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The impact of dysfunctional severity on general quality of life in patients with temporomandibular disorders

Leila Khojastepour[1], Abdolaziz Haghnegahdar[1], Mehrdad Vossoughi[2], Mahsa Sabet[3], Mohammad Mahjoorighasrodashti[4], Farzaneh Ahrari[5*]

DDS, MS, Department of Oral and Maxillofacial Radiology, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran[1]
MS, Oral and Dental Disease Research Center, Department of Dental Public Health, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran[2]
Undergraduate Student, Student Research Committee, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran[3]
DDS, Private Practice, Shiraz, Iran[4]
DDS, MS, Dental Research Center, School of Dentistry, Mashhad University of Medical Sciences, Mashhad, Iran[5]

Corresponding author: 5*

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ABSTRACT

Temporomandibular disorders (TMDs) are associated with pain and dysfunction that can affect the quality of life. This study was designed to evaluate the import of dysfunctional severity on the quality of life in TMD patients. This case-control study involved 60 TMD and 60 non-TMD subjects. The Helkimo dysfunction index was used for classifying the TMD patients into mild, moderate and severe groups (n=20). The quality of life (QoL) was assessed using the World Health Organization Quality of Life-Brief Version Questionnaire (WHOQOL-BREF) in the control and different TMD classifications. The data were analyzed by one-way analysis of variance (ANOVA) and Tukey post hoc test. There was no significant difference in the scores of physical, psychological, social and environmental subscales among the four groups (P>0.05), but a significant between-group difference was noted in the overall subscale (P=0.003). Tukey test revealed that the mean overall subscale score in the severe group (49.37± 18.35) was significantly lower than that of the mild group (66.06± 17.97). Although QoL was lower in moderate and severe TMDs than mild cases and the control group, but the statistical difference between groups was only observed in the overall subscale. These data indicate that other factors than the severity of TMD could play a role in QoL of affected patients.

1. INTRODUCTION

Temporomandibular disorders (TMDs) are a group of pathologic conditions affecting masticatory muscles, and/or temporomandibular joints (TMJs). Pain around TMJ, muscle tenderness, restricted mandibular

movement, and joint sounds (such as clicking) are the most prevalent complaints in patients with TMD [1]. TMD is more prevalent in females than males [2], [3]. Occlusal discrepancies and psychological factors such as depression and stress have traditionally been considered as the major culprit for TMJ dysfunction, although social parameters have later been involved in the disease etiology [3- 5]. According to the definition of World Health Organization (WHO, 1948), health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" [6]. This concept regards health as a multidimensional construct, into which, physical capacities and emotional and social well-being are incorporated. Quality of life (QoL) has been defined as "the perception of individuals about their position in life in the context of culture and value systems they live, and in relation to their goals, expectations, standards and concerns" (WHO, 1995) [7]. QoL is now accepted as a reliable parameter in patient assessment in nearly all areas of physical and mental healthcare, including oral health. Pain is the major symptom of TMJ dysfunction, [8] and TMD has been regarded as the most common reason for non-dental pain in the orofacial area [9- 11]. When pain lasts for a long period, it may have a severe impact on the psychological well-being, and Oral Health Related Quality of Life (OHRQoL) [12- 19]. In addition to pain, the functional disability associated with TMD may pose a negative effect on general health and quality of life [20], [18]. Therefore, TMD patients are a target population for QoL assessments, [21], [15] and the information in this field can guide and modify the course of treatment in affected individuals. Several studies exhibited that QoL was markedly impaired affected in TMD patients [22], [3], [23], [2], [20], [24]. According to the authors' knowledge, there is little information concerning how the severity of dysfunction affects the QoL in TMD patients. The Helkimo index (Di) was developed in 1974, and is a tool to assess the severity of dysfunction in TMD patients. This index classifies individuals based on 5 basic signs including impaired range of mandibular movement, mandibular deviation during movement, impaired TMJ function, TMJ pain during palpation, and muscular tenderness [25], [26] The present study was designed to measure the effect of TMD severity, as determined by the Helkimo index, on the quality of life of affected patients.

