War II, numerous clinicians have attempted to characterize the psychological adjustment of persons who incur a spinal cord injury and to explain how and why the typical patient reacts the way he or she does [4].

Spinal cord injury may produce both immediate and long term stress. Mood disturbances are common among individuals with chronic health condition including SCI or impairment. The commonest psychological response to physical illness is affective reaction, in particular higher level of anxiety and depression were found in individuals with SCI. Anxiety is the immediate response, while depression tends to be a later development. [4, 5].

Some consider depressed mood is to be inevitable lowered mood may be a normal or understandable response to SCI, may be part of normal grief, or may be indicative of a depressive illness. [2, 4].

Depression can have devastating effects on an individual with a SCI in addition to the presence of ulcers and urinary tract infections, compromised immune function, increased hospital stays,

increased medical expenses, decreased social integration, compromised intimate relationships, ability to control voluntary

movement may be compromised, sensation may be affected, bladder and bowel movements may be uncontrolled, and sexual functioning may change and strained caregiver support. [6].

The assessment, diagnosis, and treatment of depression in people with SCI are multilayered processes, complicated by interplay of biological, psychological, strategies aimed at strengthening an individual's social support system [8].

According to the grief model, as described by Hohman [7], resolution of denial is followed by depression. This may be manifested as withdrawal and internalized hostility. The patient may express suicidal ideation. Feeling of futility, lack of motivation and feelings of guilt and uselessness may be severe. The patient may attempt to dissociate himself from the family, married patients may suggest divorce, may be hostile and demanding... Later, hostility may be externalized onto those around the patient, doctors, family and friends may be blamed for the injury Physical and verbal aggression may be prominent. Various authors have characterized depression among SCI patients as internalized anger, sadness over loss, loss of reinforcers, learned helplessness, and result of biochemical changes [9]

Veterans had significantly higher global stress scores than non-veterans with SCI and the general population. Veterans with spinal cord injury have more stress than civilians with spinal cord injury and general population. Veterans with more hassles and more perceived stress were

likely to have more depressive symptoms and anxiety and were less satisfied with themselves [10].

The depressed SCI patient may reject rehabilitation and assistance. Pre-injury personality and means of coping with stress become prominent and intensification of pre-injury traits may be evident. [11].

Depression may vary from mild sadness to extremes of suicide. Suicide and self-neglect are not uncommon long term problems. Follow-up studies have shown 50% of patients with SCI describe suicidal thoughts with depressive mood [12]. The suicide rate for the disabled is greater than that for general population [11]. Suicidal plans during the chronic period may be related to a depressive disorder provoked by prolonged severe impairment [13].

This study was carried out to estimate the prevalence and severity of depression among SCI patients. We also aimed to assess factors that are associated with depression among patients with SCI at Abdulla-Ibn-Maktoom SCI treatment / rehabilitation centre in Baghdad.

## **Method**

This was a cross-sectional study of fifty-two SCI patients at Abdullah Ibn-Maktoom SCI rehabilitation and treatment centre in Baghdad during the period May-September 1997. The patients are interviewed and the sociodemographic information collected. Willingness to participate in the study was obtained by signing a consent form. The diagnosis of depression was made according to a semi-structured interview schedule based on DSMIII R criteria of

depression (American psychiatric association 1988) [14].

The severity of depression was determined by applying the 13-item short form Beck Depression Inventory (BDI), which is Arabic concise version of BDI [15].

The 13-item short form of (BDI) is a test presented in multiple choice format which measures presence and degree of depression. It is a series of questions developed to measure the intensity, severity, and depth of depression in patients with psychiatric diagnoses. It is composed of 13 questions or items, each with four possible responses. Each response is assigned a score ranging from zero to three, indicating the severity of the symptom. The sum of all item scores indicates the severity of depression. Scores from 0-4 indicate no or minimal depressive symptoms, scores of 5-7 indicate mild depression, scores of 8-15 indicate moderate depression and scores of 16 and above indicate severe depression. Individual questions of this form assess mood, pessimism, sense of failure, self-dissatisfaction, guilt, punishment, self-dislike, self-accusation, suicidal ideas, crying, irritability, social withdrawal, body image, work difficulties, insomnia, fatigue, appetite, weight loss, bodily preoccupation, and loss of libido.

## **Results**

The 52 patients participated in the study ranged in age from 22 to 60 years (mean 35.6 and standard deviation 6.6), all were males and paraplegics (as this rehabilitation centre was advocated for military persons only and no females were present).

Forty-five of SCI patients (86.5%) were depressed, while 7 (13.5%) were non-depressed according to DSMII R depressive criteria. table (1). The severity of depression has been shown in table (2).

**Table (1): demonstration of frequency of depression in SCI patients**

SCI patients		
	Observed N	
Depressed	45	86.5
Non-depressed	7	13.4
Total	52	100.00

DF=1       $p < 0.001$

**Table (2) :Severity of depression.**

Valid	Non depressed	Frequency	%	V. %
Depressed		7	13.5	13.5
	mild	6	11.5	11.5
	moderate	25	48.1	48.1
	severe	14	26.9	26.9
	Total	52	100.0	100.0

The majority (53.8%) were in the age group (30-39) years. Forty-eight percent of them were depressed statistically significant, while 5.7% were non-depressed.

Forty- six percent of depressed patients were single. Depression was higher significantly in unmarried patients. ( $P < 0.05$ ).

And 23% of them were military voluntaries (professional). Twenty-five percent of them have 11-15 years duration of the SCI. It has been notified that 48% of the sample were conscripts soldiers and depressed. The depression was significantly prevalent among conscripts patients. P value was  $< 0.05$ .

Twenty-seven percent of moderately depressed patients were of primary school educational level. 59.6% depressed patients were of primary school educational level. Depression was found in low educational level (primary) in a significant value ( $P < 0.05$ ).

Depressed SCI patients of 11-15 years duration were 42.3% of the sample.

The period of the injury was significantly related with depression ( $P < 0.05$ ).

Bedsore and depression were not significant correlated, although presence of 13(25%) depressed with bed sore out of 45 depressed patients. (P value  $> 0.05$ .) Six SCI patients (11. 5%) were depressed and abusing alcohol. alcohol and depression were not correlated significantly ( $p > 0.05$ ).

Twenty-nine percent of depressed patients were drug abusers, while 1% was drug abuser but had no depression. Despite 15 of depressive patients (28.8) were abusing drugs but the 30 patients (57.6) were not so. ( $P > 0.05$ ) .This is meant that not reaching the significant level. Three (5.7) of depressed SCI patients had previous history of depression prior to injury. Previous history of depression was non significant. ( $P > 0.05$ ). One depressed SCI patient (1.9) had family history of depressive disorder. Family history of depression was non- significant. ( $P > 0.05$ ).

**Table 4: Statistical significant of the variables between depressed and non-depressed groups:**

Variables	Depressed N (%)	Non-depressed N (%)	P value
Age 20-29ys 30-39 40 and over	7 (13.7) 25(48.0) 13(25.0)	2 (3.8) 3 (5.7) 2 (3.8)	Df=5 p<0.05(S)
Marital status Single Married divorced	24 ((46.1) 19 (36.5) 2 (3.8)	4 (7.6) 3( 5.7) .....	Df=4 p<0.05(S)
Educational level Primary Secondary university	31(59.6) 5(9.6) 9(17.3)	3(5.7) 4(7.6) .....	Df=4 p< 0.05(S)
Type of military service Conscript Reservist Volunteer	26(48.0) 15(28.8) 4(7.6)	5(9.6) 2(3.8) .....	Df=4 p<0.05(S)
Duration of the injury 1-5ys 6-10 11-15 16-20	1(1.9) 17(32.6) 22(42.3) 5(9.6)	..... 4(7.6) 2(3.8) 1(1.9)	Df=6 p< 0.05(S)
Previous history of depression Positive Negative	3(5.7) 49(94.2)		Df=1 p>0.05(NS)
Family history of depression Positive Negative	1(1.9) 51(98.0)		Df=1 p>0.05(NS)
Bed sores Present Absent	13(25.0) 32(61.5)	1(1.9) 6(11.5)	Df=3 p>0.05(NS)
Alcohol abuse Positive Negative	6(11.5) 39(75.0)	..... 7(13.4)	Df=2 p>0.05(NS)
Drug abuse Positive Negative	15(28.8) 30(57.6)	1(1.9) 6(11.5)	Df=3 p>0.05(NS)

**S=significant      NS= non-significant**



**Table (3) Sociodemographic characteristics of the sample**

Depressed patients							Non-depressed			
Level of depression	severe	%	moderate	%	mild	%	Non-depressed	%	total	%
No.	14	26.8	25	48	6	11.5	7	13.5	52	100
Age groups(years)	20-29. 3	5.7	20-29 2	3.8	20-29 2	3.8	20-29 2	3.8	9	17.3
	30-39. 9	17.3	30-39 13	25.0	30-39 3	5.7	30-39 3	5.7	28	53.8
	≥ 40 2	3.8	≥40 10	19.2	≥ 40 1	1.9	≥ 40 2	3.8	15	28.8
Marital status	Married 5	9.6	10	19.2	3	5.7	3	5.7	21	40.3
	Single7	13.4	15	28.8	3	5.7	4	7.6	29	55.7
	Divorced2	3.8	-----		-----		-----		2	3.8
Military service type	Conscript 8	15.3	14	26.9	4	7.6	5	9.6	31	59.6
	Reservist4	7.6	10	19.2	1	1.9	2	3.8	17	32.6
	Volunteer2	7.6	1	1.9	1	1.9	--	----	4	7.6
Duration of injury in years	1-5ys. 1	1.9	---	---	---	---	---	---	1	1.9
	6-10 ys 3	5.7	9	17.3	4	7.6	4	7.6	20	38.4
	11-15 ys 9	17.3	12	23.0	2	3.8	2	3.8	25	48.0
	16-20ys 1	1.9	4	7.6	----	----	1	1.9	6	11.5
Educational level	Primary12	25	15 4	26.9	4	7.6	3	5.7	34	65.3
	Secondary	-----	6	7.6	1	1.9	2	3.8	7	13.4
	University2	3.8		11.5	1	1.9	2	3.8	11	21.1
Presence of bed sore	5	9.6	7	13.4	1	1.9	6	11.5	19	36.5
Alcohol abuse	2	3.8	4	7.6	-----	----	-----	----	6	11.5
Drug abuse	8	15.3	6	11.5	1	1.9	1	1.9	16	30
Previous history of depression	3	5.7	-----		-----		-----		3	5.7
Family history of depression	1	1.9	-----		-----		-----		1	1.9

## Discussion

A review of studies was done to determine the occurrence of depression in SCI persons show different rates, from 0 to 100 percent [16,17,18,19,20,].it is quite variable from study to study, depending on the type of measure, the definition of depression, and whether the taken during rehabilitation, shortly after, ,or somewhat later. Also this variability as resulting from the wide variety of instruments used, from staff ratings, and whether or not a correction for somatic symptoms resulting from the SCI itself was used. Depressive disorders are the most common form of psychological distress in SCI and appears to be more common than in non-disabled population.[21].

The incidence of depressive disorders is higher than in general population (3-10%) and higher than the incidence of depression in orthopedic patients (10-15%) [17]. While in stroke depression was reported in Iraqi study as 66 % of the patients [23].

The results of this study was, 86% (n=45) of SCI patients were depressed out of the total sample fifty-two. Three (5.7%) of the sample have previous history of depression.

Five (22.7%) of SCI patients were depressed after the injury as depression was not exist prior to injury, but developed after the injury and 3% of them were depressed prior to injury [24, 25]. Two of the depressed SCI patients (6.6%) had positive previous history of depression and [26].Which is not so far from the result of our study (5.7%), while 2 SCI depressed patients had positive family history of depression[26]

In this study only minority, one patient, had pervious family history of depression, which meant that the effect of the injury have major role in the etiology of depressive disorder, in addition of the small number of the sample. The previous history of depression was obtained from the past records and from the relatives of the patients and from previous treatments and so the family history of depressive disorders.

This study showed that more than 60% of patients were between 20-39 years.

The mean age appears ranging from 32-50 years, which represent the main economic and social fabric of the community [27, 28, 29, 32]

Various studies have shown that SCI is more common in males than females. Epidemiological studies of SCI in both developed and developing countries have consistently shown reported male: female ratios of between 3:1 and 8.3:1[27, 30].

The sample in this study was male only because this centre is advocated for military persons who didn't involve females.

Some studies showed that SCI is higher among divorced, separated or single and 32% of patients were married [25, 27]. Another studies showed that married and those aged 30-39ys SCI patients are more depressed than others [29, 32].

While in this study 46% was married due to small number of the sample, in addition all of them were military and their injury was due the war.

Drinking problems have been found to be common among medical and surgical ward patients [30, 31]. In which such

drinking problems occur in 20-25% of male ward patients, which has not been appreciated by most physicians.

In this study 11.5% were of alcohol abuse, and when correlated with depression it doesn't reach the significant level. Seven percent of the moderately depressed patients were alcohol dependent, while 2% of severely depressed patients were alcoholic.

In this study the most drugs abused was diazepam and analgesics.

Problems resulting from substance use were reported by 70%; more than half (52%) the sample reported problems during this post- injury period [33].

While these problems (alcohol and drugs) can be a squeal in some SCI patients, they can be significant causes of the injury with their adverse effects on coping and rehabilitation of the injured patients. It has been reported that alcohol and drug abuse were prior to injury and continue after it. [9, 30, 31].

These patients are also at risk of substance abuse after discharge as means of tolerability. Frequent prescribing medications lead to addiction, or large quantities of alcohol or narcotics as part of suicidal tendencies.

The suicide rate for the disabled person is greater than that for general population, and the more the severity of the disability the high rate of suicide [32]. Twelve per cent of U S veterans with traumatic spinal injuries during the period 1946-1965 died by suicide and most suicides occurred within the first five years of injury. Older and unmarried individuals were most at risk [13].

Patients with SCI who are unmarried, beyond age 45 years, with history of alcohol or drug abuse, are the more patients at risk of suicide. Over a half of patients died by suicide were depressed [30].

Paying attention to this problem (depression) will decrease the mortality rate. A gain the SCI can be the result. Nine percent of SCI resulted from attempted suicide [31].

Pressure sores in patients with SCI which throw them in serious medical complications, are highly associated with low self esteem, isolation, depressive mood and held high risk of suicide [34]. The results of this study showed that 25% of SCI depressed patients were with pressure sore.

Also, depression is seen in a new light: as a contributing factor to pressure sores, the most expensive of complications after SCI [32,33].

The limitations of this study were; the small number of the sample and in specific group of population (military males).It had been carried out in 1997 and might not consistent with the current situation. the application of the self-report scale had some misunderstanding ,although the diagnoses of depression was confirmed by the clinical interview and the semi-structural criteria of depressive disorder as mentioned above, add the mixing somatic and psychological symptoms in such patients might over diagnose the depression.

Therefore, screening for and diagnosing depression in those groups of patients is highly reasonable for its potential complex and risk sequels aiming to

reach appropriate management and adjustment

### **Conclusion and recommendation**

Sudden transaction or severe injury to the spinal cord, which disrupts the psychophysical entity of the person, is a major cause of depression that occurs in SCI patients at greater rate than in general population, and other disabilities like orthopedics and stroke.

Furthermore, it is indicated that this group of patients (SCI depressed) can be identified by systematic evaluation using conventional interview and rating scales, and that such patients do respond to treatment with antidepressants medication and other psychosocial measures and identifying some risk factors associated with depression, like those with a pre-injury history of depression, a history of substance abuse, permanent neurological deficit, educational background, social standing, profession, age, as well as the severity and duration of the paralysis were found to be essential factors

Suicide risk assessment is recommended and referral to mental health care services is appropriate. Suicide and self-neglect may be the consequences of unrecognized and untreated depressive illness, suggesting the importance of close monitoring.

Substance-use patterns in persons with SCI who are prescribed with sedating or narcotic medications. Assessment of problems related to substance use and provision of treatment services to persons with traumatic injury are indicated to prevent a potential dual disability.

Also looking for the specific stressors often found with persons with SCI such as inadequate housing, poverty-level income, or family dissolution, are common conditions of handicap that result from the impairment of SCI. A holistic approach to the person with the co-existence of SCI and depression and their additive effect on disability and handicap is required.

Furthermore studies to confirm and extend these findings are indicated.

