

Prevalence of Temporomandibular Disorders: Samples Taken From Attendees of Medical Health-Care Centers in the Islamic Republic of Iran

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***Aims:** To determine the prevalence of facial pain and temporomandibular disorders (TMD) in people located in urban and rural areas in a newly industrialized country (Iran). **Methods:** Two-hundred twenty-three subjects between 18 and 65 years of age (mean: 32.07; SD: 10.83) were randomly selected from an urban area and a rural area. One-hundred nineteen subjects from Mashhad (major city) and 104 subjects from Zoshk (village) were voluntarily recruited from medical health-care centers. Subjects who consulted the health-care center for dental, ear, nose, or throat issues were excluded. The monitoring of public health attendance of all citizens at designated health-care centers is compulsory by local law. All subjects were examined in accordance with the Research Diagnostic Criteria for TMD (RDC/TMD). Facial pain was assessed by using a questionnaire; the prevalence of myofascial pain, disc displacement, and degenerative disorders was determined by clinical examination. Nonparametric tests were used to assess group differences (ie, between village and city). **Results:** Subjects in urban areas suffered less from facial pain (20.2% versus 46.2%; $P < .01$ [Mann-Whitney U test]) than subjects in rural areas. The frequency of TMD, disc displacement, and degenerative disorders was greater in the rural area. **Conclusion:** The symptoms under investigation were significantly more widespread in rural than in urban areas. With regard to TMD per se, the place of residence appears to be unimportant. However, the rural population was significantly affected by facial pain. J OROFAC PAIN 2010;24:361–366*

Key words: degenerative disorders, disc displacement, facial pain, myofascial pain, prevalence

Temporomandibular disorders (TMD) is an overarching term embracing several clinical problems that involve the masticatory musculature, the temporomandibular joints, and/or associated structures.¹ A comprehensive approach to solve the problem of lack of standardization was made with the introduction of the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD). The prevalence of TMD has been extensively researched in accordance with RDC/TMD² both in Europe and the United States. Much less information is available about TMD in the Middle East, since the data were obtained by nonstandardized examination.^{3,4} It seems doubtful whether previously obtained results concerning the prevalence of TMD in highly-developed countries are transferable to developing countries where different health and living conditions prevail.

This study was performed to obtain and assess data on the prevalence of facial pain and TMD in a newly industrialized country in

the Middle East (Iran). This was done by applying the RDC/TMD for the first time in a research study in this country.

The hypothesis was, first, that the population in urban areas suffers more facial pain and TMD than that in rural areas and, second, that these ailments are more prevalent in developing than industrialized countries. This pilot study sought, for the first time, to obtain an initial evaluation of the prevalence and distribution of TMD in such a population.

Materials and Methods

This study was conducted in Iran in rural and urban areas with the same cultural background but different economical and social developments. In this country, daily life in rural areas corresponds very much to the conditions of life in a village in the western world at the beginning of the twentieth century. This is very much in contrast with the conditions of life in urban areas where western standards of life prevail.

The research project was approved by the Ethics Commission of the University of Heidelberg, the Islamic Azad University of Mashhad, and the authorities of the health clinics. Data were collected with the consent of the subjects. Urban subjects were recruited from six health-care centers/bases in Mashhad (2.1 million inhabitants) randomly chosen by lot. Subjects were eligible for inclusion in the study only if they were between 18 and 65 years of age. At each clinic, adults who arrived first on the day of the investigation were asked to participate. The random selection from the rural area was from the village of Zoshk. This village is located approximately 100 km west of Mashhad. The village of Zoshk has its own health-care base. It was impossible to examine equal numbers of men and women because of practical problems: Men were at work in the fields or guarding their domestic animals, so most were unavailable for examination. From each clinic, five men and 15 women were recruited. On average, four to six subjects were examined daily. In total, 120 unrelated subjects were selected for each part of the study. The sample size was not determined by the authors, but limited by the authorities in charge. Also, to ensure comparability of both parts of the study, only 75% of women and 25% of men were examined in urban areas. It should be noted that the health centers provide not only curative but also preventive services, and all inhabitants are required to visit the health center. All residents are compelled by local law to register with the relevant health-care center or the nearest subordinate health base and to report annually for a health

check. Thus, both sick and healthy people participated in the study, but people who came for dental or ear, nose, or throat indications were excluded from the study.

All subjects had a dental examination, including occlusal report and dmft-index, and were examined for TMD by using the RDC/TMD Axis I and Axis II procedure. A high rate of illiterate persons participated in rural areas and had to be interviewed, forestalling anonymity. It seems appropriate to assume that the data thus obtained are not unbiased. Therefore, the psychosocial screening was not evaluated in this study.