2. Material and Methods

This case-control study involved 60 subjects with different degrees of temporomandibular disorders (TMDs) who referred to the Department of Prosthodontics, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran. Sixty non-TMD volunteers who sought treatment for purposes other than TMD were randomly selected from the same center as the controls. The TMD diagnosis and classification was performed according to the clinical dysfunction component of Helkimo index. This index categorizes the subjects into no TMD, and mild, moderate, and severe TMDs based on their degree of dysfunction. The patient assignment was done by one skilled investigator with more than 10 years of experience in TMD diagnosis and management. Twenty patients in each of the mild, moderate and severe TMDs were included in the study. The subjects who had systemic or autoimmune disorders (such as cancer, diabetes mellitus, rheumatoid arthritis, multiple sclerosis) as well as those with a history of orthodontic treatment or TMJ surgery were excluded from the sample. The exclusion criteria also involved subjects with mental diseases such as psychosis, or anxiety, eating, sleep, or personality disorders. The study protocol was approved by the Ethics Committee of Shiraz University of Medical Sciences. The goals of the study were clearly explained for the participants and informed consent was obtained from all subjects.

For scoring the degree of TMD dysfunction, a modified version of Helkimo index (Di) was calculated (Table 1). The clinical examination included scoring of five signs (opening of mandible, deviation during opening, TMJ dysfunction, pain in the TMJ and preauricular region, and masticatory muscle tenderness). A score of 0 to 5 was assigned for each of the 5 signs and the allocated scores were then summed up. The total score was defined as the Helkimo dysfunction score and ranged from 0 to 25 points. The higher the score, the more severe would be the disorder. Based on the values obtained, the individuals were categorized as

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follows: Di 0 = no dysfunction; Di I (1–4 points) = mild dysfunction; Di II (5–9 points) = moderate dysfunction; Di III (10–25 points) = severe dysfunction

Table 1. Clinical dysfunction component of Helkimo index

	Score 0	Score 1	Score 5
Mandibular opening range	>40 mm	30-39 mm	<30 mm
Mandibular deviation during lowering	<2 mm	2-5 mm	>5 mm
TMJ dysfunction	No impairment	Palpable clicking	Evident clicking, locking, and luxation
TMJ pain	No pain	Palpable pain	Palpebral reflex
Muscle pain	No pain	Palpable pain	Palpebral reflex

TMJ= Temporomandibular joint

Following selection of the case and control groups, the World Health Organization Quality of Life- Brief Version Questionnaire (WHOQOL-BREF) was given to assess how the participants felt about their quality of life, health or other areas of the life. The participants were given no time limit to fill the questionnaires. The WHOQOL-BREF questionnaire has been designed in harmony with the standard criteria and contains 26 questions with the following subscales: [27]

1) Physical health subscale
2) Mental health subscale
3) Social relations subscale
4) Environmental health subscale
5) Overall quality of life and public health

2.1 Scoring the questionnaire

For scoring of the questionnaire, a score of 1 to 5 was assigned to each of the 26 questions. After obtaining the raw scores of each subscale, they were converted to a standard score from 0 to 100. For this purpose the following formula was used:

$$x = \frac{\text{The resulting score of the subscale} - \text{the lowest score of the subscale}}{\text{The difference between the highest and lowest score}} \times 100$$

2.2 Statistical analysis

The sex difference between groups was analyzed by the chi-square test. The score of each subscale was calculated for the control and mild, moderate and severe TMD groups. The difference in the scores of quality of life between the groups was assessed by One-way analysis of variance (ANOVA), followed by Tukey Post hoc test for pairwise comparisons. The data were analyzed by SPSS software (Version 18; SPSS Inc., Chicago, Il, USA) and the significance level was set at $p<0.05$.