## References

- 1- Acton, N. the world's response to disability: Evaluation of a philosophy. (1982). Arch. Phys. Med. Rehabil. 63:145-149.
- 2- Wittkower, E., Gingras, G., Megler, L., Wigdor B, Lepine A. et al: A combined psychosocial study of spinal cord lesions. Journal of the Canadian Medical Association, (1954). 71, 109-115.
- 3- Scivoletto G, Petrelli A, Di Lcantel L, Castelleno V. Psychological investigation of spinal cord injured patients. (1997) Spinal cord 35(8):516-520.
- 4- Joannis N, Nesteros, M D, Louis A, Lucy A. and Voaklander D C. Level of anxiety and depression in spinal cord injury patients.. Psychosomatics. (1982) 23: 823-830.
- 5- Hancock KM, Craaia AD, Dickson HG, Chang E, Martin J. Anxiety and depression over the first year of spinal cord injury: a longitudinal study. (1993) paraplegia, 31:349-357.
- 6- Stewart, T.D.: Spinal cord injury: a role for the psychiatrist. American journal of Psychiatry, (1977) 134, 538-541.
- 7- Hohmann, G.: psychological aspects of treatment and rehabilitation of the spinal injured person. Clinical Orthopaedics (1975), 112, 81-88.
- 8- Woodbury R. Redd C. psychsocial issues and approaches in spinal cord injury. Arch. Phys. Med. Rehabil. (1987) 66: 459-462.
- 9- Trieschmann R.B. Spinal cord injuries: psychological, social, and vocational adjustment. (1980). Pergamon. Press. New York. P; 4-9., 86-92.
- 10- Lavoie J. Veterans with spinal cord injury. J. Rehabil. Research and development. (1992) Jul. 34, 247-253.
- 11- Fullerton D T, Harvey R F, Klein M H, Howell T: psychiatric disorders in patients with spinal cord injuries. Archives of General psychiatry. (1981) 38:1369-71.
- 12- Judd FK, Burrows GD. Liaison psychiatry in a spinal injuries unit. (1986) paraplegia 24:6-19.
- 13- Staas W E. Formal C.S., Gershkoff. A.M. Freda M. Hirshwarld J F. Miller G T. et al. Rehabilitation of the spinal cord injured patient. (1988). lippinott company. Philadelphia. p: 635-636.
- 14- American psychiatric association (1988) diagnostic and statistical manual of mental disorders (DSMIII R) Washington.DC:APA.
- 15- Ghareeb G .Depression Inventory for Adults. 1988. Dar Al-Nahda Al-Arabia/ Cairo.
- 16- Lawson N C. significant events in the rehabilitation process: the spinal cord patients of view. Arch. Phys. Med. Rehabil. (1978) 59: 573-579.
- 17- Fullerton DT, Harvey R F, Klein M.H, Howell. T. psychiatric disorders in patients with spinal cord injuries. Arch. Gen. Psychiatry (1981) 38: 1369-1371.
- 18- Howell T, Fullerton DT, Harvey RF, Kleia M. depression in spinal cord injured patients. Paraplegia (1981) 19: 284-288.
- 19- Frank R.G., Kashani J.H., Wonderlich S A. Lissing A. Visot LI. depression and adrenal function in spinal cord injury. Am. J. Psychiatry. (1985) 142: 252-253.
- 20- Macdonald M R, Nielson W R, Cameron M G. depression and activity patterns of spinal cord injured persons. Arch. Phys. Med. Rehabil. (1987) 68: 339-343.



- 21- S-Joh,H-I Shin, N-J Paik, T Yoo, and JH Ku. Depressive symptoms of patients using clean intermittent catheterization for neurogenic bladder secondary to spinal cord injury. (2006). *Spinal cord*; 44: 757-762.
- 22-Crewe, N M and Krause J S. Marital relationships and psychological factors in spinal cord injury. 1987. *Arch. Phys. Med. Rehabil.* 69: 435-438.
- 23- Salman w. Post-stroke depression. A thesis submitted to Arab scientific council of psychiatry. 1999.
- 24-Quinones M, Nassal M, Bader KIA, Muraikhi AE, Al kahlout SR. Traumatic spinal cord injury in Qatar: an epidemiological study. (2002) *Middle East J Emergency Med*; 2: 67-69.
- 25- Martins F, Freites F, Martins L, Dartigues JF, Barat M. Spinal cord injury- epidemiology in Portugal's central region. (1998). *Spinal cord*; 36: 574-578.
- 26- Singh R, Sharma SC, Mittal R, Sharma A. Traumatic spinal cord injuries in Haryana: an epidemiological study.(2003) *Ind J Community Med*; 28: 184-186.
- 27- Hoque MF, Grangean C, Kylie RK. Spinal cord lesions in Bangladesh: an epidemiological study 1994-1995.(1999). *Spinal cord*; 37:858-861.
- 28-Gioia MC, Cerasa A, Lucente Di L, Brunelli S, Castellano V, Trallesi M. Psychological impact of sports activity in spinal cord injury patients. (2006). *Scand J Med Sci Sports.* 16: 412-416.
- 29- Man Cheug Chung, Elens Preveza, Kanstantines Papandreou, Nikolaos Prevezas. Locus of control among spinal cord injury patients with different levels of posttraumatic stress disorder.(2007). *Psychiatric research.* 152:253-260.
- 30-Laura, T. and Joff, K. Alcohol and drug use after spinal cord injury.1994. Virginia commonwealth University health system. Department of physical medicine and rehabilitation.
- 31- Barchha R,. Stewart M. Guze S. the prevalence of alcoholism among general hospital ward patients. *Am. J. Psychiatry.* . (1968)125:681-684.
- 32- Kishi Y and RG Robinson S. Suicidal plans following spinal cord injury: a six month study. *J Neuropsychiatry Clin. Neurosci.* (1996) 8:442-44
- 33- Yarky, G M, Schnoll, S , Armstrong, K J, Doll M D, and Heinemann A W: substance use and receipt of treatment by persons with long term spinal cord injury *Arch Phys Med Rehabil.*(1991). Jun: 72(7): 482-7.
- 34-Svenson,L W,Yiannakoulis N, May L A, Rowe B H,Saunders L D, Dryden D, M:depression following traumatic spinal cord injury. *Neuroepidemiology*; (1990)25(2): 53-4.

## An Overview of the current concepts in temporomandibular joint disorders

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### Abstract

**Background:** Controversy continues in the area of etiology, diagnosis, and management of temporomandibular disorders. This article, which is based on an assessment of both the past and the most recent basic science and clinical literature, reviews and summarizes the recent temporomandibular disorders literature.

**Methods:** To find the relevant studies addressing the temporomandibular joint disorders, a MEDLINE search was conducted, which was complemented by a hand search in selected journals.

**Results and conclusions:-** Because little is known about the natural course of the various classifications of temporomandibular disorders, and because most treatment approaches are reported to be equally effective (this may include but not be limited to the following: physical therapy, pharmacotherapy, behavioral modification management, psychological therapy, splint therapy, surgical therapy, orthodontic therapy and prosthodontic therapy), a conservative noninvasive management program is endorsed. Studies concluded that a majority of temporomandibular disorder

patients achieve good relief of symptoms with noninvasive reversible therapy.

**Key words:-** Temporomandibular joint disorders, myofascial pain dysfunction syndrome, musculoskeletal fascial pain, occlusion and occlusal splints.

### Introduction:

In the last decade an interest in occlusion and the temporomandibular joint (TMJ) has expanded in many directions and from many sources. Although there is obviously a higher level of awareness about the importance of occlusion than before, there is also a high level of confusion about diagnosis and treatment of temporomandibular disorders (TMD), especially regarding the relationship between occlusion and the TMJ.

TMJ therapies that violate basic principles of occlusion are still in use. And we commonly see occlusal treatment, including orthodontics, prosthodontics, and maxillofacial surgery performed independently of any regard for the physiologic function of the jaw joints. Attempts to isolated TMJ problems as unrelated to the teeth have missed the fundamental fact that the condyles and the lower teeth have a fixed relationship to each other. Therefore, a more complete understanding of the masticatory system

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is important. Dentists today are expected to be physician of the masticatory system. It is a role for which no other medical specialist has adequate training. Equilibrium in the system cannot be achieved separated from the dentition, nor can stability of the dental arches be achieved in disharmonious relationship with the joints, the muscles, or the skeletal base [1].

The purpose of this literature is to review the current understanding of the TMD, etiology, recent classification and management with emphasis on splint therapy and occlusal therapy and how the prosthodontist can deal or manage those patients.

#### **Methods:**

To find the relevant articles, a MEDLINE literature search was conducted for the period from 1980 to June 2007. The key word “temporomandibular joint” was combined with the following key words (and combination thereof): pain, mandible, occlusion, temporomandibular joint disorders, temporomandibular joint dysfunction syndrome and orofacial pain. The computer- based literature search was further supplemented with a hand search of articles and book chapters. Whenever possible, reference was given to those articles that represented original research rather than to those that described a clinical case or opinion.

#### **Temporomandibular Disorders:**

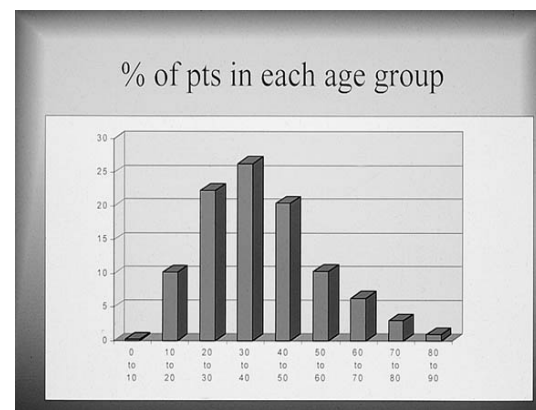
A TMD is a collective term embracing a number of clinical problems that involve the masticatory musculature, the TMJ, or both [2]. The most frequently sign at presentation is pain, usually localized in the muscles of mastication, the preauricular area, and / or the TMJ. In addition to pain, which is

usually aggravated by chewing and other jaw functions, patients with TMD often have limited or asymptomatic mandibular movements and joint sounds that are commonly described as clicking, popping , grating , or crepitus [3].

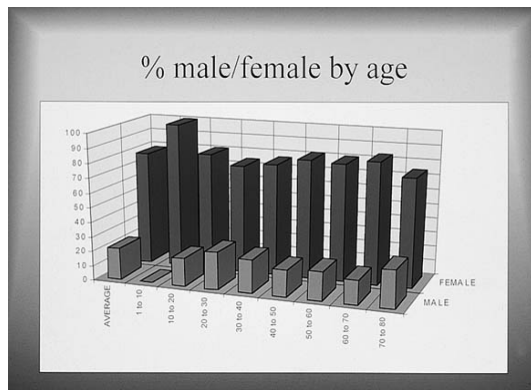
Epidemiologic studies report that approximately 75% of the population have at least one sign of dysfunction (joint noise, deviation on opening, episodic locking) and approximately 33% have at least one TMD symptom (face pain , jaw pain) [4-6]. Signs and symptoms of TMD generally increase in frequency and severity from the second through the fourth decade of life. (fig.1) [7, 8]. The clinical tabulations report a ratio of approximately 4:1 of females to males seeking care for TMD. (fig.2) [9,10].

These prevalence figures may overstate the clinical significance of this problem, because many studies include individuals with mild transient signs and symptoms that many not require treatment. Indeed, of the large percentage of the population who have signs and / or symptoms, it is estimated that only approximately 5% to 6% are in need of treatment [5, 11, 12].

**Fig.1.. Prevalence of age groups in sample of 1505 patients seeking TMD treatment at University of California, San Francisco, Center for TMD and Orofacial Pain between 1993 and 1995**



**Fig.2. Prevalence of females to males seeking TMD treatment is approximately 4:1 at University of California, San Francisco, Center for TMD and Orofacial Pain between 1993 and 1995.**



Historically, a majority of the dental profession viewed occlusal disturbances as the most important etiologic factor. Later, others emphasized the significance of psychologic factors, and the battle lines between psyche and soma were drawn. Some people tried to minimize the conflict by suggesting that both occlusal and psychologic factors contribute to the development of TMD. When it became obvious that TMD encompasses a spectrum of various disorders, etiologic concepts based on a single factor lost credibility. This idea of a multifactorial etiology became more generally accepted around the end of 1970s [13]. This Controversy exists because of the limited knowledge regarding the etiologic and natural history or course of TMD. Some contributing etiologic factors are only risk factors, others are causal in nature, and others result from, or are purely coincidental to, the problem. A further development has been to talk about contributing as well as etiologic factors and to classify these as either predisposing, initiating and perpetuating [13,14].

Predisposing factors can be systemic (general health), psychologic (personality, behavior), or structural (occlusion, joint). Many systemic disorders may affect the components of the masticatory system, for example, influencing local TMD or causing changes of the joint structures. In general, a physician should manage the systemic conditions, but the dentist may take responsibility for local TMD treatment. The most common systemic conditions are rheumatologic diseases. Several epidemiologic studies have shown that individuals with impaired general health tend to suffer more frequent and severe TMD signs and symptoms than healthy people [13]. The role of psychologic disturbances in the etiology of TMD also is controversial. It is widely recognized that psychological factors may be involved in the pain perception process [15, 16]. Although the etiology of TMD has not been established, psychological factors have been implicated in the predisposition, initiation, and perpetuation of TMD [17-22] and psychological therapies have been found to be beneficial for some TMD patients [23-26]. Psychological factors have been implicated in several aspects of masticatory pain and dysfunction problems. First, stress-related muscle hyperactivity and oral habits have been suggested as etiologic factors. Second, psychological factors have been suggested to explain why some patients seem to be more bothered by symptoms and why only a small percentage of patients actually seek treatment. Finally, psychological conditions, such as depression, have been used to explain why some patients do not respond to conventional therapy. Results of studies evaluating personality

and emotional characteristics using a variety of psychological inventories and clinical interviews indicate that TMD patients have a wide range of personality characteristics and conditions, which may result in increased emotional problems and difficulty in coping with life events [21]. Laskin [27] has distinguished myofascial pain which is of muscular origin and more diffuse in nature, from TMJ pathology (disk displacement and other joint conditions). Pain, if present in the latter condition, is usually more localized. This division is widely used when psychological profiles are evaluated between different subgroups of TMD patients [19, 20, 28-31].

The question of what role occlusal factors play in the etiology of TMD has been answered with conflicting statements over the years. Occlusion is an important variable in the overall treatment scheme for clinical restorative and prosthodontic success [32]. Occlusion is defined as "the static relationship between the incising or masticating surfaces of the maxillary or mandibular teeth or tooth analogues" [33]. This relationship should be as balanced and stress – free as possible [32]. The concept of mandibular overclosure proposed by Dr. James Costen, an otolaryngologist, in 1934 was related to various ear symptoms [34]. This was expanded in the 1970's into mechanical displacement theory. This theory claimed that deflective occlusal contacts and lack of molar support were directly responsible for the eccentric positions of condyles in fossa and that these eccentric positions caused pain and dysfunction. This theory was based on the hypothesis that the condyles had to be in a central position for proper

function. This hypothesis has been disapproved by several investigators, demonstrating eccentric condylar position in many asymptomatic patients [35]. A recent study revealed that a positive association between missing mandibular posterior teeth and the presence of disk displacement was found. The authors do not suggest that replacement of these teeth will prevent the development of TMD, but their absence may accelerate the development of degenerative joint disease [36]. The second theory that evolved in 1970's was based on assumption that occlusal interferences or loss of molar support caused hyperactivity in the masticatory muscles [37]. The altered periodontal receptor input will adversely affect the sensory feedback mechanism and result in disturbed patterns of muscle contractions [32]. The patients tried to remove the interferences by parafunctional muscular activity or to stabilize the jaw in cases where occlusal stability was not present. Interferences were thought to be the direct cause of parafunction leading to jaw muscular pain and joint overload and dysfunction [1, 38]. Even if the influence of occlusal factors in the etiology of TMD at present is questionable and likely to be of minor importance, it cannot be ruled out as a possible factor. It may certainly be a contributing factor in individual patients. Occlusion is of great importance in all aspects of clinical dentistry, and the risk of introducing unfavorable occlusal relationship in restorative dental procedures must be minimized [13].

Initiating (or participating) factors that lead to the onset of symptoms are primarily related to trauma, parafunction or repetitive adverse loading of the masticatory



system. Overt trauma producing injury to the head, neck, or jaw can result from an impact injury, possibly a flexion- in extension injury, an injury while eating, yawning, or even from prolonged mouth opening during long dental appointments. A second form of trauma is associated with the sustained and repetitions adverse loading of the masticatory system as a result of parafunction. However, a demonstrated direct cause and effect relationship is still lacking between Parafunction and TMD [13, 39].

Perpetuating (or sustaining) factors, such as parafunction, hormonal factors, or psychological factors, may be associated with any predisposing or initiating factor and can sustain the patient's disorder, complicating management of it [40].

#### **Diagnostic Classification of Temporomandibular Disorders:**

Developing a validated diagnostic classification for TMD has been difficult because of the lack of clear etiologic factors, lack of homogeneity of the patient population, and the lack of knowledge regarding the natural progression of TMD. The American academy of orofacial pain's (AAOP) classification of the TMD includes a disparate group of TMJ (articular) and masticatory muscle (non articular) disorders. The following subclassifications are paraphrased from the 1993 and 1996 AAOP guidelines on TMD and orofacial pain.

TMD can be subdivided into articular disorders related to congenital or development disorders, disk derangement disorders, dislocation, inflammatory disorders, osteoarthritic disorders(non inflammatory), ankylosis, and condylar fracture (Table.1). These

subclassifications are very similar to disorders in other synovial joints in the body [41, 42].

Most congenital or development joint disorders are rarely accompanied by orofacial pain. They include agenesis, hypoplasia, hyperplasia, and neoplasia. Important exceptions that are painful are malignant diseases of the condyle, such as osteosarcoma, chondrosarcoma, or adenocarcinoma [43, 44].

The subclassification of disk displacement represents a disk-condyle misalignment and is subdivided into disk displacement with reduction or disk displacement without reduction [45-47]. Disk displacement with reduction is characterized by the "temporarily" displacement or misaligned disk abruptly improving its structural relationship with the condyle during mandibular translation resulting in an opening joint sound, for example clicking or popping. A reciprocal closing noise is of less magnitude and is thought to be produced by the displacement once again of the disk in usually an anterior or anteromedial position. The condition is very common and may represent a physiologic accommodation without clinical significance [48, 49].

Disk displacement without reduction, also called closed-lock, is described as an altered or misaligned disk-condyle structural relationship that is maintained during mandibular translation. It is characterized by a lack of joint noise and limited jaw motion. After an acute episode, which can be extremely painful, the chronic condition can become non-painful with the range of motion approximately normal. The finding from a 30 year follow-up study by de Leeuw et al (1994) revealed that over that time very few reducing

displaced disk cases progressed to a non-reducing stage, but almost all the non-reducing displaced disk cases developed structural bone changes [50].