Examination of TMD was performed by an examiner who was a native speaker of Farsi and was calibrated by use of a gold-standard. The translation procedure was performed according to the guidelines laid down by the RDC/TMD. The exact RDC/TMD diagnostic algorithms were used, and further explicit details can be gathered from the literature.⁵

Statistical analysis was performed with SPSS version 14.0. Descriptive statistics were used to analyze the sociodemographic data and other clinical data. For pairwise comparison of the rural and the urban environments, a nonparametric test was used (Mann-Whitney *U* test). A logistic regression analysis was performed to assess the influence of potential risk factors in the occurrence of TMD.

Results

Sufficient and comprehensible data were collected from 119 of the 120 subjects in the urban area and from 104 of the 120 subjects in the rural area. The subjects in the urban area were between 18 and 64 years of age, with a mean (\pm SD) age of 33.68 ± 10.31 ; in the rural area, subjects were between 18 and 65 years of age, with a mean age of 29.86 ± 10.89 . Mean age of all 223 subjects was 32.07 ± 10.83 . The distribution between the sexes in the urban and rural populations was almost identical, with three-quarters being female and one quarter male.

The sociodemographics of the subjects under review, for both the urban and rural populations, are presented in Table 1. The extremely low number of subjects having attained a higher level of education in the rural area is noteworthy. The only major difference in marital status was that a significantly greater number of married spouses were living outside of the household in the urban area. An approximate comparison of income shows the urban population in almost all income brackets was earning approximately twice as much as the rural

Table 1 Sociodemographics of the Study Population

Characteristics	Urban (n = 119)	Rural (n = 104)	Level of significance
Sex			
Female	90 (75.6%)	81 (77.9%)	<i>P</i> = .69
Male	29 (24.4%)	23 (22.1%)	
Education			
Less than secondary school completed	49 (41.2%)	90 (86.5%)	<i>P</i> < .01
Secondary school completed	33 (27.7%)	13 (12.5%)	
Some university or other postsecondary school education	37 (31.1%)	1 (1.0%)	
Marital status			
Never married	19 (16.0%)	22 (21.2%)	<i>P</i> = .07
Married, spouse in household	68 (57.1%)	73 (70.2%)	
Married, spouse not in household	25 (21.0%)	7 (6.7%)	
Widowed/divorced/separated	7 (5.9%)	2 (1.9%)	
Income (1\$ = 926 Touman)			
0 to 120,000	44 (43.1%)	79 (80.6%)	<i>P</i> < .01
121,000 to 200,000	31 (30.4%)	12 (12.2%)	
201,000 to 280,000	14 (13.7%)	1 (1.0%)	
281,000 to 400,000	12 (11.8%)	6 (6.2%)	
Missing	1 (1.0%)	0 (0%)	

P values are based on Mann-Whitney *U* tests. Missing = subjects who participated but did not submit complete data.

one. That the numbers in the lowest income bracket were reversed proves the majority of the rural population to be among the least affluent.

The results of the survey on the prevalence of joint sounds on mandibular movement showed no noteworthy differences. (Joint sounds on opening: 26.9% urban versus 26% rural; joint sound on closing: 22.7% urban versus 26.9% rural; joint sound on any excursive movement: 29.3% urban versus 30.8% rural).

However, examination of muscle pain palpation on the right side of the face revealed that far fewer subjects in the rural area felt no pain (63.9% urban versus 49% rural). The number feeling pain on three (3.4% urban versus 6.7% rural) or more palpations (5.9% urban versus 11.5% rural) was greater in the rural area. The findings for the left side of the face were similar, except pain felt on more than three palpations was five times greater in rural areas (1.7% urban versus 9.7% rural). Congruent with the aforementioned findings, fewer than 10% of the subjects felt pain on the pole on the lateral and/or posterior side of the condyle; this occurrence was predominantly noted in the rural area (6.7% urban versus 12.4% rural).

Data gained by examination in accordance with the RDC/TMD are summarized in Table 2. As is apparent from the Table, subjects in the rural area claimed to suffer slightly more from myofascial pain, but the difference between rural and urban subjects was not significant (*P* = .23 [Mann-Whitney *U* test]).

The higher prevalence of all afflictions tends to suggest that the population in the rural area suffers more from TMD. Facial pain was ascertained by using a questionnaire. Of the subjects examined in the urban area, 20.2% claimed to suffer from facial pain. In the rural area, the figure was 46.2%, more than twice as high (*P* < .001 [Mann-Whitney *U* test]) as in the urban area.

