

CLINICAL FEATURES OF TEMPOROMANDIBULAR DISORDERS AMONG JORDANIAN CHILDREN

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ABSTRACT

This study was done to record the prevalence of signs and symptoms of temporomandibular disorders (TMD) among Jordanian children, and to compare the results with those from other groups. The data obtained from a questionnaire and physical examination of signs and symptoms of TMD on 2157 randomly selected children who attended to the screening, dental clinics in three hospitals located indifferent geographic. areas in Jordan. The sample was divided into three groups, 527 (251 males, 276 females) with primary, 1076 (522 males, 554 females) with mixed and 554 (272 males. 282 females) with permanent dentition.

The prevalence of TMD signs was found to be (19.1%) and the most common sign of TMD was joint sounds (12.4%). Restricted mouth opening (7.0%) was the second most common sign. Muscle and temporomandibular joint (TMJ) pain as well as deviation upon Jaw opening appeared infrequently.

TMJ sounds were significantly increasing with age ($P < 0.001$). TMD symptoms as reported by the parents were evident in (24.3%) of the returned questionnaires (1338). The most common symptoms were pain on chewing (12.4%) and headache (11.9%). The incidence of headache was found increasing from primary to permanent dentition ($P < 0.001$). No sex difference in the prevalence of any symptom was reported.

The data obtained from the physical examination and questionnaire identified a high prevalence of signs and symptoms of TMD in Jordanian children. It was concluded that the importance of a screening examination for symptoms and signs of TMD should not be overlooked in the clinical assessment of the pediatric patients.

Key words: Signs, symptoms, temporomandibular joint disorders, children.

INTRODUCTION

Temporomandibular disorders have been recognized as a common orofacial pain condition. The American Dental Association in 1983 suggested that the term Temporomandibular disorders (TMD) refers to a group of disorders characterized by pain in the temporomandibular joint (TMJ), the periauricular area, or the muscles of mastication. TMJ may produce sounds during man-

dibular function; and deviations or restriction in mandibular range of motion.¹

The diagnosis and treatment of temporomandibular disorders (TMD) in children and young adults have received increased attention in the past 20 years. A number of epidemiological studies on the prevalence of TMD in children and adolescents have been published from different populations, where the prevalence of TMD varied widely in the literature from 16% in

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children with primary dentition to 90% in children with mixed dentition.²⁻⁶

The prevalence of TMD is still not well known and more studies and comparisons are necessary to allow better understanding of the pathological aspects so as to address effective preventive and therapeutic measures. There is no other study that reported the prevalence of signs and symptoms of TMD among Jordanian children.

The aims of the present study were to record the prevalence of TMD signs and symptoms in Jordanian children at different age groups, and to compare the results with those from other populations.

METHODOLOGY

The subjects were randomly selected from screening dental clinics in three public hospitals in Jordan, namely Prince Ali Bin Al-Hussain Hospital located in Al-Karak city in the south, Marka Medical Center located in Amman in the center, and Prince Rashid Bin Al-Hasan Hospital located in Irbid city in the north of Jordan. The parents and the children were informed regarding the purpose of the study. Children who fulfilled the following criteria were included in the study:

- All children who were Jordanian nationals
- Parental consent to be obtained for the child to participate in the study
- The child to be in good general health
- The child to be cooperative for examination.

A total of 2157 Jordanian children, aged 3-15 years, were examined. Fig 1 shows the distribution of the sample population by their age. The sample was divided into three groups, 527 (251 males, 276 females) with primary teeth, 1076 (522 males, 554 females) with mixed and 554 (272 males, 282 females) with permanent dentition.

Clinical examination

The clinical examination included the following; muscle (temporalis, masseter and sternocleidomastoid) tenderness on palpation, TMJ tenderness during opening and closing, TMJ sounds upon opening, deviation of mandible upon opening and maximum extent of

vertical opening. The muscles and the TMJ were palpated bilaterally with two fingers while the child opened and closed his mouth.