Table.1 Articular Disorders*
Congenital or development disorders
<ul style="list-style-type: none"> <li>• Aplasia</li> <li>• Hypoplasia</li> <li>• Hyperplasia</li> <li>• Neuplasia</li> </ul>
Disk derangement disorders
<ul style="list-style-type: none"> <li>• Disk displacement with reduction</li> <li>• Disk displacement without reduction</li> </ul>
Joint dislocation
Inflammatory condition
<ul style="list-style-type: none"> <li>• Capsulitis / synovitis</li> <li>• Polyarthritides</li> </ul>
Non inflammatory (Osteoarthrosis)
<ul style="list-style-type: none"> <li>• Osteoarthritis : primary</li> <li>• Osteoarthritis : secondary</li> </ul>
Ankylosis
<ul style="list-style-type: none"> <li>• Fibrous</li> <li>• Bony</li> </ul>
Fracture (condylar process)

Adopted from American Academy of Orofacial Pain, McNeill C, editor. Temporomandibular disorders: guidelines for classification, assessment, and management. Chicago: Quintessence, 1993; and Okeson JP, editor. Orofacial Pain: guidelines for assessment, diagnosis, and management. Chicago: Quintessence, 1996.

Dislocation of the TMJ occurs when the condyle becomes positioned anterior and superior to the articular eminence, usually during jaw opening and is unable to return to a closed position. It can be caused by trauma or can be a manifestation of joint hypermobility. This condition is referred to as subluxation if the patient is able to self-manipulate the jaw back to a closed position. It is called open lock or dislocation if a health care provider has to reduce the anterior-positioned condyle. Inflammatory conditions can occur in the synovium (synovitis) and /

or capsule (capsulitis) as a result of local trauma, infection, or degeneration, or as a part of a systemic polyarthritic or collagen diseases. TM joint polyarthritides include rheumatoid arthritis, juvenile rheumatoid arthritis (Still's disease), spondyloarthropathies (ankylosing spondylitis, psoriatic arthritis, infectious arthritis, Reiter's syndrome), crystal-induced disease (gout, hyperuricemia) and autoimmune disorders (lupus erythematosus). Osteoarthritis is a degenerative condition of the joint (non inflammatory) characterized by deterioration and abrasion of articular tissue and concomitant remodeling of the underlying subchondral bone. Osteoarthritis is classified as primary or idiopathic osteoarthritis when the etiology is unknown and secondary osteoarthritis when an etiologic event or factor can be identified (e.g., gout, Cushing's disease, osteonecrosis, infections, and Charcot's neuropathic pain). Ankylosis of the joint could occur and it is either fibrous or bony adhesions restrict condylar movement. Extrinsic traumatic force can injure all related bony components of the masticatory system. Condylar fracture (intra- or extracapsular) with or without displacement can result in contusion and / or laceration of the articular surfaces, ligaments, and disk, usually with intra-articular hemarthrosis. Sequelae could include synovitis, capsulitis, ankylosis, or osteoarthrosis [41, 42].

Masticatory muscle disorders, which are analogous to other regional or localized muscle disorders in the body, include myofascial pain, myositis, myospasms, unclassified local myalgia, myofibrotic contracture, and neoplasia. Table .2

Table .2 Masticatory muscle disorders\*

Myofascial pain
Myositis
Myospasms
Local myalgia-unclassified
Myofibrotic contracture
Neoplasm

\* Adopted from American Academy of Orofacial Pain, McNeill C, editor, temporomandibular disorders: guidelines for classification, assessment, and management. Chicago: Quintessence, 1993; and Okeson JP, editor. Orofacial Pain: guidelines for assessment, diagnosis, and management.

Myofascial pain is characterized by a localized or regional, dull aching pain, presence of localized tender spots (trigger points) in muscle, tendons, or fascia that reproduce pain on palpation. A characteristic pattern of localized tenderness and regional referred pain on palpation is associated with myofascial pain and differentiates it from the more generalized tenderness in many sites of the body associated with fibromyalgia. A great deal of study and debate continues regarding the similarities and differences of these two conditions [51]. Inactivation of the trigger point area with local anaesthesia, spray and stretch, or ice usually relieves the pain [52]. The muscle pain may be associated with a localized ischemia, histochemical changes at peripheral nociceptive nerve endings, or central nervous system changes including increased activity within the sympathetic nervous system, or psychologic or emotional changes [53]. Patients diagnosed with myofascial pain and other joint conditions had significantly higher levels of depression and somatization than patients diagnosed with only disk displacement [3].

Myositis is an acute, painful, generalized inflammation and swelling of usually the entire muscle. Clinically the patient usually exhibits a marked limited range of motion. Myositis is usually the result of local causes such as infection or trauma. While myospasm (acute trismus, splinting, or cramping) is an acute disorder caused by involuntary, sudden, tonic contraction of a muscle resulting in a marked limitation in the range of motion and pain. The acute pain is present at rest as well as during function. It can be differentiated from other muscle disorders by clinical inspection or fine wire electromyographic verification (EMG). Local myalgia – unclassified which include muscle pain secondary to ischemia, bruxism, fatigue, delayed onset, muscle soreness, autonomic effects, and protective splinting (co-contraction- contraction) that can not be distinguished from the other muscle classifications. Another masticatory muscle disorder is myofibrotic contracture which is a painless shortening of a muscle as result of fibrosis or scarring of the supporting tendons, ligaments, or muscle fibers [41, 42].

#### Clinical Finding and Diagnosis:

The initial examination for routine dental patients should include procedure and history to determine whether any TMDs exist. Many patients have problems that should be corrected, but they are not aware of the relationship of the TMJ to the health and stability of the dentition and vice versa. A simple screening should be done on every dental patient as part of a complete examination. This include:-

### **1. Screening Examination:**

The screening examination consists of the presence or absence of discomfort in centric relation, and whether upward pressure toward the joint elicits any response of tenderness or tension in centric relation [1]. Evaluating the hinge movement of the mandible, the presence or absence of any difficulty or deviation in mouth opening, joint sounds, pain or tenderness in the muscles of mastication during palpation. Evaluate the harmonization between maximum intercuspation of the teeth and centric relation of the mandible, and examine the teeth for any sign of wear or hypermobility [54].

### **2. Screening History:**

It is helpful to compute the screening examination before the history is taken because the examination often turns up signs of suspected disorders that the examiner can relate to when quizzing patients about their history.

Screening history includes information regarding patient's medical, emotional, socioeconomic status, history of chief complaint which includes onset, duration, and possible exacerbations and remissions of the problem, joint sounds, subluxation or dislocation of the joint, history of arthritis, history of trauma and previous treatment for TMD.

The above examination and screening history should be a routine part of a complete dental examination. If any positive findings are turned up, a more comprehensive examination should be directed at the specific signs and symptoms.

For diagnosing masticatory muscle disorders, seven steps should be followed, and these are: (1) Evaluating muscle tenderness. (2) Ruling out intra-articular problems, this is done by

testing the joints with very firm upward pressure after the condyles are gently positioned into what the operator feels is centric relation and through the use of anterior bite plane. Fig.3

(3) Finding the trigger for occluso-muscle pain, this means the occlusal interferences.

Such interferences can be difficult to discern, but if diagnostic casts are mounted with a carefully made centric bite record, the interference can be found easily. (4) Verifying condyle health and position radiographically. (5) Ruling out gross bone pathosis with radiographs. (6) Ruling out pulpal or periodontal pathosis as sources of pain. (7) Correcting the cause of occluso – muscle pain, occlusal interferences to centric relation (CR) can be eliminated in a reversible or an irreversible manner. Whether a treatment is reversible is only critical when the outcome of treatment is in doubt. Thus reversible methods of treatment realistically fall more into the category of diagnostic procedures. It's really a way of testing a treatment hypothesis to see if it works before we proceed to do something of an invasive nature.

For diagnosing internal derangement, there are several methods, but a combination of methods is usually necessary in meaningful detail. Some of the most methods, in addition to a detailed history, are as follows: (1) Clinical observation of mandibular movement. (2) Manipulative testing. (3) Auscultation. (4) Palpation. (5) Various radiographic techniques. (6) Axiography (7) Mounted diagnostic casts. (8) Diagnostic occlusal therapy [1, 54].

**Fig.3. Anterior deprogrammer to separate posterior teeth with smooth function on anterior teeth.**



### **Management of Temporomandibular Disorder:**

The majority of TMD patients achieve good relief of symptoms with a conservative model of noninvasive management [56- 61]. However, the treatment of patients with TMD does not necessarily eliminate the disorder(s) but rather results in the management of the disorder(s). Patients with TMD frequently require managed treatment over extended periods of time because of the multifactorial etiology and the long-term nature of many of these disorders [62, 63].

A multidisciplinary model that includes patient education and self-care, cognitive behavioral intervention, pharmacotherapy, physical therapy, and orthopedic appliance therapy (interocclusal splints) is endorsed for the management of nearly all TMD patients. Historically, treatment of patients with TMD has been divided into phase I and phase II therapy. Phase I include the entire multidisciplinary model that have been mentioned before. Phase II therapy involves treatment such as surgical intervention, orthodontic modification, occlusal therapy or prosthodontic rehabilitation, and it is often

nonreversible [2, 64]. The management goals are similar to those of other orthopedic conditions, namely, reduction of pain, reduction of adverse loading, improvement of function, and restoration of normal, daily activities. The emphasis should be on conservation therapy that facilitates the system's natural healing capacity and treatment that involves the patient in the physical and behavioral management of their own problem. Although individual clinicians are successful in diagnosing the more common TMD problems, a team approach is often required for managing complex chronic TMD problems, in particular for evaluating psychological disorders that may be present [41].

Most importantly, regardless of the approach selected, all therapy should be directed at minimizing aberrant input into the central nervous system, whatever the source, for example, stress or pathology [65]. In this way complete dental care for patients can be provided and fulfill patient needs and desires with respect to appearance, comfort, and function [32].

### **Patient Education and Self-care:**

The success of a self-care program is often enough to control an uncomplicated TMD problem [60]. Instruction in a self-care routine should include the following: rest of masticatory system, habit awareness and modification, and a home physiotherapeutic program [41].

### **Cognitive Behavioral Intervention:**

Cognitive behavioral intervention is an important part of the over all biopsychosocial treatment program for TMD patients [66]. Although simple habits will often reduce when the patient is made aware of them, changing persistent habits may require

comprehensive stress management and counseling programs. Behavioral strategies involving a combination of EMG biofeedback, relaxation techniques, and self-directed lifestyle changes are more effective than any single behavioral treatment procedure [6].

#### **Pharmacotherapy:**

The indicated classes of pharmacologic agents include analgesics, anti-inflammatory agents, corticosteroids, anxiolytics, muscle relaxants, and low-dose antidepressants [41].

#### **Physical Medicine:**

Physical therapy is an effective treatment for TMD because it helps to relieve musculoskeletal pain, restores normal function, and promotes the repair and regeneration of tissues [67]. Referral and close cooperation with licensed professional therapists is recommended. Physical agents include electrotherapy and ultrasound devices, vapocoolants, anesthetic injections, and acupuncture [68]. Physical medicine applications also involve postural training; include correct jaw posture, exercise therapy, and mobilization [69].

#### **Occlusal Splints:**

Splint therapy may be defined as the art and science of establishing neuromuscular harmony in the masticatory system and creating a mechanical disadvantage for parafunctional forces with removable appliances. A properly constructed splint supports a harmonious relation among the muscles of mastication, disk assemblies, joints, ligaments, bones, teeth, and tendons [70].

Occlusal splints, also referred to as orthopedic appliances, intraoral appliances, orthotics, night guards, or

bruxism appliances, have a reported 70% to 90% rate of clinical success [71, 72]. Whereas the treatment effect is somewhat predictable, the explanation of the efficacy of the treatment response is less understood [71]. It is considered to be part of the phase I therapy of TMD that seeks to alleviate pain and improve function and often involves reversible therapy [2, 64]. All splints are classified as either permissive or nonpermissive. A permissive splint [73] allows the teeth to move on the splint unimpeded, which in turn allows the condylar head and disk to function anatomically (fig.4).

A nonpermissive splint has a ramp or “indentations” that position the mandible inferiorly and anteriorly and secure it there (fig.5). Examples of permissive splints include bite planes (anterior jigs, Lucia jig, anterior deprogrammer) (Fig.3) and stabilization splints (flat plane, Tanner, superior repositioning, and centric relation [CR]) (Fig.6). An example of a nonpermissive splint is a repositioning splint (anterior repositioning appliance [ARA]) (Fig.7).

Properly fabricated splints have at least six functions including the following:

- (1) To relax the muscles.

Occlusal splints are a means of reversibly altering the occlusion to reduce masticatory muscle activity. Fuchs [74] reported the advantages of splint therapy in the reduction of nocturnal EMG masseter activity in patients with TMD. Beard and Clayton [75] also reported reductions in muscle symptoms with splint therapy. Okeson et al [76] found that acute or chronic symptoms of muscle hyperactivity were lessened significantly with 24-hour splint wear. The effectiveness of splint therapy in reducing pain indexes and



muscle hyperactivity is well documented [70, 77-79].

(2) To allow the condyle to seat in CR. This can be achieved if the lateral pterygoid muscle completely relaxes because of its attachment to the disk through the superior belly. Therefore, the condyle-disk assembly will maintain its normal healthy relationship to each other.

(3) To provide diagnostic information. If a patient rapidly becomes comfortable with a splint, it may be an indication that the disorder is muscular. If symptoms worsen with permissive splint wear, this may indicate an internal derangement (disk) problem (perhaps caused by free reign of the condylar head back to the retrodiscal tissues without housing by the disk) [1, 70].

(4) To protect teeth and associated structures from bruxism. Gibbs et al [80] found that the highest recorded bite force during bruxism was 975 lbs. and that bite strength in some bruxer-clenchers can be as much as 6 times that of the nonbruxer. Holmgren et al [81] have shown that splints do not stop bruxism but do redistribute the load borne by the teeth and masticatory system [82, 83].

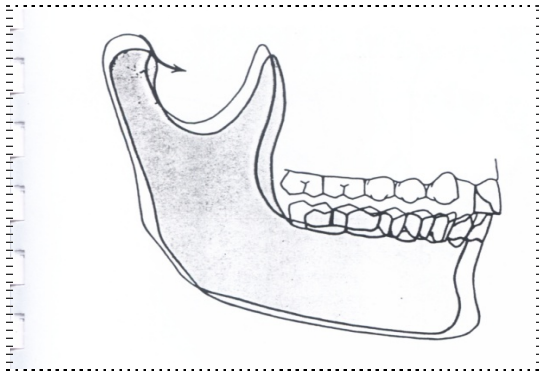
(5) To mitigate periodontal ligament proprioception.

(6) To reduce cellular hypoxia levels. In a study by Nitzan [84], pressure was measured in the superior joint space of patients with articular disk displacements. When they clenched maximally, recorded pressures reached up to 200 mm Hg. When a flat plane appliance was placed, no significant pressure (no capillary hyperfusion pressure) was recorded. This lends credence to stabilization splint therapy from a molecular point of view.

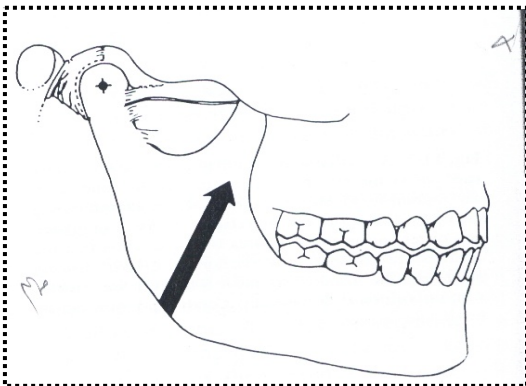
Determination of the appropriate type of splint therapy depends on the specific diagnosis of the TMD and a thorough understanding of the anatomy of the condyle/disk complex. Muscle incoordination is usually treated with bite plane therapy or permissive splint therapy in phase I (reversible treatment) and with appropriate phase II therapy to restore balance from/to the CR position. Muscle and disk incoordination has the same signs and symptoms as muscle incoordination except reciprocal clicking or a history of reciprocal clicking that stops. Treatment usually includes permissive splint therapy and Phase II therapy for stabilization because of the weak ligament structure [70].

Splints cannot do 3 basic things: unload the joint, prevent bruxism, or “heal” the patient. Some authors and lecturers have stated that splints function to unload the joints and therefore take pressure off the disk. This theory has been disproved by Kuboki et al [85] and cannot be explained anatomically or physiologically. The elevator muscles are located behind the most posterior tooth and therefore ensure that the joint will always be loaded when the elevators contract. Splints do not prevent bruxism; they balance the force distribution to the entire masticatory system. They can decrease the frequency but not the intensity of bruxing episodes [81]. Splints also do not heal patients; they give patients the opportunity to heal themselves. The patient pays not for the fabrication of a splint only but also for the care, skill, and judgment of the practitioner whose goal is to enable healing through appropriate design, monitoring, and adjustment [70].

**Fig.4. Permissive splint**



**Fig.5. Nonpermissive splint.**



**Fig.6. Occlusal view of mandibular stabilization appliance.**



**Fig.7. Repositioning appliance locking condyle into antero-inferior position (top). Occlusal view of appliance with indentations in acrylic (bottom).**



### **Occlusal Therapy:**

Occlusion is an important factor for restorative dentistry and prosthodontics and therefore requires evaluation to ensure optimal stability of the stomatognathic system. However, if occlusal therapy is deemed necessary to complete treatment of a patient with TMD, the treatment should only be completed after the patient's pain has been significantly relieved and the range of motion substantially improved. The maxillomandibular relationship,

neuromuscular activity, and psychosocial status of the patient must be as stable as possible before proceeding with treatment [86]. Proper treatment sequencing is essential, including pretreatment with an interocclusal appliance, ancillary dental treatment, appropriately timed appointments, and prolonged provisional treatment and cementation. The cardinal rule should be to proceed carefully, using the least invasive procedure possible [41]. When prosthodontic rehabilitation is required in a patient who is having musculoskeletal fascial pain, the first obligation of the clinician is to differentially diagnose the pain. Clinicians should take a cautious approach to the timing of restorative treatment in patients who are experiencing musculoskeletal pain. The validity of the maxillomandibular registration is questionable [87].