The total prevalence of myofascial pain (9.9%) and its correlation with occlusal risk factors has been reported elsewhere.⁶

Tables 3 and 4 display the occurrence of myofascial pain, disc displacement, degenerative disorders, and TMD divided into age groups and areas of habitation. All age groups under 55 in the urban area showed a high prevalence of these disorders with the exception of disc displacement where the age group of 55 to 65 was most affected.

Table 2 Summary of Data Obtained from Examination in Accordance with the RDC/TMD

RDC/TMD diagnosis and self-reported facial pain	Urban (n = 119)	Rural (n = 104)	Level of significance
a) Myofascial pain			
No myofascial pain	109 (91.6%)	91 (87.5%)	<i>P</i> = .23
Myofascial pain	9 (7.6%)	13 (12.5%)	
Missing	1 (0.8%)	0 (0%)	
b) Disc displacement			
No anterior disc displacement	107 (89.9%)	90 (86.5%)	<i>P</i> = .43
Anterior disc displacement	10 (8.4%)	12 (11.5%)	
Missing	2 (1.7%)	2 (2.0%)	
c) Arthralgia, arthritis, arthrosis			
No arthralgia, arthritis, arthrosis	105 (88.2%)	86 (82.7%)	<i>P</i> = .23
Arthralgia, arthritis, arthrosis	12 (10.1%)	16 (15.4%)	
Missing	2 (1.7%)	2 (1.9%)	
d) TMD			
No TMD	88 (73.9%)	69 (66.4%)	<i>P</i> = .22
TMD	29 (24.4%)	33 (31.7%)	
Missing	2 (1.7%)	2 (1.9%)	
e) Facial pain			
No face pain	95 (79.8%)	56 (53.8%)	<i>P</i> < .01
Face pain	24 (20.2%)	48 (46.2%)	

P values are based on Mann-Whitney *U* tests. Missing = subjects who participated but did not submit complete data.

Table 3 Summary of Data Obtained from Examination in Accordance with the RDC/TMD Presented by Age Group for Urban Area

RDC/TMD diagnosis urban (n = 119)	Age				
	≤ 24	25 to 34	35 to 44	45 to 54	55 to 65
a) Myofascial pain					
No myofascial pain	21 (87.5%)	39 (95.2%)	35 (87.5%)	8 (100%)	6 (100%)
Myofascial pain	3 (12.5%)	1 (2.4%)	5 (12.5%)	0 (0.0%)	0 (0.0%)
Missing	0 (0.0%)	1 (2.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
b) Disc displacement					
No anterior disc displacement	23 (95.8%)	37 (90.3%)	34 (85.0%)	8 (100%)	5 (83.3%)
Anterior disc displacement	1 (4.2%)	3 (7.3%)	5 (12.5%)	0 (0.0%)	1 (16.7%)
Missing	0 (0.0%)	1 (2.4%)	1 (2.5%)	0 (0.0%)	0 (0.0%)
c) Arthralgia, arthritis, arthrosis					
No arthralgia, arthritis, arthrosis	29 (96.7%)	35 (85.4%)	34 (85.0%)	7 (87.5%)	6 (100%)
Arthralgia, arthritis, arthrosis	1 (3.3%)	5 (12.2%)	5 (12.5%)	1 (12.5%)	0 (0.0%)
Missing	0 (0.0%)	1 (2.4%)	1 (2.5%)	0 (0.0%)	0 (0.0%)
d) TMD					
No TMD	20 (83.3%)	31 (75.6%)	25 (62.5%)	7 (87.5%)	5 (83.3%)
TMD	4 (16.7%)	9 (22.0%)	14 (35.0%)	1 (12.5%)	1 (16.7%)
Missing	0 (0.0%)	1 (2.4%)	1 (2.5%)	0 (0.0%)	0 (0.0%)

Missing = subjects who participated but did not submit complete data.