3. Results

Sixty TMD and 60 healthy individuals participated in this study. Table 2 presents the gender distribution of the patients in the study groups. The groups were matched regarding the gender distribution of the participants. Table 3 presents the mean and standard deviation (SD) of quality of life scores in the study groups. As represented in Table 2, all subscales achieved lower scores in individuals with moderate and severe TMDs as compared to the mild cases and control group. The statistical analysis revealed no significant difference in the physical, psychological, social and environmental subscales among the four groups (P>0.05), but a significant between-group difference was noted in the overall subscale (P=0.003). Tukey test revealed that the mean overall subscale in the severe group (49.37± 18.35) was significantly lower than that of the mild group (66.06± 17.97). However, the subjects in the moderate TMD and control groups showed comparable scores to both mild and severe TMD cases (P>0.05; Table 3).

Table 2. The gender distribution of the patients in the study groups

Variables	N	Female	Male	P-value
Control	60	38 (63.33%)	22 (36.66%)	0.436
Mild TMD	20	10 (50%)	10 (50%)	
Moderate TMD	20	15 (75%)	5 (25%)	
Severe TMD	20	13 (65%)	7 (35%)	

Table 3. The mean and standard deviation (SD) of quality of life (QoL) subscale scores in the control and mild, moderate and severe TMD groups

QoL Subscales	Control	Mild TMD	Moderate TMD	Severe TMD	P- value*
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Physical	52.84 ± 11.76	53.57 ± 15.15	51.09 ± 11.55	45.89 ± 11.42	0.166
Psychological	55.01 ± 12.2	57.84 ± 15.30	51.76 ± 11.19	48.75 ± 12.39	0.100
Social	53.81 ± 17.73	57.35 ± 20.38	49.35 ± 15.26	52.08 ± 15.73	0.323
Environmental	56.56 ± 16.76	56.98 ± 15.44	47.95 ± 15.61	48.90 ± 15.74	0.157
Overall**	61.01 ± 20.11^{AB}	66.05 ± 17.96^{A}	60.57 ± 20.52^{AB}	49.37 ± 18.35^{B}	0.003*

*P<0.05 indicates a statistically significant difference among the groups

**The groups with different superscript letters in the row showed a significant difference at P<0.05, whereas those with the same letters were statistically comparable.

4. DISCUSSION

The present study evaluated the impact of disease severity on the general quality of life in TMD patients. The Helkimo dysfunction index used in this study is a clinical and easy to recruit method for TMD classification. Other studies employed different criteria to assess the severity of TMD such as the duration of pain, [28]. or the RDC_TMD (research and diagnosis criteria for TMD). [29], [30], [3], [31], [18] For measuring the quality of life, the WHOQOL-BREF questionnaire was recruited. This instrument contains 26 questions divided into 5 domains including physical, psychological, social, environmental and overall QoL. Others employed different instruments such as Short-Form 36 (SF-36) or Oral Health Impact Profile (OHIP). [31], [23] The OHIP questionnaire is more suitable for assessing the effect of oral health on the quality of life, whereas the WHOQoL contains standard questions that are not restricted to oral conditions. The concept of QoL is subdivided into several subscales in WHOQOL-BREF questionnaire. The score of physical health domain implies the degree of individuals' satisfaction with their physical status. Although this score was lowest in severe TMD cases, but the difference between groups was not significant. It seems that TMD patients don't perceive themselves physically impaired by dysfunction, implying that in their opinion temporomandibular dysfunction is not categorized as a disabling condition. Psychological

impairment is a widespread phenomenon among TMD patients and several studies reported that individuals with TMD exhibit greater psychological maladjustment, on average, compared to healthy controls [32], [33]. The psychological domain achieved lower scores in the severe TMD cases, but the difference between groups was not significant. This indicates that other factors such as the personal perception about the health conditions and also cultural experiences are involved in this domain. The social relations and environmental health subscales were lowest in the moderate TMD patients, with no significant difference among the groups. The outcomes of this study revealed that social interactions and environmental health is not significantly affected by the severity of dysfunction, possibly due to the cultural characteristics of the population. The last domain in WHOQOL-BREF questionnaire pertains to the overall quality of life. The findings of this study demonstrated that severe TMD could affect the overall quality of life of the patients. This subscale presented significantly lower scores in individuals with severe TMD as compared to the mild group. Therefore, the pain and functional limitations associated with severe TMD could decrease the satisfaction levels of the patients with life. This can complicate both the assessment and treatment procedures in TMD cases. It appears that the effective treatment of severe TMD is mandatory not only to relieve the signs and symptoms of the disease but also to improve the overall quality of life of the affected subjects.