The occlusal scheme must be integrated with and conform to the remaining tissues of the masticatory system at the time of treatment. This newly established functional equilibrium may be the most optimum physiologic relationship for that particular masticatory system even though the morphologic relationship may not be ideal [88].

On the other hand, if a functional equilibrium has not been established, or if the intercuspal position (ICP) and / or the vertical dimension of occlusion (VDO) are unacceptable or need to be altered to perform necessary dental treatment, the treatment may need to be re-established. When an occlusal scheme has to be re-established, a treatment reference position must be established, namely CR to allow the clinician to design treatment from a known starting

point and to evaluate the progress and the outcome of the treatment on the basis of that starting point [41].

The specific treatment objectives that are desired from an optimum structural and functional re-establishment stand point for all patients [89] including TMD patients are as follows: (1) Maximum symmetrical distribution of intercuspal contacts in the predetermined jaw relationship. (2) Axial or near axial loading of the teeth. (3) An acceptable occlusal plane. (4) Guidance contacts that allow freedom during closing and excursive gliding mandibular movement without deflection of the mandible or teeth. (5) An acceptable vertical dimension of occlusion and interocclusal resting range.

#### **Surgery:**

Temporomandibular surgery is the indicated treatment for a very small percentage of TMD patients and only those with specific TMD articular disorders. Surgical management may vary from closed surgical procedures (arthrocentesis and arthroscopy) or open surgical procedures (arthrotomy) to subcondylar osteotomies (condylotomy). A pre-operative and post-operative nonsurgical management should be integrated with the surgical treatment into an over all multidisciplinary treatment approach [41].

#### **Summary:**

The clinicians have the responsibility to understand, diagnose TMD conditions, provide treatment, monitor the condition and refer the patient to another practitioner if necessary. Prosthodontists have an important role in occlusal therapy. They should take a cautious approach to the timing of restorative treatment as well as

careful evaluation for the maxillomandibular relationship

**Reference:-**

1. Dawson PE. Evaluation, diagnosis, and treatment of occlusal problems. 2<sup>nd</sup> edi. St. Louis: Elsevier; 1989.
2. McNeill C. Temporomandibular disorders-guidelines for classification, assessment and management. 2<sup>nd</sup> ed. Chicago: Quintessence Publishing Co, 1993.
3. Adrian UJ, Ee Kiam C, and Hee Hon T. Depression and somatization in patient with temporomandibular disorders. J Prosthet Dent 2002, 88(5), 479-84.
4. Okeson JP, ed. Orofacial pain: guidelines for assessment, disease, and management. Chicago: Quintessence Publishing Co, 1996.
5. Rugh JD, Solberg WK. Oral health status in the United States: temporomandibular disorders. J Dent Educ 1985, 49, 398-404.
6. Schiffman E, Fricton JR. Epidemiology of TMJ and craniofacial pain. In Fricton JR, Kroening RJ, Hathaway KM, editors. TMJ and craniofacial pain: diagnosis and management. St Louis: IEA Publishers, 1988, 1-10.
7. Dworkin SF, Huggins KH, LeResche L, Von Korff M, Howard J, Truelove E, Sommers E. Epidemiology of signs and symptoms in temporomandibular disorders: clinical signs in cases and controls. J Am Dent Assoc 1990, 120, 273-281.
8. Agerberg G, Inkapööl I. Craniomandibular disorders in an urban Swedish population. J Craniomandib Disord Facial Oral Pain 1990, 4, 154-64.
9. McNeill C. The optimum temporomandibular joint condyle position in clinical practice. Int J Periodont Rest Dent 1985, 6, 53.
10. Howard JA. Temporomandibular joint disorders, facial pain and dental problems of performing artists. In Sataloff R, Brandfonbrener A, Lederman R, editors. Textbook of performing arts medicine. New York: Raven Press, 1990.
11. Schiffman EL, Fricton JR, Haley DP, Shapiro BL. The prevalence and treatment needs of subjects with temporomandibular disorders. J Am Dent Assoc 1990, 120, 295-303.
12. Magnusson T, Carlsson GE, Egermark I. Changes in subjective symptoms of craniomandibular disorders in children and adolescents during a 10-year period. J Orofacial Pain 1993, 7, 76-82.
13. Gunnar E. Carlsson, Tomas Magnusson. Management of temporomandibular disorders in the general dental practice. Chicago: Quintessence Publishing Co; 1999.
14. McNeill C. Craniomandibular (TMJ) disorders - the state of the art. Part II: accepted diagnostic and treatment modalities. J Prosthet Dent 1983; 49: 393-397.
15. Melzack R, Wall PD. Pain mechanisms: a new theory. Science 1995, 150: 941-949.
16. Gasma A. The role of psychological factors in chronic

- pain. I. A half-century study. *Pain* 1994, 57, 5-15.
17. Sipila K, Veijola J, Jokelainen J, Jarvelin MR, Oikarinen KS, Raustia AM, et al. Association between symptoms of temporomandibular disorders and depression: an epidemiological study of Northern Finland 1966 Birth Cohort. *Cranio* 2001, 19, 183-7.
  18. Rollman GB, Gillespie JM. The role of psychological factors in temporomandibular disorders. *Curr Rev Pain* 2000, 4, 71-81.
  19. Michelotti A, Martina R, Russo M, Romeo R. Personality characteristics of temporomandibular disorder patients using MMPI. *Cranio* 1998, 16, 119-25.
  20. Rudy TE, Turk DC, Kubinski JA, Zaki HS. Differential treatment responses of TMD patients as a function of psychological characteristics. *Pain* 1995, 61, 103-112.
  21. Rugh JD. Psychological factors in the etiology of masticatory pain and dysfunction. In: The president's conference on the examination, diagnosis and management of temporomandibular disorders. Chicago: American Dental Association, 1982. p. 85-94.
  22. List T, Dworkin SF. Comparing TMD diagnosis and clinical findings at Swedish and US TMD centers using research diagnostic criteria for temporomandibular disorders. *J Orofacial Pain* 1996, 10, 240-53.
  23. Turk DC, Rudy TE, Kubinski JA, Greco GM. Dysfunctional patients with temporomandibular disorders: evaluating the efficacy of a tailored treatment protocol. *J Consult Clin Psychol* 1996, 64, 139-46.
  24. Clarke NG, Kardachi BJ. The treatment of myofascial pain-dysfunction using the biofeedback principle. *J Periodontol* 1977, 48, 643-5.
  25. Gessel AH. Electromyographic biofeedback and tricyclic antidepressants in myofascial pain-dysfunction syndrome: psychological predictors of outcome. *J Am Dent Assoc* 1975, 91, 1048-52.
  26. Gramling SE, Neblett J, Grayson R, Townsend D. Temporomandibular disorder: efficacy of an oral habit reversal treatment program. *J Behav Ther Exp Psychiatry* 1996, 27, 245-55.
  27. Laskin DM. Etiology of pain-dysfunction syndrome. *J Am Dent Assoc* 1969, 79, 147-53.
  28. Eversole LR, Stone CE, Matheson D, Kaplan H. Psychometric profiles and facial pain. *Oral Surg Oral Med Oral Pathol* 1985, 60, 269-74.
  29. McCreary CP, Clark GT, Merrill RL, Flack V, Oakley ME. Psychological distress and diagnostic subgroups of temporomandibular disorder patients. *Pain* 1991, 44, 29-34.
  30. Auerbach SM, Laskin DM, Frantsve LME, Orr T. Depression, pain, exposure to stressful life events, and long-term outcomes in temporomandibular disorder patients. *J Oral Maxillofac Surg* 2001, 59, 628-34.

31. Marbach JJ, Lund P. Depression, anhedonia and anxiety in temporomandibular joint and other facial pain syndromes. *Pain* 1981, 11, 73-84.
32. Michael J. Orofacial pain and occlusion: Is there a link? An overview of current concepts and the clinical implications. *J Prosth Dent* 2005, 39(2), 189-196.
33. The glossary of prosthodontic terms. *J Prosth Dent* 2005, 94(1).10-92.
34. Costen Jb. Syndrome of ear and sinus symptoms dependent upon functions of the temporomandibular joint. *An Oto Rhinol Laryngol* 1934,3,1-4.
35. Pullinger A, Hollender L, Solberg WK, Peterson A. A tomographic study of mandibular condyle position in an asymptomatic population. *J Prosth Dent* 1985,53,706.
36. Ross h, Donald J Stephanos K, Richard W, and Mark E. Prevalence of missing posterior teeth and intraarticular temporomandibular disorders. *J Prosth Dent* 2002,87(1),45-50.
37. Posselt U. The physiology of occlusion and rehabilitation, 2<sup>nd</sup> edi. Blackwell:Oxford,1968.
38. Ramfjord SP and Ash MM. Occlusion.3<sup>rd</sup> edi.Philadelphia:W.B. saunders, 1983.
39. Rugh JD, Harlan J. Nocturnal bruxism and temporomandibular disorders. *Adv Neurol* 1988, 49,329-41.
40. Rugh JD. Psychological components of pain. *Dent Clin North Am* 1987,31,579-94.
41. McNeill C. Management of temporomandibular disorders: Concepts and contrivesies. *J Prosth Dent* 1997,77(5),510-22.
42. James P, Gilles J, Ronald D, and Barry J. Orofacial pain: from basic science to clinical management. The tranfere of knowledge in pain research. Quintessence Publishing Co.2001.
43. Sanchez Aniceto G, Garcia Penin A, de la Mata Pages R, Montalvo Moreno JJ. Tumors metastatic to the mandible: analysis of nine cases and review of the literature. *J Oral Maxillofac Surg* 1990, 48,246-51.
44. Bavitz JB, Chewning LC. Malignant disease as temporomandibular joint dysfunction: review of the literature and report of case. *J Am Dent Assoc* 1990,120,163-6.
45. Farrar WB. Differentiation of temporomandibular joint dysfunction to simplify treatment. *J Prosthet Dent* 1972, 28,629-36.
46. Dolwick MF. Diagnosis and etiology of internal derangements of the temporomandibular joint. In Laskin D, Greenfield W, Gale E, et al, editors. The President's Conference on the examination, diagnosis and management of temporomandibular joint disorders. Chicago: Am Dent Assoc 1983:112-7.
47. Hansson TL. Temporomandibular joint anatomical findings relevant to the clinician. In Clark GT, Solberg WK, editors. Perspectives in

- temporomandibular disorders. Chicago: Quintessence Publishing Co, 1987:45-57.
48. Carlsson GE, Oberg T. Remodeling of the temporomandibular joints. *Oral Sci Rev* 1974, 4, 53-86.
  49. Moffett BC, Johnson LC, McCabe JB, Askew HC. Articular remodeling in the adult human temporomandibular joint. *Am J Anat* 1964, 115,119-42.
  50. de Leeuw R, Boering G, Stegenga B, de Bont LG. Clinical signs of TMJ osteoarthritis and internal derangement 30 years after nonsurgical treatment. *J Orofacial Pain* 1994, 8, 18-24.
  51. Friction JR. Myofacial pain syndrome: characteristics and epidemiology. In: Friction JR, Awad EA, editors. *Advances in pain research and therapy*, vol 17. Myofacial pain and fibromyalgia. New York: Raven Press, 1990:107-27.
  52. McMillan AS, Blasberg B. Pain-pressure threshold in painful jaw muscles following trigger point injection. *J Orofacial Pain* 1994, 8,384-90.
  53. Mense S. Nociception from skeletal muscle in relation to clinical muscle pain. *Pain* 1993, 54,241-89.
  54. Dolwick MG, and Riggs RR: Diagnosis and treatment of internal derangements of the temporomandibular joint. *Dent Clin North Am* 1983,27,561.
  55. Gilboe D: Centric relation as the treatment position. *J Prosth Dent* 1983,50(5),685-89.
  56. Apfelberg DB, Lovey E, Janetos G, Maser MR, Lash H. Temporomandibular joint disease. Results of a ten-year study. *Post Graduate Med* 1979, 65,167-72.
  57. Greene CS, Laskin DM. Long term status of TMJ clicking in patients with myofascial pain dysfunction. *J Am Dent Assoc* 1988, 117,461-5.
  58. Carlsson GE. Long-term effects of treatment of craniomandibular disorders. *J Craniomandib Pract* 1985, 3,337-42.
  59. Okeson JP, Hayes DK. Long-term results of treatment for temporomandibular disorders: an evaluation by patients. *J Am Dent Assoc* 1986, 112,473-8.
  60. Hodges JM. Managing temporomandibular joint syndrome. *Laryngoscope* 1990, 100, 60-6.
  61. Randolph CS, Greene CS, Moretti R, Forbes D, Perry HT. Conservative management of temporomandibular disorders: a posttreatment comparison between patients from a university clinic and from private practice. *Am J Orthod Dentofac Orthop* 1990, 98, 77-82.
  62. Parker MW: A dynamic model of etiology in temporomandibular disorders. *J Am Dent Assoc* 1990,120,283-90.
  63. Okeson JP: Management of temporomandibular disorders and occlusion, 3<sup>rd</sup> ed. St Louis, MO, Mosby, 1993.
  64. Baragona PM, Cohen HV: Long-term orthopedic appliance therapy. *Dent Clin North Am* 1991, 35,109-21.
  65. Sessle BJ. Acute and chronic craniofacial pain: brainstem



- mechanisms of nociceptive transmission and neuroplasticity and their clinical correlates. *Crit Rev Oral Biol Med* 2000, 11, 57-91
66. Clark GT, Seligman DA, Solberg WK, Pullinger AG. Guidelines for the treatment of temporomandibular disorders. *J Craniomandib Disord Facial Oral Pain* 1990, 4, 80-8.
  67. Danzig W, Van Dyke AR. Physical therapy as an adjunct to temporomandibular joint therapy. *J Prosthet Dent* 1983, 49, 96-9.
  68. Lark MR, Gangarosa LP Sr. Iontophoresis: an effective modality for the treatment of inflammatory disorders of the temporomandibular joint and myofascial pain. *Cranio* 1990, 8, 108-19.
  69. Au AR, Klineberg IJ. Isokinetic exercise management of temporomandibular joint clicking. *J Prosthet Dent* 1993, 70, 33-9.
  70. Tim J. A common-sense approach to splint therapy. *J Prosth Dent* 2001, 86(5), 539-45.
  71. Clark GT. A critical evaluation of orthopedic interocclusal appliance therapy: design, theory, and overall effectiveness. *J Am Dent Assoc* 1984, 108, 359.
  72. Sheikholeslam A, Holmgren K, Riise C. A clinical and electromyographic study of the long-term effects of an occlusal splint on the temporal and masseter muscles in patients with functional disorders and nocturnal bruxism. *J Oral Rehabil* 1986, 13, 137-45.
  73. Boero RP. The physiology of splint therapy: a literature review. *Angle Orthod* 1989, 59, 165-80.
  74. Fuchs P. The muscular activity of the chewing apparatus during night sleep. An examination of healthy subjects and patients with functional disturbances. *J Oral Rehabil* 1975, 2, 35-48.
  75. Beard CC, Clayton JA. Effects of occlusal splint therapy on TMJ dysfunction. *J Prosthet Dent* 1980, 44, 324-35.
  76. Okeson JP, Kemper JT, Moody PM. A study of the use of occlusion splints in the treatment of acute and chronic patients with craniomandibular disorders. *J Prosthet Dent* 1982, 48, 708-12.
  77. Manns A, Miralles R, and Guerrero F. The changes in electrical activity of the postural muscles of the mandible upon varying the vertical dimension. *J Prosthet Dent* 1981, 45, 438-45.
  78. Manns A, Miralles R, Santander H, Valdivia J. Influence of the vertical dimension in the treatment of myofascial pain-dysfunction syndrome. *J Prosthet Dent* 1983, 50, 700-9.
  79. Clark GT, Lanham F, Flack VF. Treatment outcome results for consecutive TMJ clinic patients. *J Craniomandib Disord* 1988, 2, 87-95.
  80. Gibbs CH, Mahan PE, Mauderli A, Lundeen HC, Walsh EK.

- Limits of human bite strength. *J Prosthet Dent* 1986;56,226-9.
81. Holmgren K, Sheikholeslam A, Riise C. Effect of a full-arch maxillary occlusal splint on parafunctional activity during sleep in patients with nocturnal bruxism and signs and symptoms of craniomandibular disorders. *J Prosthet Dent* 1993;69,293-7.
  82. Gentz R. Apparatus for recording of bruxism during sleep. *Sven Tandlak Tidskr* 1972, 65,327-42.
  83. Kydd WL, Daly C. Duration of nocturnal tooth contacts during bruxing. *J Prosthet Dent* 1985, 53,717-21.
  84. Nitzan DW. Intraarticular pressure in the functioning human temporomandibular joint and its alteration by uniform elevation of the occlusal plane. *J Oral Maxillofac Surg* 1994;52,671-9.
  85. Kuboki T, Takenami Y, Orsini MG, Maekawa K, Yamashita A, Azuna Y, et al. Effect of occlusal appliances and clenching on the internally deranged TMJ space. *J Orofac Pain* 1999, 13,38-48.
  86. McNeill C, ed. Current controversies in temporomandibular disorders. Chicago: Quintessence Publishing Co, 1992.
  87. Ales Oberz and Jens C. Turp. The effect of musculoskeletal facial pain on registration of maxillomandibular relationships and treatment planning: A synthesis of the literature. *J Prosth Dent* 1998;79:439-45.
  88. Stohler CS. Clinical decision-making in occlusion: a paradigm shift. In McNeill C, editor. The science and practice of occlusion. Carol Stream: Quintessence Publishing Co; 1997 (In press).
  89. McNeill C. Fundamental treatment goals. In McNeill CM, editor. The science and practice of occlusion. Carol Stream: Quintessence Publishing Co; 1997 (In press).