Pain responses, were recorded as 'present or absent'. TMJ sounds were evaluated, during opening, and closing, by palpation and/or audibly with the examiner's ear within 5 cm of the TMJ.⁷ TMJ sounds were recorded as click (single irregularity) or crepitua (multiple irregularities).⁸ Deviation during opening of more than 2 mm to the right or left of an imaginary vertical line when the mandible had reached approximately half of its vertical opening was considered a positive finding.

The movement was repeated several times for confirmation. Maximal opening was measured, using a Boley gauge, from maxillary to mandibular central incisor edges adjacent to the dental midlines.

The patient was asked to open as wide as possible and the measurement was recorded. The overbite measurement was added to the maximum incisal distance to obtain the value for maximum vertical opening.

The measurement was performed twice and the highest value was recorded. The lower limit for normal mouth opening was considered to be 35 mm for children with primary dentition⁵ and 40 mm for children with mixed and permanent dentition.⁹

Any child with one or more positive findings either in the muscles, TMJ or at opening was categorized as having signs of TMD.

The parents were requested to answer questionnaire concerning history of acute pain in the periauricular area during chewing, difficulty in mouth opening, hearing TMJ noises, frequent headache (at least one to two times per week) and jaw lock.

SPSS statistical package (ver.11) was used. The frequency and forms of appearances of TMD signs and symptoms were analyzed regarding the total number of subjects, for females and males separately.

Differences between frequencies were tested using Pearson chi-square statistic and complemented with Fisher's exact test when expected values were <5. The level of significance was set at $P < 0.05$.

TABLE 1: DISTRIBUTION OF TMJ SIGNS ACCORDING TO SEX AND DENTAL AGE

	Primary Dentition			Mixed Dentition			Permanent Dentition			Total	P-value**
	Male	Total	P-value*	Male	Female	Total	Male	Female	Total		
	N=(%)	N=(%)	N=(%)	N=(%)	N=(%)	N=(%)	N=(%)	N=(%)	N=(%)		
TMJ sounds	23(9.2)	27(9.8)	50(9.5)	80(15.3)	89(16.1)	169(15.7)	22(8.9)	27(9.5)	49(8.5)	268(12.4)	<0.001
Muscle Tenderness	12(4.8)	14(5)	26(4.9)	13(2.4)	15(2.7)	28(2.6)	4(1.4)	13(4.6)	17(3.10)	71(3.2)	NS
TMJ Tenderness	9(3.6)	10(3.6)	19(3.6)	22(4.2)	19(5.2)	41(3.8)	8(2.9)	10(3.5)	18(3.2)	78(3.6)	NS
Restricted Opening	11(4.4)	13(4.7)	24(4.6)	49(9.4)	48(8.7)	97(9.0)	12(4.4)	19(6.7)	31(5.6)	152(7.0)	NS
Deviation	11(4.4)	10(3.6)	21(4)	26(5.0)	31(5.6)	57(5.3)	7(2.6)	7(2.4)	14(2.5)	92(4.7)	NS
At Least One Sign	34(13.7)	40(14.5)	74(14)	112(21.5)	119(21.4)	231(21.5)	47(17.3)	61(21.7)	108(19.5)	413(19.1)	<0.05

*P-value of difference between sexes

**P-value of difference between age groups

N = number of subjects

ns = Not significant (Pvalue >0.05)