Table 4 Summary of Data Obtained from Examination in Accordance with the RDC/TMD Presented by Age Group for Rural Area

RDC/TMD diagnosis rural (n = 104)	Age				
	≤ 24	25 to 34	35 to 44	45 to 54	55 to 65
a) Myofascial pain					
No myofascial pain	42 (93.3%)	26 (83.9%)	16 (88.9%)	5 (100%)	2 (40%)
Myofascial pain	3 (6.7%)	5 (16.1%)	2 (11.1%)	0 (0%)	3 (60%)
Missing	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
b) Disc displacement					
No anterior disc displacement	39 (86.7%)	29 (93.5%)	16 (89.0%)	4 (80%)	2 (40%)
Anterior disc displacement	5 (11.1%)	2 (6.5%)	1 (5.5%)	1 (20%)	3 (60%)
Missing	1 (2.2%)	0 (0%)	1 (5.5%)	0 (0%)	0 (0%)
c) Arthralgia, arthritis, arthrosis					
No arthralgia, arthritis, arthrosis	35 (77.8%)	28 (90.3%)	15 (83.4%)	4 (80%)	4 (80%)
Arthralgia, arthritis, arthrosis	9 (20.0%)	3 (9.7%)	2 (11.1%)	1 (20%)	1 (20%)
Missing	1 (2.2%)	0 (0%)	1 (5.5%)	0 (0%)	0 (0%)
d) TMD					
No TMD	31 (68.9%)	22 (71.0%)	13 (72.3%)	3 (60%)	0 (0%)
TMD	13 (28.9%)	9 (29.0%)	4 (22.2%)	2 (40%)	5 (100%)
Missing	1 (2.2%)	0 (0%)	1 (5.5%)	0 (0%)	0 (0%)

Missing = subjects who participated but did not submit complete data.

Contrary to the urban subjects, the rural subjects showed a high prevalence of all disorders in the age group of 55 to 65.

Within the framework of a logistic regression analysis, the influence of potential risk factors such as education, gender, health in general, and environment involved in the occurrence of TMD was evaluated. Gender was only slightly short of being regarded as significant ($P = .054$). The Odds Ratio of 2.28 shows that gender plays an important role in being affected by TMD and that the risk for women was 2.2 times higher.

It appears that the risk of being affected by TMD diminished in accordance with the level of education ($P = .003$; odds ratio: 0.896). Considering the odds ratio to be slightly lower than 1, its influence on the results of this study can be neglected.

Discussion

As far as the authors are aware, this is the first study evaluating the prevalence of TMD and facial pain in an Indo-Germanic population by use of the RDC/

TMD. Contrary to their expectation, the study revealed that the population in a rural area suffers significantly more from facial pain than the population in an urban area, not vice versa. Myofascial pain may be slightly more prevalent in the rural area.

The results of the study are in contrast with those of the study by Goddard et al.⁷ Their study, conducted in rural and urban areas in a native-American population, contrast with the present findings, maybe for the reasons that subjects examined were undergoing dental treatment at the time of the study and that the age of their subjects differed widely from those of the present study. In a study by Chung et al,⁸ rural living was associated with a higher pain intensity than living in an urban area ($P = .022$). Once again, the age group under study differed. In another study conducted by Macfarlane et al⁹ in the United Kingdom, the findings were almost entirely consistent with those in the present study with regard to the urban area. In this cross-sectional study, it was found that the overall prevalence of orofacial pain was 26% and that the prevalence was higher in women and younger age groups; however, there was no differentiation between subjects residing in

rural and urban areas. Although cultural¹⁰ differences have been of significant importance in other studies, no divergence was found between the two groups examined.

One of the objectives of the present study was to have the process of randomization perfectly executed. However, country-specific circumstances had to be dealt with, which may have somewhat impaired representativeness.

In judging the findings of the present study, one must make allowances for the high proportion of women examined; the extent to which this distorted the findings remains unclear, although numerous other studies have reported that TMD and facial pain are frequently more prevalent in women than in men.⁸ The logistic regression analysis revealed that females were affected by TMD 2.2 times more often than men. Whether the level of education has any influence on the prevalence of TMD remains to be investigated.

With increasing age, the occurrence of facial and myofascial pain seems to diminish.^{11,12} These results are confirmed by the figures obtained in the urban area but not in the rural area. In the National Oral Health Survey in Spain in 1994,¹³ it was demonstrated that the limitation of oral aperture and pain in turn increased from 15 years to 44 years and decreased for subjects aged 56 to 74 years. Because there was only a limited number ($n = 5$) of participants in the rural area in the age group of 55 to 65 years in the present study, the results obtained may not be representative and may be coincidental.

White et al¹⁴ claimed that patients under financial strain suffer more from TMD than those who were affluent. As was to be expected, the findings of the present study revealed that the urban population enjoyed a much larger income but the prevalence of TMD in this group was not significantly greater than that of the rural group.

Conclusions

This is the first survey of a sample in a newly industrialized country to evaluate the prevalence of facial and myofascial pain, disc displacement, and degenerative disorders based on standardized examination and questionnaires. The survey revealed that the occurrence of facial pain was significantly greater in the rural area. The place of residence seems to have no effect on the prevalence of TMD per se.

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