## An Orthodontic Study of the Relation between Anterior Crossbite and Temporomandibular Disorders

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### Abstract

**Background:** Anterior crossbite is an abnormal labiolingual relationship between one or more maxillary and mandibular anterior incisor teeth. This study was conducted to assess the prevalence of the anterior crossbite of Iraqi student sample in randomly selected primary schools in Baghdad and assess its effect on temporomandibular joint. The investigation was carried out on males and females at age range between 7-11 years.

**Materials and methods:** The number of examined students was 6758 (3385 female, 3373 male). The assessment procedure was done by direct examination on patient's mouth using vernier and the examination of temporomandibular joint was done according to World Health Organization (1997).

**Result** .The relative frequency of anterior crossbite was 1.1%. There was statistically significant difference in the relative frequency of TMD in cases with anterior crossbite.

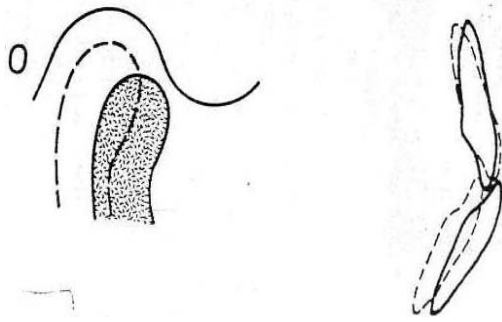
**Key words:** anterior crossbite, TMDs

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### Introduction

Anterior crossbite is one of the commonest malocclusion to be presented to general dental practitioner in growing children<sup>1</sup>. It is defined as an abnormal labiolingual relationship between one or more maxillary and mandibular anterior incisor<sup>2,19</sup>, as shown in fig1. Clinically, it is expressed as a "reversed overjet" in which one or more maxillary incisor teeth are positioned lingually to mandibular incisor teeth when the patient closed his mouth into centric occlusion, it could be skeletal, functional or dental<sup>2,4,6,7,19,5</sup>. Anterior crossbite may consider as a traumatic occlusion<sup>10</sup> which may lead to an abnormal path of closure and later on to a temporomandibular disorders<sup>16</sup> (Fig 2). TMDs include variety of different disorders involving the TMJ and the muscle of mastication separately or together<sup>11,18</sup>. It is found in a longitudinal study on children that crossbite are more likely associated with development of TMDs than other types of malocclusion<sup>14</sup>. Anterior crossbite cause excessive tension on TMJ causing marked deviations of the mandible on opening and closing. The condyle may be positioned downward and forward and may lead to its anterior resorption. In this study we try to assess the prevalence of anterior crossbite in Iraqi



students aged between 7-11 years in primary schools in Baghdad and its effect on TMJ



## Materials and Methods

The sample had been selected from 20 primary schools in Baghdad city (Karekh and Rusapha) , which was randomly selected during the period between October 2004 to the end of December 2004 . The age range of the subjects was comprised of between 7-11 years. The samples was 6758 students ;3373 female and 3385 male) Table (1)

The sample was selected with the following criteria:

1. Upper and lower first molars are present.
2. Upper and lower centrals are present and fully erupted.
3. No previous orthodontic treatment and facial asymmetry

### Instruments and supplies:

Plane mouth mirrors, millimeter graded vernier and Stethoscope.

## Examination area

All students were examined to detect the subjects who have anterior crossbite Then, each one of them with anterior crossbite was age- and sex- matched with a control subject entering the same criteria mentioned above, except the presence of anterior crossbite, and randomly selected among other students. Natural light was utilized with the aid of portable light. The examination was done through the following sequential steps:-

1. Each student was comfortably seated in a chair with high backrest with his/her head supported in an upright position <sup>22</sup>
2. Each subject was asked to swallow and then to close into maximum intercuspation to obtain a centric occlusion. <sup>21</sup>

**Table (1): The percentage of the number of examined students in relation to the number of students present in Baghdad primary schools.**

Age	Female		%	Male		%
7-11 years	No of students	No. of examined		No. of students	No. of examined	
	195765	3385	1.7	226582	3373	1.4

## TMJ assessment <sup>22,17</sup>

**A-Symptoms:** The following codes and criteria were used:

**0**=No symptoms.

**1**=Occurrence of clicking, pain or difficulties in opening or closing the jaw once or more per week.

**9**= not recorded.

**B- Signs:** The following codes and criteria were used:

**0**=No signs.

**1**=Occurrence of clicking, tenderness (on palpitation) or reduced jaw mobility (Opening<30mm).

**# TMJ sounds:**

This was assessed with the use of the stethoscope on the lateral aspect of each joint in front of the tragus<sup>16,13</sup>, while the subject was asked to open and close his mouth.

**# Maximal opening of the mouth**

It can be determined by measuring maximum jaw opening in the incisor region adding the amount of overbite<sup>11</sup>. The inter incisal distance was measured by a vernier graded in millimeter<sup>16</sup>. One end of the vernier was placed against the incisal edge of one of the lower incisor and the vertical distant to the incisal edge of the opposing upper incisor while the subject held his \her mouth as wide as possible was measured to the nearest half of a millimeter.

**#Tenderness**

Tenderness was examined by palpitation of the anterior temporalis and\or masseter muscle on one or both sides. The tenderness was evaluated by unilateral palpitation with soft and firm pressure of two fingers were applied to the designated muscles for 1or 2 seconds during palpitation the patient is asked whether the pressure hurts or just uncomfortable<sup>17,18</sup>. The patient's response is placed in one or four categories<sup>15</sup>:

**0**=no pain and response.

**I**=palpitation is uncomfortable.

**II**=definite discomfort and pain.

**III**=shows evasive action.

**C-Deviation on maximal mouth opening:** It was measured by drawing a vertical line with an indelible pencil on the midline from the upper incisors down to

the opposing lower incisor. Then the patient was asked to open his \her mouth, any horizontal deviation of 2mm or more upon closing and opening was recorded. The direction of the shifting was also recorded<sup>16</sup>

**Anterior displacement:**

Any patient with a mild reverse overjet and positive overbite should be examined for anterior displacement<sup>6</sup>. The patient was in centric occlusion and his occlusal plane was horizontal, a vertical line was drawn with an indelible pencil on the midline from the upper incisors down to the opposing lower incisor<sup>16</sup>. First the student was asked to close in centric relation. The incisors meet edge to edge relation but the posterior teeth are out of occlusion. In order to obtain a position of maximum occlusion, the mandible was displaced anteriorly, so there is over closure of the mandible in this case<sup>6</sup>.

**Result**

Table (2) showed that the total number of examined students, and the number of control groups, in addition to the number of students with anterior crossbite, (unilateral and bilateral).

**Table (2): The total number of examined students, number of control groups, and number of students with anterior crossbite.**

	Male	Female	Total
<b>Examined</b>	3373	3385	6758
<b>Control</b>	100	100	200
<b>Unilateral crossbite</b>	34	27	61
<b>Bilateral crossbite</b>	6	4	10

### Frequency of anterior crossbite

#### A- Age and gender

The table 3 showed that there was no statistically significant difference in prevalence rate of anterior crossbite

between male and female in each age group. But there was a statistically significant difference in prevalence rate of anterior crossbite between age groups.

**Table (3) The relative frequency (prevalence rate) of identified anterior cross-bite by age, and gender.**

Age in years	Male			Female				
	Examined	Anterior Cross-bite		Examined	Anterior Cross-bite			
	No	No	%	No	No	%	Z	P
7	670	8	1.2	674	6	0.9	0.28	0.78 <sup>[NS]</sup>
8	668	10	1.5	673	13	1.9	0.4	0.69 <sup>[NS]</sup>
9	713	13	1.8	713	4	0.6	1.95	0.05
10	754	9	1.2	758	4	0.5	1.12	0.26 <sup>[NS]</sup>
11	568	4	0.7	567	0	0.0	0.41	0.13 <sup>[NS]</sup>
Total	3373	44	1.3	3385	27	0.8	1.93	0.05

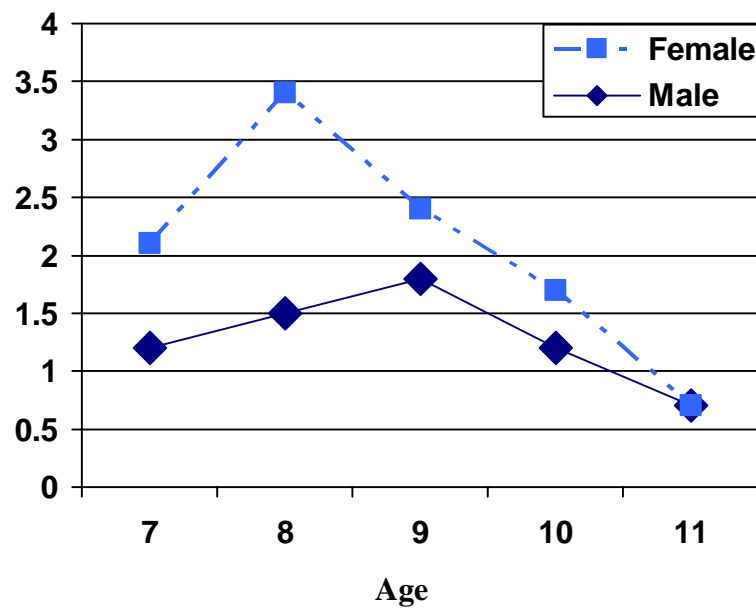


Figure (3): Prevalence rate of anterior crossbite

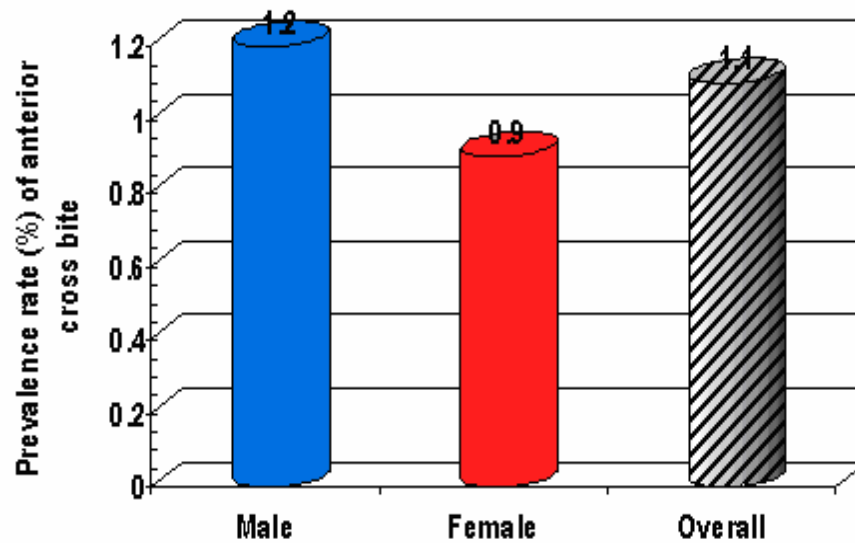


Figure (4): Prevalence rate of anterior crossbite between male and female.



### B- Tooth

Table (4) showed that the majority of subjects have one tooth affected with anterior crossbite

**Table (4): Frequency distribution of cases with anterior cross-bite by number of affected teeth.**

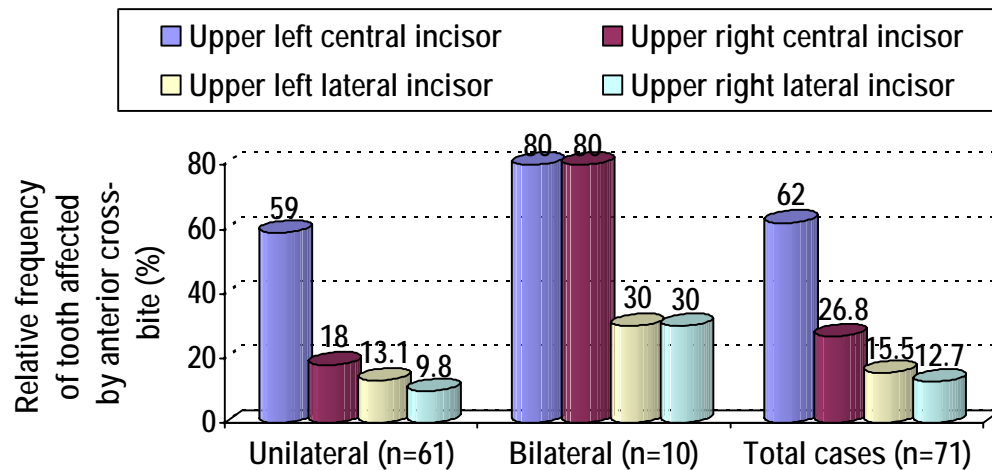
Number of tooth presenting with anterior cross bite	N	%
1	61	85.9
2	9	12.7
4	1	1.4
Total	71	100

Table (5) showed that the upper left central incisor is the most affected tooth with anterior crossbite (unilateral and

bilateral), while the upper right lateral incisor is the less one affected.

**Table (5): The relative frequency of each type of upper incisor manifesting the anterior cross bite unilateral and bilateral cases**

	unilateral anterior cross-bite (n=61)		Bilateral anterior cross-bite (n=10)		Total anterior cross bite (n=71)	
Teeth affected by anterior cross-bite	N	%	N	%	N	%
Upper left central incisor	36	59	8	80	44	62
Upper right central incisor	11	18	8	80	19	26.8
Upper left lateral incisor	8	13.1	3	30	11	15.5
Upper right lateral incisor	6	9.8	3	30	9	12.7



**Figure (5): Relative frequency of a tooth affected by anterior crossbite**

## Temporomandibular joint examinations

### A-Temporomandibular joint symptoms

Table (6) showed that there was statistically significant difference in the relative frequency of temporomandibular joint symptoms between control subjects and subjects with anterior crossbite

Table (7) showed that there was no statistically significant difference in the relative frequency' tenderness of masseter and temporalis between unilateral and bilateral anterior crossbite cases.

**Table (6): Case-control difference in relative frequency of TMJ symptoms**

TMJ-symptoms	Controls (n=200)		Cases - Anterior x-bite (n=71)				
	N	%	N	%	$\chi^2$	df	P
	0	(0)	4	(5.6)	**	**	0.004

**Table(7): The relative frequency difference of TMJ symptoms between unilateral and bilateral anterior crossbite cases**

	Unilateral anterior x-bite		Bilateral anterior x-bite				
Positive findings	N	%	N	%	$\chi^2$	df	P
TMJ-Symptoms	2	3.3	2	20	**	**	0.09 <sup>[NS]</sup>

### B-Temporomandibular joint signs

Table (8) showed that there was statistically significant difference in the relative frequency of TMJ signs between control group and cases with anterior crossbite

**Table (8): Case-control difference in relative frequency of TMJ signs**

	Controls (n=200)		Cases - Anterior crossbite (n=71)				
Positive findings	N	%	N	%	$\chi^2$	df	P
TMJ-Click	11	5.5	21	29.6	29.2	1	<0.001
Tenderness- Masseter muscle	4	2	6	8.5	**	**	
Tenderness- Temporalis	4	2	5	7	**	**	

Table(9): showed that the clicking and the tenderness of temporalis and masseter muscle showed no statistically significant difference in the

relative frequency between subjects with anterior unilateral crossbite and subjects with bilateral anterior crossbite

**Table(9): The difference between unilateral and bilateral anterior cross-bite- in relative frequency of muscle tenderness and clicking**

	Unilateral anterior cross- bite (n=61)		Bilateral anterior crossbite (n=10)				
Positive findings	N	%	N	%	$\chi^2$	df	P
TMJ-Click	16	26.2	5	50	**	**	0.15 <sup>[NS]</sup>
tenderness-Masseter muscle	4	6.6	2	20	**	**	0.2 <sup>[NS]</sup>
Tenderness- Temporalis muscle	4	6.6	1	10	**	**	0.54 <sup>[NS]</sup>

The table (10) showed that there are agreements between clicking

and the side of crossbite tooth about 81.8%

**Table (10): Relation between the side of crossbite and the side of clicking**

side of anterior cross bite tooth	TMJ-clicking				
	Negative	Right	Left	Both sides	Total
Right	12	2	0	3	17
Left	33	2	7	2	44
Total	45	4	7	5	61

$$\text{Agreement} = 2 + 7 / 11 = 81.8\%$$

Table (11) showed that the mean mouth opening was significantly lower in subjects with anterior crossbite (unilateral and

bilateral cases) which is equal to 37mm-compared with control subjects which is equal to 43.6mm.

**Table (11): Case-control difference in the mean mouth opening.(in mm)**

	Control s (n=200)	Cases (Anterior crossbite) (n=71)	t	df	P
Mouth opening (mm)			11.3	269	<0.001
Range	(33-54)	(30-46)			
Mean	43.6	37			
SD	4.26	4.07			
SE	0.301	0.483			

Table (12) showed that the mean mouth opening was the same in

subjects with anterior crossbite (unilateral and bilateral cases)

**Table (12): The difference between Cases with unilateral and those with bilateral anterior crossbite in mean mouth opening. (in mm)**

	Unilateral anterior crossbite	Bilateral anterior crossbite	t	df	P
Mouth opening (mm)			0.035	69	0.97 <sup>[NS]</sup>
Range	(30-46)	(30-43)			
Mean	37	37			
SD	3.95	4.99			
SE	0.506	1.578			

### Anterior displacement:

Table (13) showed that there was a statistically significant difference in the relative frequency of anterior

displacements between control subjects and subjects with anterior crossbite.