TABLE 2: DISTRIBUTION OF TMJ SYMPTOMS ACCORDING TO SEX AND DENTAL AGE

	Primary Dentition			Mixed Dentition			Permanent Dentition			Total sample	P-value**
	Male	Female	Total	Male	Female	Total	Male	Female	Total		
	N=(%)	N=(%)	N=(%)	N=(%)	N=(%)	N=(%)	N=(%)	N=(%)	N=(%)		
Pain on Chewing	18(10.5)	25(13.7)	43(12.2)	22(7.6)	53(14.1)	75(11.3)	1(4.9)	42(23.6)	19(15.3)	167(12.4)	ns
Headache	3(1.7)	7(1.9)	10(1.9)	13(4.5)	47(12.5)	60(9.1)	23(16.1)	66(37.1)	89(27.7)	159(11.9)	<0.00`
Opening Difficulty	6(3.5)	11(6.0)	17(4.8)	4(1.4)	5(1.3)	9(1.4)	3(2.1)	5(2.8)	8(2.5)	34(2.5)	ns
Hearing TMJ Noises	2(1.2)	2(1.1)	4(1.1)	0(2.1)	8(2.1)	14(2.1)	1(4.5)	10(5.6)	17(5.3)	35(2.6)	ns
Locking of the jaws	0(0.0)	1(0.5)	1(0.28)	2(0.59)	2(0.53)	4(0.6)	1(0.70)	0(0.0)	1(0.31)	6(0.45)	ns
At least one symptom	17(9.9)	26(14.3)	43(12.2)	63(21.9)	92(24.5)	155(23.3)	51(35.7)	76(43.7)	127(39.6)	315(24.3)	<0.05

**P-value of difference between age groups

N = number of subjects

ns = Not significant (Pvalue >0.05)

TABLE 3: PREVALENCE (%) OF SIGNS AND SYMPTOMS OF TMD IN DIFFERENT EPIDEMIOLOGICAL STUDIES ON CHILDREN AND ADOLESCENTS

Investigator	Popula- tion	Sample size	Subjects			Signs%	Symptoms%
			Females	Males	Age		
Nilner 1981 ²	Sweden	44.0	218	222	7-14	64	36
Egermark-Eriksson 1982 ³	Sweden	131	61	70	11	46	67
Gazit et al 1985 ¹⁶	Israel	369	181	181	10-18	44	56
Ogura et al 1985 ¹⁹	Japan	2198	1103	1095	10-18	9.8	
Dibbets 1985 ¹²	Holland	165	94	71	7-19	21	19
Motegi et al 1992 ¹⁸	Japan	7337	4118	3219	6-18	12.2	12.2
Deng et al 1995 ¹³	China	63.4	326	308	12-15	21.9	—
Al Amoudi et al 1998 ⁶	S Arabia	502	267	235	3-7	16.5	—
Farsi N 1999 ¹⁷	S Arabia	696	—	—	6-14	17.1	14.1
Farsi N 1999 ¹⁰	S Arabia	734	420	314	3-15	20.7	24.2
Present study	Jordan	2157	1054	1112	3-15	19.1	24.3

RESULTS

The prevalence of the different signs of TMD in the different dental age groups is shown in Table 1. TMJ sounds were the most frequent sign in the total sample found in 268 children (12.4%), while muscle tenderness was the least frequent sign as it was registered in only 71 children (3.2%).

A total of 413 children (19.1%) had at least one sign of TMD. Regarding sex differences, the presence of joint sounds was significantly higher in females than males in children with permanent dentition ($P < 0.05$).

This difference was not significant in the other two age groups. There was no difference between sexes in frequency of muscle tenderness in any age group.

Pain in TMJ was significantly higher among females than males in the permanent dentition group. Among children with permanent dentition the frequency of jaw restriction upon opening muscle tenderness, and the presence of at least one sign were significantly higher in females than males ($P < 0.05$).

Regarding dental age difference, TMJ sounds and the presence of at least one sign was considered significant increase in prevalence from primary to permanent dentition stage ($P < 0.001$ and $P < 0.05$ respectively).

Out of 2157 parents, a total of 1338 parents returned the questionnaires giving a response rate of

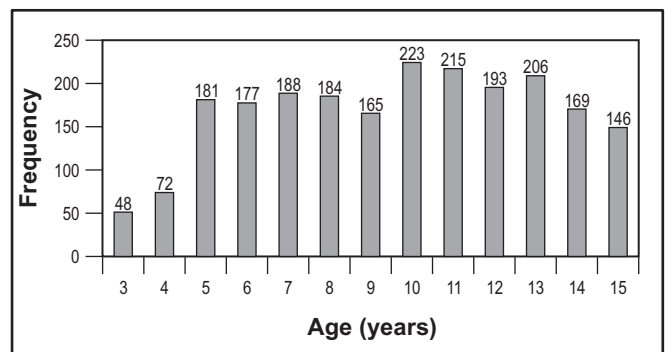


Fig 1: Distribution of the sample by age and gender

62%. Table 2 presents the frequency distribution of different symptoms of TMD according to parent's responses to questionnaire. Prevalence of frequent pain in chewing was the highest among symptoms of TMD. It was reported by 167 (12.4%) children. The lowest prevalence was locking of the jaws which were found in 6 (0.45%) children. While sex was not a significant factor in the prevalence of symptom of TMD dental age seemed to have a significant relation. Headache and the presence of at least one symptom were reported in significantly higher frequency during permanent than in the primary or mixed dentition stage with P values of 0.001 and < 0.05 , respectively.