In the present study, the physical, psychological, social, environmental and overall quality of life was lower in the moderate and severe TMDs than the mild TMD and control groups. Indeed, there was some degree of dissatisfaction with QoL in TMD patients, according to the severity of dysfunction. However, the statistical difference between groups was only found in the overall QoL subscale between mild and severe TMDs. These data imply the efforts of individuals to resist physical, mental and social deterioration. Of course, this effort will be highly dependent upon cultural, social and economic status of the individuals. It appears that other factors than the severity of disease could play a strong role in QoL of TMD patients. Interestingly, the QoL scores in mild TMD cases were similar or even a bit higher than that of the control group in this study. [28] reported that TMD patients with pain complaints existing less than 1 year scored even better than the general population, but with a longer duration of pain, social functioning was significantly affected by reduced physical health. It should be borne in mind that TMDs are generally self-limiting and the progression towards disabling forms is uncommon, thus only the minority of TMD patients seek treatment and a pronounced percentage of mild TMD cases do not refer and are missed [34], [35]. The mild TMD cases who seek specific treatment for dysfunction are probably highly educated and have higher economic conditions and possibilities. These can explain to some part the greater QoL scores observed in the mild TMD group. This issue, however, should be further evaluated in future studies. The outcomes of this study are consistent with several studies that demonstrated the negative impact of TMD on QoL. [22], [3], [23], [2], [20], [24], [2] reported that the OHRQoL was disturbed in TMD patients, particularly in those with psychological impairments. Some studies demonstrated an association between TMD severity and QoL. [36], [29], [37], [38]. [36] revealed significant but weak associations between the number of TMD symptoms and OHRQoL, stress, anxiety and depression. [29] observed a clear correlation between the severity of TMD and impact on quality of life. The systematic review of Dahlström and Carlsson [38] revealed that TMD had a substantial impact on OHRQoL, especially in patients with more signs and symptoms.

However, the present results indicate a significant difference in just one out of the five QoL subscales among the study groups. Although the overall QoL subscale was significantly lower in severe than mild TMD cases, but the physical, psychological, social and environmental health domains were not significantly different among the groups. This contradicts the results several studies that revealed TMD had a negative impact on the quality of life especially regarding the social, psychological and physical aspects of the

individuals [14], [28], [30], [23], [20]. It should be emphasized that the severity of the disease is just one of the factors that affect QoL in TMD patients. Other parameters such as age, gender and type of TMD could also play a role in QoL assessments. Some studies found a gender difference in association between chronic TMD and QOL, so that women's QoL was more affected than men by TMD [39], [40], [17]. In contrast, [29] and Dahlstrom and Carlsson [38] showed that the difference in OHRQoL between men and women was small and not significant. [2] concluded that age and gender did not seem to have a serious effect on OHRQoL. There are some reports that disk displacement brings lower impact on QoL, compared with muscular disorders and osteoarthritis [29], [30]. Indeed patients may gradually adopt themselves with functional limitations to chew and speak. On the other hand, pain in muscle-joint related TMD may increase on some times over the course of disease, causing a deleterious effect on life satisfaction. The limitation of this study was the small sample size in TMD subgroups. According to the outcomes of this study, most QoL subscales were not significantly affected by the severity of dysfunction, but the overall view of the individuals about their lives was noticeably deteriorated in severe cases. This may have some implications in the treatment process of TMD patients. Further studies with standard instruments are warranted to elucidate the effect of dysfunctional severity or type of TMD on the quality of life at the community level.

5. Conclusion

QoL was lower in moderate and severe TMDs than the mild cases and control group. However, the statistical difference between groups was only observed in the overall subscale, so that severe cases revealed lower satisfaction level with life than the mild group. The overall findings of this study indicate that other factors than the severity of TMD could play a strong role in QoL of affected patients.

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