**Table (13): Case-control difference in relative frequency of anterior displacement.**

	Controls (n=200)		Cases (Anterior cross-bite) (n=71)				
Positive findings	N %		N %		$\chi^2$	df	P
Anterior displacement	21	10.5	19	26.8	11.0	1	0.001

**\*\* Fisher's exact significance**

(Table 14) showed that there was no statistically significant difference in the relative frequency

of anterior displacements between subjects with unilateral and bilateral anterior crossbite

**Table (14): The in relative frequency difference between Cases with unilateral and bilateral anterior cross-bite of anterior displacemnt.**

	Unilateral anterior crossbite (n=61)		Bilateral anterior crossbite (n=10)				
Positive findings	N	%	N	%	$\chi^2$	df	P
Anterior displacement	16	26.2	3	30	**	**	1 [NS]

**\*\* Fisher's exact significance**

## Discussion

### Age

The prevalence rate of anterior crossbite in the samples is 1.1%. Table (3) shows that the majority of anterior crossbite cases are found between 8-9 years in female, and between 9-10 years in male as shown in fig (3,4,5). This is because of the exfoliation time in female is earlier than male. The prevalence rate of frequency will decrease with growing age because the incisors erupt earlier than other permanent teeth and they are located in

front of the mouth; therefore, they affect dental and facial appearance greatly. For the above reasons, most parents bring their children early when they have irregular incisors, seeking orthodontic treatment.<sup>10</sup>

### Gender

The majority of anterior crossbite are found in males as shown in table (3), because the females here aware of their appearance more than the males

### **Tooth**

The majority of the samples with anterior crossbite have only one affected tooth which is the left central incisors. This may be due to trauma to the tooth bud, retained deciduous teeth or delayed eruption of permanent incisor-as shown in table (4) and (5). Table (5) has shown that the lateral incisors are the least one affected differentiate between toothache, earache, and joint pain. (Table6&7) while the opposite was true in other study <sup>10</sup>. In this study, the canine has not been erupted yet. The eruption of canine later will displace the lateral palatally.

### **The temporomandibular disorder**

**A-TMJ symptoms:** The prevalence of symptoms is less in children (5.6%) which agreed with other study <sup>13</sup>.

### **B-TMJ signs**

#### **1-Clicking:-**

The study revealed that 29.2% of patients have clicking in comparison with control group-table (8) Patients with anterior crossbite are most likely to develop clicking at early age <sup>13</sup>. Clicking is seen in both unilateral and bilateral anterior crossbite-table (9)-. In children, clicking may be associated with muscle tenderness and reduced mouth opening. There is a correlation between the side of crossbite and side of clicking. Table (10)

#### **2- Tenderness of muscles (masseter and temporalis)**

Only small numbers of students have pain upon palpitation and it might be increased with growing age-Table (8) and (9)

### **3-Mouth opening**

Restricted mouth opening is more obvious in both unilateral and bilateral anterior crossbite in comparison with the control group, (Table 11). Both unilateral and bilateral anterior crossbite have restricted mouth opening as shown in( Table 12). It might be associated with anterior displacement, muscle tenderness, and clicking

### **4-Anterior displacement of the mandible**

Anterior crossbite is more associated with unilateral and bilateral anterior crossbite than control groups (Table12and 13). This might be related to occlusal interference which forced the patient to displace the lower teeth to get maximum interdegitation. Excessive tension can be placed on TMJ causing marked effect on opening and closing. The condyle may be positioned downward and forward and may lead to anterior resorption.

### **Conclusion**

The prevalence rate of anterior crossbite is 1.1% The left central incisor is the most affected tooth with anterior crossbite in such group of age. The majority of anterior crossbite cases are found between 8-9 years in female, and between 9-10 years in male clicking is highly associated with crossbite side. Restricted mouth opening is more obvious in both unilateral and bilateral anterior crossbite in comparison with the control group. Anterior crossbite is highly associated with anterior displacement

## References

- 1-Bodenham R, Bodenham J.: The etiology and treatment of anterior cross-bite. *The Dent. Practit.* 1969:Oct. 52-58.
- 2-Brian DL: Correction of crossbite: *Dent Clin North America*; 1978;22(4): 647-657.
- 3-Ciancaglini R, Gherlone E, Redaelli S.: The distribution of occlusal contacts in the intercuspal position and temporomandibular disorder. *J Oral Rehabil*; 2002;29:1082-1090.
- 4-Chow MH.: Treatment of anterior crossbite caused by occlusal interferences. *Quintessence International*;1979;2:57-60.
- 5-Daskologiannakis J.: Glossary of orthodontic terms. Berlin, Quintessence Publishing Co. Inc. 2000
- 6-Houston WJB.: Orthodontic Diagnosis. Bristol: John Write and Sons LTD: 1975
- 7-Houston WJB :Orthodontic diagnosis.3rd ed. Bristol; Wright PSG. 1982
- 8-Houston WJB: Walther's Orthodontic notes.4th edition. Bristol: John Write and Sons LTD.1983
- 9-Klinberg I, Jagger R.: Occlusion and clinical practice; Wright. 2004
- 10-Kinaan BK.: Treatment of lingual occlusion of upper anterior teeth. *Iraqi J of Dental Research.* 1981;2:49-59.
- 11-Keeling SD, McGorry S, Wheeler TT, King GJ.b.: Risk factors associated with Temporomandibular joint sounds in children 6 to 12 years of age. *Am J Orthod-Dentofacial.*1994;105:279-287.
- 12-Mohlin B, Derweduwen K, Pilley R, Kingdon A, Shaw WC, Kenealy P: Malocclusion and Temporomandibular Disorder: A Comparison of Adolescentswith Moderate to severe Dysfunction with those without Signs and Symptoms of Temporomandibular Disorder and Their Further Development to 30-Years of Age. *Angle Orthod*; 2003 ;74(3):319-327.
- 13-Motegi E, Miyazaki H, Ogura I, Konishi H, Sebata M: An orthodontic study of Temporomandibular joint disorders. Part 1: Epidemiological research in Japanese 6-18 years the Angle Orthodontist; 1992;62(4):249-256.
- 14-Nomura M, Motegi E, Isoyama Y.: Case report of lateral crossbite. Part I. Mixed dentition. *Bull Tokyo Dent Coll*; 1995;36(2): 91-97.
- 15-Okeson JP: Management of Temporomandibular joint disorder and occlusion, 4<sup>th</sup> ed. St. Louis,Mosby. 1998.
- 16-Padamsee M, Ahlin JH, Ko CM, Tsamtsouris A.: Functional disorder of the stomatognathic system: part II-A review .*J pedod*; 1985;9(3):179-187
- 17-Peter S.: Essentials of preventive and community Dentistry. 2nd ed. Aria (medi) Publishing House. 2004
- 18-Pergamalian A, Rudy T, Zaki H, Greco CThe association between wear facets,bruxism ,and severity of facial pain in patients with Temporomandibular disorders *Prosthet Dent*; 2003.90:194-200.
- 19-Purcell PD: The Crossbite. *J of the Michigan Dent Assoc*; 1984;66:69-73.
- 20-Rani S.: Synopsis of orthodontics.AITB publishers Distributors, Delhi. 1995
- 21-Rahn A, Heartwell M: Textbook of complete dentures.5th ed. Lippincott Walliams & Wilkins. . 1993



## Performance level of caregivers and its relationship with some variables

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### Abstract

There is an urgent for an immediate action if the goals of the Safe Motherhood Initiative are to be achieved .As one of four pillars of Safe Motherhood includes Antenatal Care(ANC), therefore this study is mainly concerned with (ANC)performance that is provided through caregivers at primary health care centers (PHCCs) .In order to describe Antenatal care (ANC) performance of the caregivers in Baghdad PHCCs sectors and to determine the relationship between the performance level of caregivers with some variables such as, age, level of education, years of experience and training sessions of caregivers.

**Material and Methods :** Descriptive cross sectional fields study to describe Antenatal care (ANC) performance of the caregivers in Baghdad PHCCs sectors .

It started on the 4<sup>th</sup> of April 1997 and continued up to the 23<sup>rd</sup> of June 1997. The study includes two part instruments conducted; demographical datasheet and observational checklist.

**Results:** The sample consisted of 132 caregivers at 20 Primary Health Care Centers (PHCCs) in (5) Baghdad PHC sectors chosen randomly.

The data analysis revealed that there were big differences between the actual working observed and standardized

numbers among nurses, health auxiliaries and clerks.

The coverage rate for the 4<sup>th</sup> visit and above it of the pregnant woman to PHCC was 31.4%. The study showed that the nurses had a good performance, the health auxiliaries and clerk as well in one of PHC sectors only. While in terms of physical examination activity by physicians ; the B.P showed 86.2% and 93.5% was of the fund height level in abdominal examination activity, but fetal heart sound was 9.8% at this examination.

### Discussion and Recommendations:

The study recommended to emphasis on the number and quality of the training courses together with feedback information and to provide PHC sectors with the required man power.

### Introduction

There is an urgent for an immediate action if the goals of the Safe Motherhood Initiative are to be achieved .As one of four pillars of Safe Motherhood includes Antenatal Care(ANC), therefore this study is mainly concerned with (ANC)performance that is provided through caregivers at primary health care centers (PHCCs) . Thus the need has emerged to assess the level of antenatal caregiver's performance. In addition it is the key stone of modern obstetrics that is

routinely provided for all pregnant women at primary care level from screening to intensive life support while pregnant and up to delivery (Rooney,1992). Moreover several health organizations and recent reviews of literature gave a high priority to improve mothers' health by early detection and treatment of abnormalities that affect their health or their babies to successful childbearing and adequate preparations for labour and lactation (WHO,1992). In order to describe Antenatal care (ANC) performance of the caregivers in Baghdad PHCCs sectors by providing health services to women during their pregnancy and to determine the relationship between the performance level of caregivers with some variables such as, age, level of education, years of experience and training sessions of caregivers.

## **Materials and Methods**

A descriptive cross sectional field study using simple random sample was conducted on different professional categories who were dealing with pregnant woman, so as to assess and describe antenatal care (ANC) performance of the caregiver at primary health care centers (PHCCs). It adopts the following process:

Administrative arrangements , instrument construction, setting of the study, validity, pilot study, reliability of an instrument, data collection, implementation, data processing and statistical analysis.

### **Instrument construction:**

A two-part instrument was constructed, it consisted of the following:

#### **1- Participant information :**

Developed to obtain general information of participants including

their age, level of education, years of experience and the number and the period of training courses in the field of practice.

#### **2- Observation checklist:**

Five observational checklists were designed for each activity of (ANC) clinic to assess caregivers' performance. Each item has yes and no options to be checked by the investigator. Every option rated on a 3-point type likert scale as (weak,moderate,good).(polite,1995) The three observations were divided into weak level of performance to be bellow 50 marks, (50-75) marks were for moderate performance level and (75-100) marks were for good performance.

### **Setting of the study:**

20 PHC centers , were selected randomly from 101 PHC centers in five Baghdad Sectors such as Al-Adhamia , Al-Rusafa , Al-Karkh, Al-Kadhmia and Al Sader City Sectors ; these represent about 20% of the total number of (PHC) centers.

### **Selection of the sample:**

The study sample consisted of 132 caregivers at the selected 20 (PHCCs) .

### **Validity of the instrument:**

The content validity of an instrument is based on the principle of judgment. Experts in the content may be called on to analyze the items to see if they represented adequately. (Polit, 1995).

Some notes and opinions that were added by experts were coded and tabulated. The instrument was therefore valid since all the notes were introduced.

### **Reliability of an instrument :**

Reliability refers to the stability, consistency, accuracy and dependability of the instrument (Tones & Tilford, 1994).

To check the interrator reliability of the observation checklist, the investigator and her colleague were

observing the caregivers of different categories at the same time by using the same sheet of checklist. These observations were implemented on 15 caregivers. They were distributed across three PHC centers. Each PHC center represented a PHC Sector in Baghdad City. Internal consistency reliability was established for the observation checklist, the results showed that reliability coefficient (R) was 0.86 which indicated that the checklist was adequately reliable for the study.

#### **Data Collection :**

Data were gathered by the use of structured interviews and a checklist which was specified for each category of caregivers . Data were collected between the 4<sup>th</sup> of April 1997 and the 23<sup>rd</sup> of June 1997.

#### **Implementation:**

At the beginning the investigator made herself as an active participant and trying to learn from them and observe them, and interacting as a student with them accordingly with out interfering with their activities. Sometimes caregivers asked the investigator to do things, and she did it. Thus three observations of performance was made for every skill performed by each caregiver according to the type of activity. This division was applied to all categories of caregivers in order to determine the line of achieving activities evidently.

#### **Data processing and analysis :**

Information from the instrument was recorded into a tally sheet from which it was analyzed.

#### **Statistical analysis:**

##### 1. Descriptive statistics :-

A-tables

B-Rates

##### 2. Inferential statistics :-

C-Regression analysis (simple linear model) Al-Jiboory, 1991.

D-Person product correlation coefficient to estimate the scale reliability (Hinke, 1982) .

There was a set of probability levels to determine the significance of the test a:

(1)Non significant (NS)(  $P \geq 0.05$ ).

(2) Significant (S)( $P \leq 0.05$ ) .

(3) High significant (HS)( $P \leq 0.01$ ).

(R) In Regression analysis test means coefficient determination which explain the degree of effectiveness of the independent variable (number of training courses) on the degree of changes occurring to dependent variable (performance) (Polit, 1995).

## The results

**Table No. (1): Distribution of the caregivers by age, level of education, years of experience and their training at PHCCs in Baghdad (n=132)**

Caregivers Categories	Physicians	Nurses	Medical Assistants	Health Auxiliaries	Clerks	Total	Percent
<b>Age</b>							
20-30	0	1	15	5	5	26	19.7
31-40	25	3	12	14	9	63	47.7
41-50	16	5	4	13	2	40	30.3
>50	0	0	0	3	0	3	2.3
<b>Total</b>	<b>41</b>	<b>9</b>	<b>31</b>	<b>35</b>	<b>16</b>	<b>132</b>	<b>100</b>
<b>Educational Status</b>							
Primary School Graduates	0	0	0	9	4	13	9.9
Intermediate School Graduates	0	6	0	20	5	31	23.5
Secondary School Graduates	0	2	0	5	7	14	10.6
Institute Graduates	0	0	30	1	0	31	23.5
College Graduates	37	1	0	0	0	38	28.8
Post Based Graduates	4	0	1	0	0	5	3.8
<b>Total</b>	<b>41</b>	<b>9</b>	<b>31</b>	<b>35</b>	<b>16</b>	<b>132</b>	<b>100</b>
<b>Years of Experience</b>							
<1	0	2	2	0	2	6	4.6
1-10	27	4	27	19	9	86	65.2
11-20	13	3	1	12	5	34	25.8
21-30	1	0	1	3	0	5	3.8
>31	0	0	0	1	0	1	1.5
<b>Total</b>	<b>41</b>	<b>9</b>	<b>31</b>	<b>35</b>	<b>16</b>	<b>132</b>	<b>100</b>
<b>No of MCH Training Courses Participations</b>							
One course	7	0	2	3	1	13	9.9
Two courses	2	3	2	3	1	11	8.3
Three courses	3	1	0	4	3	11	8.3
More than three courses	28	2	21	24	6	81	61.4
<b>Total</b>	<b>40</b>	<b>6</b>	<b>25</b>	<b>34</b>	<b>11</b>	<b>116</b>	<b>87.9</b>

**Note:** Total Number (116) of participants doesn't mean the total number of caregivers in the sample.

**Table No.(2):The relationship between the ages of caregivers and their performance level .**

<b>caregivers</b>	<b>performance level Age categories</b>	<b>Weak F.</b>	<b>Moderate F.</b>	<b>Good F.</b>	<b>Comparative significance</b>
<b>Physicians</b>	<b>30-34</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>(0.33)</b>
	<b>35-39</b>	<b>14</b>	<b>5</b>	<b>-</b>	<b>(0.40**)</b>
	<b>40-44</b>	<b>4</b>	<b>2</b>	<b>-</b>	<b>(0.33)</b>
	<b>45-49</b>	<b>6</b>	<b>2</b>	<b>-</b>	<b>( 0.42)</b>
	<b>50</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>(0.33)</b>
<b>Nurses</b>	<b>28-34</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>(0.33)</b>
	<b>35-41</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>(0.33)</b>
	<b>42-48</b>	<b>-</b>	<b>3</b>	<b>2</b>	<b>(0.33)</b>
<b>Medical Assistants</b>	<b>21-26</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>(0.10)</b>
	<b>27-32</b>	<b>3</b>	<b>2</b>	<b>7</b>	<b>(0.25)</b>
	<b>33-38</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>(0.16)</b>
	<b>39-44</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>(0.33)</b>
	<b>45-50</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>(0.67*)</b>
<b>Health Auxiliaries</b>	<b>27-32</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>(0.17)</b>
	<b>33-38</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>(0.33)</b>
	<b>39-44</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>(0.17)</b>
	<b>45-50</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>(0.21)</b>
	<b>50&lt;</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>(0.67*)</b>
<b>Clerks</b>	<b>25-30</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>(0.13)</b>
	<b>31-36</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>(0.24)</b>
	<b>37-42</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>(0.33)</b>
	<b>43&lt;</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>(0.33)</b>

Table No.2 demonstrates the relationship between the categories mentioned above and their ages, in which there was a high significant association (0.40) between the physicians' performance level and their ages ranging (35-39)years old at level  $P \leq 0.01$  concerning medical assistants a significant relationship

(0.67\*)at level  $P \leq 0.05$  on weak level of performance of ages ranged between (45-50) years old . a significant differences(0.67\*) at level  $P \leq 0.05$  for Health Auxiliaries of more than 50 years old .