DISCUSSION

Table 3 shows some of studies about the prevalence of TMD in children that have been published in different parts of the world. The aim of this study was to

evaluate the prevalence of signs and symptoms of TMD in Jordanian school children through clinical examination and subjective data obtained from questionnaires and compare the findings with other and international studies. The present study has shown that the prevalence of clinical signs and symptoms was 19.1% and 24.3% respectively, with females statistically higher than males. These results are in agreement with similar results reported by some investigators.¹⁰⁻¹³ Also, the present results were lower than some previously reported studies^{14,15,16} but slightly higher than others.^{16,17,19}

Although the disagreement might reflect differences between the samples, which are taken from populations with different racial, social and cultural features, it may also be attributed to differences in the study methodology.

In accordance to previous studies in children at different age groups^{2,3,14}, the prevalence of TMJ sounds seems to be increasing from primary to permanent dentition stage. This could be attributed to the longer duration of muscle tension among older age groups, causing intracapsular changes and consequently TMJ sounds. Some clinicians suggested muscles disorders may precede joint problem.²⁰

In addition, the state of development of the dentition might contribute to the relatively frequent occurrence of TMJ sounds in mixed and permanent dentition.

The high frequencies of occlusal interferences and occlusal instability reported by Malmgren²¹ during mixed and early permanent dentition support the previous assumption.

The next common single sign was restricted opening. It was found in 7.0% of the children. The maximum mouth opening of 35 mm was reported to be the acceptable minimum limit in children.^{5,16} Mouth opening of less than 40 mm was considered as restricted opening by others^{3,9} when they used 40 mm as a cut point for normal limit of mouth opening and found that 10% of children at 7 years old had restricted opening.

While in the same study, when 3% mm was considered as minimum limit, only 1% of the children were found having restricted opening. In the present study,

the cut point for normal limit of mouth opening for young children with primary dentition was 35 mm. Meanwhile, 40 mm was used for children with mixed and permanent dentition. Present result showed no significant differences in prevalence of restricted opening among the different dentition groups.

TMD signs were higher among females than males. This is in accordance with the results of previous studies.^{3,22,23} Differences in the physical build and possible greater social pressure could account for this sex difference.

24.3% of the children had at least one TMD symptom with the highest frequency of 39.6% being among children with permanent dentition. This result is in accordance to the one reported by Abdel-Hakim, Alsalem and Khan (1996) who found 32% of their Saudi adolescents participants had at least one dysfunction symptom.²⁴

The prevalence of pain in chewing was the most frequent symptom. It was reported by 12.4% of the parents. This result is similar to what is reported by Esposito et al, 2000²² which found the muscular pain as the most common symptom followed by headache as the next most common. Headache was significantly increasing with age. A possible explanation is that the changes in headache pattern may occur in older age group because of hormonal changes.

The result regarding the prevalence of TMD symptoms, not being lower in males than females, is similar to Widmalm et al.⁵ He found only slight difference in distribution observed between the sexes but strong difference between races. Present results are contrary to other reports who found higher prevalence of symptoms among females.^{3,22}

CONCLUSIONS

The data obtained from the physical examination and questionnaire identified a high prevalence of signs and symptoms of TMD in Jordanian children.

The TMD signs were found in 19% of the Jordanian children with TMJ sounds as the most common. The TMD symptoms were reported by 24.3% of the parents with pain on chewing as the most common symptom.

Further study is required to evaluate the prevalence of signs and symptoms at TMD in older age groups among Jordanian population.

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