**Table No. (3): The relationship between the educational status of caregivers and their performance level.**

<b>caregivers</b>	<b>performance level education status</b>	<b>Weak F.</b>	<b>Moderate F.</b>	<b>Good F.</b>	<b>C.S</b>
<b>Physicians</b>	<b>College Graduates</b>	24	13	0	<b>(0.33**)</b>
	<b>Post Based Graduates</b>	4	0	0	<b>(0.67*)</b>
<b>Nurses</b>	<b>Intermediate School Graduates</b>	0	3	3	<b>(0.33)</b>
	<b>Secondary School Graduates</b>	0	1	1	<b>(0.33)</b>
	<b>College Graduates</b>	0	0	1	<b>(0.67)</b>
<b>Medical Assistants</b>	<b>Institute Graduates</b>	10	5	15	<b>(0.17)</b>
	<b>Post Based Graduates</b>	1	0	0	<b>(0.67)</b>
<b>Health Auxiliaries</b>	<b>Primary School Graduates</b>	1	3	5	<b>(0.22)</b>
	<b>Intermediate School Graduates</b>	4	8	8	<b>(0.13)</b>
	<b>Secondary School Graduates</b>	0	2	3	<b>(0.33)</b>
	<b>Institute Graduates</b>	1	0	0	<b>(0.67)</b>
<b>Clerks</b>	<b>Primary School Graduates</b>	0	1	3	<b>(0.13)</b>
	<b>Intermediate School Graduates</b>	1	3	1	<b>(0.13)</b>
	<b>Secondary School Graduates</b>	1	4	2	<b>(0.19)</b>

This table shows a highly significant association (0.33) at level  $P \leq 0.01$  concerning medical college graduates and their performance. The same table

also demonstrates a significant differences (0.67) at level  $P \leq 0.05$  regarding postgraduates .C.S means Comparative significance.

**Table No.(4) : Relationship between years of experience of caregivers and their level of performance.**

<b>caregivers</b>	<b>performance level years of experience</b>	<b>Weak F.</b>	<b>Moderate F.</b>	<b>Good F.</b>	<b>Comparative significance</b>
<b>Physicians</b>	<b>1-10</b>	19	8	-	<b>(0.37**)</b>
	<b>11-20</b>	9	4	-	<b>(0.36)</b>
	<b>21-30</b>	-	1	-	<b>(0.33)</b>
<b>Nurses</b>	<b>1&gt;</b>	-	1	-	<b>(0.33)</b>
	<b>1-10</b>	-	1	4	<b>(0.42)</b>
	<b>11-20</b>	-	1	2	<b>(0.33)</b>
<b>Medical Assistants</b>	<b>1&gt;</b>	1	-	1	<b>(0.17)</b>
	<b>1-10</b>	8	4	15	<b>(0.22)</b>
	<b>11-20</b>	1	-	-	<b>(0.67)</b>
	<b>21-30</b>	1	-	-	<b>(0.67)</b>

<b>Health Auxiliaries</b>	<b>1-10</b>	<b>4</b>	<b>6</b>	<b>9</b>	<b>(0.14)</b>
	<b>11-20</b>	<b>1</b>	<b>7</b>	<b>4</b>	<b>(0.25)</b>
	<b>21-30</b>	<b>-</b>	<b>1</b>	<b>2</b>	<b>(0.33)</b>
	<b>31&gt;</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>(0.67)</b>
<b>Clerks</b>	<b>1&gt;</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>(0.33)</b>
	<b>1-10</b>	<b>2</b>	<b>5</b>	<b>2</b>	<b>(0.11)</b>
	<b>11-20</b>	<b>-</b>	<b>2</b>	<b>3</b>	<b>(0.33)</b>

this table revealed that a highly significant relationship between years of experience and performance for

physicians only (0.37) at level  $P \leq 0.01$  of (1-10) years .

**Table No.(5):The effect of the training courses length on the performance for all categories of caregivers .**

Categories of caregivers	Training courses ( $\geq 3$ & $< 3$ )*	Beta (slope)	T value	Prob. Level	Correlation coefficient	R-squared	No. of training courses
<b>Physicians</b>	$\geq 3$	<b>1.59</b>	<b>( 0.53)</b>	<b>(0.60)</b>	<b>0.09</b>	<b>0.7%</b>	<b>25</b>
	$< 3$	<b>-2.92</b>	<b>( -0.68)</b>	<b>(0.50)</b>	<b>-0.11</b>	<b>1.2%</b>	<b>56</b>
<b>Nurses</b>	$\geq 3$	<b>-26.08</b>	<b>( 4.93)</b>	<b>(1.6E-5**)</b>	<b>0.62</b>	<b>38.4%</b>	<b>10</b>
	$< 3$	<b>49.95</b>	<b>(10.94)</b>	<b>( 1.8E-3**)</b>	<b>0.87</b>	<b>75.4%</b>	<b>10</b>
<b>Medical Assistants</b>	$\geq 3$	<b>1.11</b>	<b>(0.94)</b>	<b>(0.35)</b>	<b>0.15</b>	<b>2.2%</b>	<b>13</b>
	$< 3$	<b>22.37</b>	<b>(3.29)</b>	<b>( 2.1E-3**)</b>	<b>0.47</b>	<b>21.8%</b>	<b>34</b>
<b>Health Auxiliaries</b>	$\geq 3$	<b>11.23</b>	<b>(2.56 )</b>	<b>(0.01 **)</b>	<b>0.37</b>	<b>14.04%</b>	<b>39</b>
	$< 3$	<b>27.77</b>	<b>(5.16)</b>	<b>(7.2E-8**)</b>	<b>0.63</b>	<b>39.9%</b>	<b>44</b>
<b>Clerks</b>	$\geq 3$	<b>26.14</b>	<b>(3.94)</b>	<b>(3.3E-4 **)</b>	<b>0.53</b>	<b>28.5%</b>	<b>12</b>
	$< 3$	<b>42.59</b>	<b>( 6.59)</b>	<b>(7.9E-8**)</b>	<b>0.73</b>	<b>52.7%</b>	<b>13</b>

Note : \* 3 days and above for courses with symbol  $\geq 3$  , and below of 3 days for courses with symbol  $< 3$  . The highest significant relationship between the level of performance and the duration of training courses was for the nurses. It was (1.6E-5) at  $P < 0.001$  for  $\geq 3$  days participation in these courses, while it was (1.8E-13)at  $P < 0.001$  for  $< 3$  days participation in these courses .

### **Discussion:**

The findings of the study indicated that the majority 47.7% (63) of caregivers were aged 31-40 years old which may be a good age for productivity, while the age of more than 50 years old formed the minority 2.23% (3). In regard to educational status of the subjects they were different Table No. (1).

Among (41) physicians only (4) of them were of post based graduates, and

the remaining (37) were of college graduates. In contrary to the findings of our study, the results of Fadhil's study (1987), revealed a higher score (4) of post based graduate level compared with only (9) physicians who had basic medical college qualification. Among (9) nurses, the majority of them (8) were of secondary and intermediate school graduates, leaving only (1) with higher education level college graduate.



In contrast to this finding, Fadhil's (1987) found that (7) professional nurses were distributed among (6) centers, which were considered better coverage in those centers. While most of medical assistants (31) of them were institute graduates. Then the auxiliaries and clerks were distributed between secondary school graduates and below, where as Fadhil's (1987) showed that categories such as auxiliary nurses or vaccinators had primary education only. With respect to the years of experience it seemed that the majority 65.15 % (86) of all caregivers who had experience were between (1-10) years, which means that the sample may had taken moderate years of practice in their work. While the 3.8 (5) of physician, medical assistants, auxiliaries had (21-30) years of experience.

In support to this study, Fadhil's (1987) found that most of physicians working at PHCCs have had more than six years of experience since qualification. The longest qualified physician was 21 years of experience. The same study showed that the health visitors working at MCH centers had been qualified between (7) and (14) years of experience and the professional nurses were qualified between (9) to (12) years of experience.

Other categories of caregivers such as vaccinators or auxiliary nurses had six years of primary education and special training courses were ranging from (3) to (18) months.

As regards other categories of caregivers in the present study, the longest period of experience to the physicians and nurses was (18) years, to the medical assistants (23) years of experience, to health auxiliaries (33) years of experience, with respect to health visitors and to clerks (15) years of experience, while the most recent

qualified were for the physicians (1) year and the nurses (9) months of experience, medical assistants (3) months, health auxiliaries (1) years and clerks (2) months of experience during the present study. That indicated a big gap of the experience years among each category of personnel.

In terms of training courses, it appeared from this table that the highest percentage in participating of all caregivers (132) was 61.4% for those who attended courses for more than three courses, for caregivers who were working for the last three years.

It has been noticed that it can be considered as a good indication of training. Through these courses practical knowledge done by the trainees to change their trends and attitudes in these courses were added to that the evaluation at the end of the course except, courses that extended three days and less. In Abdul Jabar & Khawa's survey (1997) conducted on 574 caregivers to evaluate their work performance at PHC centers in six Iraqi Governorates. It was revealed that 63% of the staff were included in the survey participated in training courses. This finding was decreased to the results of this study which represented 87% of the total participation in training courses. Since, the present study found that the physicians number the highest percentage 31.1% (41), and the lowest percentage were reflected by the nurses 6.8%(9), it seems that the nurses were in desperate need for participating more in training courses.

In support of our study results, Abdul Jabar & Khawla,s survey (1997) which was carried out to evaluate MCH work performance, showed that the highest percent 34.2% (216) was of physicians which was less than the results of our study because of sample size. Regarding nursing category they accounted for 26.2% (147) which was close to the present study finding. We can notice that the results of both studies are approximately similar.

The relationship between the age of caregivers and their level of performance: When a relationship was established between the ages of caregivers and their performance level the investigator had realized that the relationship between the ages of physician and level of performance on its moderate or weak level, was highly significant at level  $p < 0.01$  for ages between (35-39) years old. That is probably due to lack of awareness and motivation both moral and financial. This can be achieved by fostering them into training courses, in which new policies of MOH will be explored to them which may help to ensure their engagement in work. There was also a significant relationship at level  $p < 0.05$  of health auxiliaries for age of more than 50 years old, which was on good level of performance. While medical assistants at ages between (45-50) showed significant differences at level  $p < 0.05$  but on the weak level of performance, it means that their output was affected by their ages Table No.(2) .

The relationship between the educational status of caregivers and their level of performance: Concerning the relationship between the educational status of caregivers and their performance level. Findings of the study indicated that there were high significant differences at level  $p < 0.01$  through testing the observed and expected frequencies concerning college graduate physicians on weak and moderate levels of work. That indicated negative attitude toward performance which was clear at weak level (table No.3).

In addition to that there was a statistical significant association at level  $p < 0.05$  found for post based graduates through testing the observed and expected frequencies on their weak level

of performance. This finding was unexpected since good performance should be achieved when there is scientific specialization, a case which is considered confusing because it is illogical event. The investigator believed that this situation came up in our country for the circumstances of sanction. That caused loose of motivation and default in some of their duties. Therefore other qualified categories like nurses, medical assistants should be allowed more to do normal activities, as it is wrong for higher trained staff to spend time doing things that others can do as stated by (wood, et al., 1981).

(Stanhope & Lancaster, 1996) mentioned also that studies have shown that 60% to 80% of primary care traditionally done by physicians, can be delivered by nurse practitioner for less money and with equal or better quality. The author's point of view supported these concepts to let physicians be more interested in managing serious cases of clients and decrease the work load they face.

Moreover, in a paper written by (Ryan et al., 1997) to assess benefits of two alternative forms of ANC G.P/midwife, the results suggest willingness to pay of pounds b2500 for ANC, with no significant differences between the types of care provided.

Relationship between years of experience of caregivers and their level of performance: As for the effect of the years of experience of caregivers on their performance level (table No.4) the results indicated highly significant differences at level  $p < 0.01$  of physician's performance to their years of experience (1-10).

The same table demonstrated non significance at level  $p > 0.05$  among nurses, medical assistants, auxiliaries and clerks on all levels of performance against all levels of their years of experience. These findings are practically unacceptable.

However from the author's point of view, caregivers are always in need of more motivation and encouragement in their field of practice in order to maintain good and satisfactory performance. And perhaps there is a need to make review of evaluating application through and after the training courses accomplishment in order to overcome the obstacles that may be developed. In service programs need to include evaluation of participant satisfaction, learning and application to clinical practice. (Alspach, 1995).

Since the performance level depends in most cases on the health personnel training in the courses, the length of these courses spent and the number of these courses in a year. Then not necessarily for performance depends on years of experience, although it is significant factor. Joan & Bentley stated that obstetrician should receive training in appropriate practice situations. The major deficiency is the lack of suitable training placement and support of midwives (WHO, 1991).

The effect of the training courses length on the performance for all categories of caregivers: Table No (5) demonstrated a simple linear model of a regression test for the performance of all caregivers categories. This test conducted a measure of the effect of different courses toward performance. There were two in dependable variables, they comprised courses which extended more than 3 days marked by  $>3$  days, and courses which were less than 3 days pointed by a symbol of  $<3$  days. This table showed that there was an effect of training courses ( $\geq 3$  days) on nurse's performance (dependent variable) representing 38.4% which was regarded the highest percentage among other caregivers. These courses were

considered as dominant factors of the effectiveness on nurse's performance. There were many factors intervening and affecting their performance among which the carelessness to engage nurses into suitable courses through the responsible staff, or the load of work in the ANC clinic. In addition these courses ( $\geq 3$  days) represented high significant association at level  $p \leq 0.01$ , T-value (4.93) and correlation coefficient (R) (0.62), that means that they need training courses of more than 3 days. A strong effect of  $< 3$  days represented 75.4% on the nurse's performance, was considered the highest percentile among the other caregivers. Moreover a high significant relationship at level  $p \leq 0.01$ , T-value (10.9) and (R) (0.87).

In support of this finding (Tiendrebeogo, et al. 1996), revealed that the rise in the number of health agents to be trained has led to the arrangements of short-term courses. So as MOH, (1992-1997) applied this policy. That means also these courses ( $< 3$  days) had a good effects on nurse's performance. Although they had minimum requirements of giving educational information (MOH, 1997). Therefore it should emphasis more knowledge and practice during these courses. This can be achieved by implementation of  $> 3$  days training courses. Relative to clerks, auxiliaries and medical assistants for courses of  $< 3$  days representing 52.7% 39.9% and 21.8% respectively were accounted (6.59), (5.16) and (3.29) which were highly significant. That interpreting the lack in application work procedures and may be that need more follow up after have being back into work place. Concerning  $> 3$  days training courses for clerks, and auxiliaries. They had high significant relationship at level  $p \leq 0.01$  with T-value (3.24) for clerks, and T. value (2.56) for auxiliaries. While their performance were affected by these courses ( $\geq 3$  days) in 28.5% and

14.04%. (Abdul Jabar& Khawla 1997) carried out a study on 574 caregivers in PHCCs in Iraq it revealed that 65% of most courses held for the staff, lasted for 3 days, that means more than two thirds of caregivers had participated for 3 days courses. Despite MOH (1985) recommended that caregivers should be involved into intensive training courses and maintaining continuous follow up to them especially those caregivers who have been in desperate need to these courses. Unfortunately the physicians demonstrated lowest percentage of effect on performance 0.72% although they were good participants in training courses that they achieved the highest percentile in the number of these courses as it showed in table no (4) among the other caregiver. That indication that some factors interfere in the situation of the effect on performance like incentives, materials, transportation or others..... Finally a confirmation upon teaching and training courses should take place to all caregivers in order to support their skills. Because these courses will give more knowledge and more practice (12 hours theory and 12 hours practice with an evaluation at the end of the course)as an example to small courses (MOH, 1997 ).

### **Conclusions:**

According to the findings of this study and their interpretations, the investigator has come up with the following Conclusions:

1. There was shortage in the numbers of nurses, health auxiliaries and clerks in all PHC sectors in Baghdad according to standardized values, whereas there was some shortage in medical personnel numbers in Saddam PHC sector in Baghdad.

2. Most ANC personnel were of young age group (31-40) years old, and with experience of (1-10) years in the field of practice . And about 1/3<sup>rd</sup> of the sample were college graduates who were medical personnel. In addition to that, over 2/3<sup>rd</sup>s of all the sample had participated in the training courses for more than (3) courses of participations.

3. There was weak to moderate performance level of medical personnel who were working in 2/5<sup>ths</sup> of PHC sectors, while it was not significant for the other personnel as regards educational status.

4. Duration of training courses moved toward those with less than 3 days which affected the quality of these courses and consequently the performance level of caregivers. It revealed that the nurses were the highest category who was affected by those courses.

### **Recommendation:**

Based on the stated conclusions, the study recommended that:

- 1.PHC sectors should be provided with the required manpower and/or redistribution of the available personnel according to the catchment's area of each PHCC.

- 2.The number of training courses and arrangement of time table for participation for personnel involved in ANC to ensure equal opportunities for them should be concentrated on.

- 3.The training courses must concentrate in their syllabuses on the practical activities in order to enhance the performance level of the trainees.

- 4.The quality of the training courses should be emphasized by providing adequate time with the presence of time table for the relevant subjects and setting clear objectives for the training courses with serious evaluation.

- 5.Feedback information should be provided to explore benefits of the training courses

and regular supervision should be directed to PHCCs on ANC personnel.

6. Encourage studies and surveys to detect problems at the level of PHCCs with emphasis on ANC area.

#### References:

1. Abdul Jabar ,A. A ,Khawla, N.,UI,N.S .,:Rapid Evaluation Methodology for MCH Services in Iraq . MOH, 1997.
2. Al- Jiboory,S.A :Risk Approach in Maternity Care . A professional Diploma in Community Medicine . Mosul,1996,P.11,37.
3. Alspach,J.G: The Educational Process in Nursing Staff Development . Mosby,1995,P.246
4. Clark,M: Nursing in the community . 2<sup>nd</sup> Edition, USA Appleton& Lange,1996,P.61 .
5. Fadil, .M: Evaluation of the Antenatal Care Programme in Basrah, Iraq.Health Services Journal of the Eastern Mediterranean Region, WHO, 6(2), 1992, P. 6-10.
6. Fadil,I.M: Quality of mother and Child Care in Basrah- Iraq. A Doctor of philosophy Thesis, University of London ,1987,P.150-153,158,159,161.162,206,207,210,262.
7. Ryan., Ratctiffe, J., Tucker ,J: Using Willingness to Pay to Value alternative models of antennal care . Soc-Sci-Med. Department of Epidemiology and Public Health, Ninewells Hospital and Medical school, Dundee, Scotland, U.K.,1997.2,44(3),P.P. 371-80.
8. Stanhope,Lancaster:Community Health Nursing .Promoting Health of Aggregates, Families, and individuals. 4<sup>th</sup> Edition . Office of Technology Assessment,1986,P.41.
9. Stanhope,M.,Lancaster,J: Community Health Nursing .Promoting Health of Aggregates, Families, and individuals. 4<sup>th</sup> Edition .United Status:Mosby,1995,P.1084.
10. Tiendrebeogo,A.,Blanc,L., Sylla,PM.,Bobin,P:The training of health personnel by the Marchoux Institute in Bamako from 1995to1997.Acta-Leprol. Switzerland, 10(1), 1996,P.P.37-43.
11. Tones, K.andTiford,S : Health education :Effectivness,efficiency and equity. 2<sup>nd</sup> Edition .UK: Chapman AndHall, 1994, P.P.11, 107,153,156,174,199.
12. WHO: Maternal Mortality: Helping women off the road to death . Chronicle, 40(5), 1986,P.P.175-179.
13. WHO: Strengthening Maternal and Child Health Programmes through Primary Health Care WHO, EMRO Technical Publication .18.1991, P.25, 33,34,36,39.
14. Wood, C.H., Vaughau, H.de., Glanville:Community Health. African Medical and Research Foundation,1981,P.P.(393-400).
15. Polit,D., Hunger,B: Nursing Research Principles and method. Edition, Lippincott company 1995, P.P., 639,656.
16. Hinke, D, E., Weirsma, W., Juns, S.G: Basic Behavioral Statistics. 1<sup>st</sup> Edition Boston: Houghton, 1982, P.P.214, 216.

## Letter to the editor

### **Sexual dysfunction in uncomplicated diabetic men: Positive association with insulin therapy**

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Erectile Dysfunction(ED), the inability to achieve and / or to maintain an erection for a sufficiently long period of time to permit satisfactory sexual intercourse has been attributed to diabetic nephropathy in diabetic patients [1, 2]. ED showed a positive correlation with age after 65 years, history of diabetes of more than 10 years and was not correlated to the type of diabetes mellitus and diabetic therapy [3, 4, 5]. In one study the prevalence of ED is lower in type 1 diabetic patient. [6]. Orgasmic dysfunction was correlated positively with the duration of diabetes but not with the type of received by the patients [7]. The prevalence of erectile dysfunction amongst diabetic men in a hospital clinic population has been reported to be between 35 and 40 % [8, 9]. Also ED has been reported in up to 75% of diabetic men [8-12].

The aim of this paper is to report a positive correlation between ED in small series of relatively health patients with uncomplicated diabetes. From January to march 2003, 28 male diabetic patients attending the outpatient of general hospital in Baghdad, were asked to complete a questionnaire of 11 questions about their disease and sexual problems. All the patients answered the questions

completely. We excluded any patient with sexual dysfunction prior to the diabetic illness and other associated medical condition. The age of patients ranged from 19 to 50 years (mean 35.5y.) Twenty of them (71%) were married and 8 (29%) were single.

Twelve patients (43%) were diagnosed as diabetic type 1 and 16 patients (57%) were diabetic type 2. The diagnosis depended on the international classification of the diabetes mellitus & was done by a specialist in endocrinology. 16 patients (57%) were on insulin treatment, 9 patients (32%) on hypoglycemic agents and 3 patients (11%) on mixed treatment.

The answers were analyzed and statistical methods of percentages and chi-square had been used. 10 patients (35.5%) complained from ED and one patient (3.5%) complained from lack of interest, while 17 patients (61%) did not have sexual dysfunction. Among patients with sexual dysfunction, 5 patients (46%) on insulin therapy, 3 patients (27%) on hypoglycemic agents and the remainder 3 patients (27%) were on mixed treatments.

In this series significant numbers of diabetic men were excluded because of

prior sexual dysfunction and other medical disorders.

The lack of sexual interest was described by only one patient (3.5%). It appeared that premature ejaculation was considered to remain intact. The most interesting finding of this study was that half of patients with ED were on insulin therapy which is inconsistent with other studies which found that it is lower in type 1 diabetic patients [2]

## References

- 1-Foresta C; Caretta N; Aversa A; Bettocchi C; Corona G; Mariani S; Rossato M, et al. Erectile dysfunction. *J Endocrinol Invest* 2004 Jan;27(1):80-95.
- 2-Saenz de Tejada I, Goldstein I, Azadzi K et al. Impaired neurogenic and endothelium mediated relaxation of penile smooth muscle from diabetic men with impotence. *N Engl J Med* 1989;320:1025-30.
- 3-Fedele D; Coscelli C; Cucinotta D; Forti G; Santeusano F; Viaggi S; Fiori G; Velona T; Lavezzari M. Incidence of erectile dysfunction in Italian men with diabetes. *J Urol* 2001 Oct;166(4):1368-71.
- 4-El-Sakka AI; Tayeb KA et al. Erectile dysfunction risk factors in noninsulin dependent diabetic Saudi patients. *J Urol* 2003 Mar;169(3):1043-7.
- 5-Foresta C; Caretta N; Aversa A; Bettocchi C; Corona G; Mariani S; Rossato M. Erectile dysfunction. *J Endocrinol Invest* 2004 Jan;27(1):80-95.
- 6-Klein R, Klein BE, Lee KE et al. Prevalence of self-reported ED in people with long-term IDDM. *Diabetes Care* 1996;19:135-41.
- 7-D.G Wilkinson (1981) Psychiatric aspects of diabetes mellitus, Review Article. *British Journal of Psychiatry*, 138, 1-9.
- 8-Dunsmuir WD, Holmes SA. The aetiology & management of erectile ejaculatory, and fertility problems in men with diabetes mellitus. *Diabetic Med* 1996; 13:700-8.
- 9-Price D, O'Malley BP, James MA et al. Why are important diabetic men not being treated? *Pract Diabetes* 1991;8:10-1.
- 10-Broderick GA, Schwartz S. Erectile dysfunction in diabetes. *Hosp Pract off Ed* 1991;26:139-42, 147-55.
- 11-Delawater DE. Diabetes and impotence. *Md Med J* 1990;39:683.
- 12-Lustman PJ, Clouse RE. Relationship of psychiatric illness to impotence in men with diabetes. *Diabetes Care* 1990;13:893-5.

**BMC Public Health. 2007 Oct 2;7(1):274**

**Prevalence of childhood & early adolescence mental disorders among children Attending Primary Health Care Centers in Mosul, Iraq A cross-sectional study.**

**Al-Jawadi AA, Abdul-Rhman SA.**

**ABSTRACT:** Background Children and adolescents are more vulnerable to be affected by war & violence than adults. At the time of initiation of this study nothing was known about the prevalence of childhood & early adolescents mental disorders. The aim of the present study is to measure the point prevalence of mental disorders among children 1-15 year old of age in Mosul city, Iraq. Methods To achieve the aim of the present study a cross-sectional study design was adopted. Four primary health care centers were chosen consecutively as a study setting. The unit of the present study was a mother who came to the primary health care center for vaccination of one of her children. The chosen mothers were included by systematic sampling randomization. Then all children (1-15) year old a mother has were considered in the interview & examination. Results The present study shows that out of 3079 children assessed, 1152 have childhood mental disorders making a point prevalence of 37.4% with a male to female ratio equal to 1.22:1. The top ten disorders among the examined children are post-traumatic stress disorder (10.5%), enuresis (6%), separation anxiety disorder (4.3%), specific phobia (3.3%), stuttering & school refusal show a point

prevalence of 3.2% each, learning & conduct disorders have the same figure (2.5%), stereotypic movement (2.3%) & feeding disorder of infancy or early childhood (2.0%). Overall, the highest prevalence is among children 10-15 year old (49.2%). While the lowest one is among 1-5 year olds (29.1%). Boys are more afflicted than girls (40.2% & 33.2%) respectively. Conclusions Childhood mental disorders are a common condition highly prevalent amongst the children & early adolescents in Mosul city. Data of the present study mirror the size of the problem in local community. Several points deserve attention the most important of which include giving care at the community level, educating the public on mental health, involving communities & families, monitoring community mental health indicators & providing treatment at primary health care level.

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**Eur J Epidemiol. 2007;22(8):493-503.**  
**Acute myocardial infarction incidence in immigrants to Sweden. Country of birth, time since immigration, and time trends over 20 years.**

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This study investigates incidence of first acute myocardial infarction (MI) among foreign born persons in Sweden using case control methods, taking into consideration country of birth, gender, socio-economic group and time since



immigration and evaluates if the decreasing incidence of MI in Sweden during the study period was also present in immigrants. The study base consisted of persons 30-74 years of age in Stockholm County 1977-96. All incident cases of first acute MI in the study population were identified using registers of hospital discharges and deaths. Controls were selected randomly from the study base and the sampling fractions were known, enabling estimates of person time at risk. Foreign born subjects had a higher incidence of MI than subjects born in Sweden (men RR [Relative risk]=1.17; 95% CI 1.13-1.21; women RR = 1.15; 95% CI 1.09-1.21) after adjustment for calendar year, age and socio-economic group. An increased incidence was present primarily in subjects born in Finland, other Nordic countries, Poland, Turkey, Syria and South Asia in both genders, from the Netherlands among men and from Iraq among women and was still present after more than 20 years in Sweden. The incidence rate of MI 1977-96 among foreign born persons followed the general decline in the Swedish population. We conclude that foreign born persons in Sweden have an increased incidence of first MI which persists several years after immigration and is not explained by socio-economic differences. It is likely that this to an important extent has a background in factors in the country of origin.

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**Ann Nutr Metab. 2007;51(3):277-80.**  
**Predictors of incident diabetes mellitus in Basrah, Iraq.**  
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**BACKGROUND:** New-onset diabetes was associated with a 90% increase in risk of all-cause mortality and a 120% increase in risk of cardiovascular mortality compared with study participants without diabetes. The aim of this study was to study prospectively the predictors of incident diabetes mellitus in Basrah, Iraq, with special emphasis on predictive performance of the four anthropometric variables of obesity, namely body mass index (BMI), waist circumference (WC), waist-to-hip ratio (WHpR) or waist-to-height ratio (WHtR). **MATERIAL AND METHODS:**

A total of 13,730 subjects (7,101 males and 6,629 females) diabetes-free at baseline were followed for a mean of 5 years (January 2001 to end of December 2006). **RESULTS:** There were 935 (6.80%) cases of incident diabetes (513 males and 422 females). All anthropometric indices (BMI, WC, WHpR, WHtR) were higher among those with incident diabetes ( $p < 0.001$ ). In both sexes, WHpR has the strongest associations with incident diabetes that was gender-insensitive (AUC = 0.74 in males and 0.72 in females) followed by WC and then BMI which has the weakest association with incident diabetes. On multivariable logistic regression, only hypertension (OR 1.66; 95% CI 1.41-1.96;  $p < 0.001$ ) was associated with incident diabetes. All anthropometric indices were significantly associated with incident diabetes except WHtR. There was no association between incident diabetes and gender, age, stroke, and ischemic heart disease.

**CONCLUSION:** In both sexes, WHpR has the strongest associations with incident diabetes, followed by WC then BMI which has the weakest association

with incident diabetes, while WHtR has no association. Hypertension is the only non-anthropometric variable associated with incident diabetes

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**Acta Obstet Gynecol Scand. 2007;86(7):805-13.**

**Utilisation of antenatal care by country of birth in a multi-ethnic population: a four-year community-based study in Malmö, Sweden.**

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**BACKGROUND:** The aim of this study was to investigate differences in use of antenatal care in a multi-ethnic population in Malmö, Sweden, over a 4-year period. Age, parity, cohabiting status, use of an interpreter, and tobacco-use were examined to assess the potential effects of confounding factors. **METHODS:** A 4-year (2000-2003) retrospective community-based register study was performed. Low-risk singleton pregnancies (n=5,373) registered for antenatal care at 5 municipal clinics and at the delivery ward at Malmö University Hospital were included, and divided into 6 subgroups by country of origin. The odds for utilisation of antenatal care were analysed by means of logistic regression.

**RESULTS:** Significantly increased odds of lower utilisation of planned antenatal care were found among some groups of foreign-born women. Women born in Eastern and Southern Europe, Iraq and Lebanon, and Asia had fewer antenatal visits than recommended, and all foreign-born women (except for women born in Iraq and Lebanon, and South and

Central America) had a late first visit compared to Swedish-born women. Foreign-born women had, in general, fewer unplanned visits to a physician at the delivery ward, but women originating from Asia, Iraq and Lebanon, and Africa had higher utilisation visits to midwives at the delivery ward compared to Swedish-born women. **CONCLUSIONS:** Foreign-born women had lower utilisation of planned antenatal care. Approximately 50% of women had higher utilisation of care, by making unplanned visits to the delivery ward. This puts strain on both economical as well as staff resources. The delivery clinic at the hospital level is not intended to handle routine visits, and, moreover, some of these women do not receive the full benefits of planned routine antenatal care.

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**Dermatol Online J. 2006 Dec 10;12(7):2.**

**Lactic acid 5 percent mouthwash is an effective mode of therapy in treatment of recurrent aphthous ulcerations.**

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**BACKGROUND:** Recurrent aphthous ulcerations (RAU) are the most common oral mucosal disease among the general population including in Iraq. There is no uniformly effective therapy for this disease.

**OBJECTIVE:** To evaluate the therapeutic efficacy and safety of 5-percent lactic acid mouthwash in the

treatment of patients with recurrent aphthous ulcerations.

**METHODS:** This is a single-blind controlled therapeutic study. We recruited 80 subjects with early-onset oral aphthosis from patients who attended Baghdad Teaching Hospital Department of Dermatology and Venereology in the period between April 2004 and April 2005. Of those subjects, 10 defaulted; the remaining 70 patients were divided into two groups, A and B. Subjects in group A (36 patients) were instructed to use 5-percent lactic acid mouthwash, one teaspoonful three times daily before meals. Subjects in group B (34 patients) were instructed to use placebo (distilled water mouthwash) in a similar way. Assessment of each patient of both groups was done by using oral clinical manifestation index (OCMI) before, after 3 days and after 7 days of therapy.

**RESULTS:** The mean of OCMI in group A started to decline after 3 days of therapy and attained statistically significant lower level after 7 days of therapy ( $p < 0.05$ ). The change in the mean OCMI of group B after 3 and 7 days of therapy was also statistically significant ( $p < 0.05$ ). However, the response rate (percentage of change in the mean) after 3 days of therapy in group A was 63.6 percent and in group B was 8.8 percent, and the response rate after 7 days of therapy in group A was 90.8 percent and in group B was 35.7 percent. The difference in the response rates after 3 and 7 days between groups A and B was statistically significant ( $p < 0.05$ ). No significant side effects were noticed apart from mild irritation in two patients using lactic acid.

**CONCLUSIONS:** Lactic acid 5 percent mouthwash is a new effective mode of therapy for patients with RAU and had

significantly reduced the signs and symptoms of the disease, especially when compared with placebo. The mechanism of action may be related to increasing spontaneous secretion of endothelial growth factor from keratinocytes.

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**Transcult Psychiatry. 2007 Mar;44(1):5-26.**

**Reporting questionnaire for children as a screening instrument for child mental health problems in Iraqi Kurdistan.**

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To identify child mental health problems in a mid-sized to large city in Iraqi Kurdistan, the Reporting Questionnaire for Children (RQC), followed by the Child Behaviour Checklist (CBCL) and the Post-traumatic Stress Symptom Checklist for Children (PTSS-C), were administered in interview form to the caregivers of 806 school-aged children. To cover different categories of children, four samples were randomly selected from among the general population ( $n = 201$ ), orphans ( $n = 241$ ), primary medical care patients ( $n = 199$ ), and hospital patients ( $n = 165$ ).

The RQC revealed satisfactory validity against a deviant CBCL cut-off. The screening capacity of the RQC was further supported by its similarity to the CBCL in distribution of problem scores among the four samples and its positive

correlation with the CBCL, but not with the trauma-related PTSS-C. Although the general population showed lower problem scores than the orphans and the two clinical samples, problem scores in all instruments were considerably higher than those reported from other societies. The RQC seems to be useful as a first-stage screening instrument for child mental health problems in Kurdistan.

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**Tenn Med. 2006 Oct;99(10):38-9.**

**Neonatal footdrop.**

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This study included 50 newborns; it was conducted in the Department of Orthopedics in Azady Hospital in Duhok, Kurdistan, Iraq, from June 1998-June 2000. The patients were 26 males (52 percent) and 24 females (48 percent). The loss of movement of the affected foot was detected in the first day after delivery in 15 cases (30 percent), later within the first week in 20 cases (40 percent) and the remaining 15 cases (30 percent) from the second to the fourth week after delivery. The condition was unilateral in 46 cases (92 percent) and bilateral in four cases (eight percent). All the patients were treated conservatively by either immobilization by a back slab of the affected limb or immobilization and physical therapy. Recovery was faster when physiotherapy was implied. All the mothers were educated to avoid two traditional methods of nursing their babies. They were advised not to wrap the newborns tightly and to avoid using the traditional crib (Landek).