

Comparison for oral health-related quality of life in fibromyalgia subgroups according to fibromyalgia impact questionnaire: A preliminary study

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Abstract

Aim: This study aimed to compare the relationship between the severity of fibromyalgia and oral health-related quality of life in participant subgroups according to the fibromyalgia impact questionnaire.

Materials and Methods: Forty female participants aged 46.18±8.91 years old who were diagnosed with fibromyalgia were included in the study. Demographic data, education status, smoking, systemic anamnesis, employment status was recorded. Decayed, missing and filled teeth index values, periodontal situation and removable prosthesis conditions were evaluated. Participants were asked to fill three self-reported questionnaires: the fibromyalgia impact questionnaire, oral health impact profile-14 and general oral health assessment index scores. Fibromyalgia subgroups were classified as FM-Type I and FM-Type II according to the Souza et al classification. The primary outcome of which relationship between subcategorize of oral health related quality of life indexes and fibromyalgia impact questionnaire values were evaluated with Spearman correlation analysis.

Results: The total value of oral health impact profile-14 was found to be 12.25±9.17 in the FM-Type I group and 19.74±10.48 in the FM-Type II group. There was a statistically significant relationship between fibromyalgia subgroups and oral health impact profile-14 psychological impacts ($p=0.031$) and total values ($p=0.023$). The values of total fibromyalgia impact questionnaire scores were obtained on a wide scale between 34.08 and 93.34, and the mean value was measured as 67.06 ± 16.06. The fibromyalgia impact questionnaire median cut-off score was detected as 66.42 according to ROC analysis.

Conclusion: The higher negative oral health related quality of life values were observed in participants more severely affected by fibromyalgia. In addition to medical and psychiatric treatment of fibromyalgia participants, evaluation of dental conditions may be suggested.

Keywords: Fibromyalgia; oral health; quality of life; surveys and questionnaires

INTRODUCTION

Fibromyalgia syndrome (FM) is a chronic condition characterized by various symptoms, including chronic fatigue, widespread musculoskeletal pain, sleep problems, irritable bowel syndrome, and temporomandibular joint disorders (TMDs). FM is more commonly seen in women and affects 3%–10% of the population, although its etiology has not yet been determined (1-3).

Oral health is considered a multidimensional concept that takes into account both the absence of disease as well

as the impact of one's oral health on their general health and wellbeing in everyday life (4). Oral diseases can affect physical and functional capacity and have significant psychological and sociodemographic effects (5).

The term quality of life (QoL) is defined as the degree of life pleasure that a patient has in life. It is influenced by participants' personal characteristics and situations, including psychological, sociocultural, economic, and environmental (6). Oral and dental health are important in the development of QoL (7). Especially in elderly participants, oral problems and related risk factors

Received: 17.03.2020 **Accepted:** 05.06.2020 **Available online:** 22.04.2021

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increase with the deterioration of systemic health and mental stress. Decreased oral health-related quality of life (OHRQoL) was reported with geriatric individuals with systemic disorders. Oral health cannot only be evaluated with clinical, microbiological, and radiological measurements, but also with the self-reported patient-based satisfaction with treatment (8).

Various indices have been developed to evaluate OHRQoL (9-11). Recent studies have assessed the patient-based relations of oral status with chronic rheumatic and neurological disorders. In a cross-sectional study on rheumatoid participants, the oral condition measurements assessed by the OHIP of participants included in the study were reported to be low (12). A study evaluating oral status in Parkinson's participants has reported them as having more tooth loss, bruxism, dental biofilm, and low periodontal health compared to the control group (13). In a study evaluating OHRQoL in Parkinson's participants, a higher rate of GOHAI was detected in Parkinson's participants compared to the control group (14).

To the best of our knowledge, there is no study evaluating the effect of FM on OHRQoL. The aim of this study was to compare the relationship between the severity of fibromyalgia and OHRQoL in patient subgroups according to the fibromyalgia impact questionnaire (FIQ).

MATERIALS and METHODS

Study Population and Study Design

The present study was designed as a prospective cross-sectional clinical trial. The study participants were chosen from 40 participants with FM who referred to the Department of Periodontology from August 2018 to February 2019. The study was approved by the Local Clinical Ethics Committee (Decision no:2018-6.10) and was conducted in compliance with the Helsinki Declaration revised in 2008. Written informed consent was obtained from all participants.

The revised 2016 American College of Rheumatology (ACR) fibromyalgia diagnostic criteria were employed to diagnose the participants (15). In these revised criteria, the patient must have pain in at least four of the five regions (left upper, right upper, left lower, right lower, axial) to be diagnosed with FM. Fibromyalgia syndrome diagnoses were provided and directed by one physical therapy and rehabilitation medical doctor.

The exclusion criteria were pregnancy or lactation, alcohol or drug abuse, and other arthritic and rheumatoid arthritis (RA), infectious-metabolic and neurologic diseases, being < 18 years old, uncontrolled diabetes mellitus, and hypertension.

Clinical Measurements

Demographic information about age, education status, smoking, systemic diseases, and employment status was recorded. The oral status of all participants was examined and recorded by a single specialist dentist. The decayed, missing, and filled teeth (DMFT) index values, periodontal

diagnosis, and removable prosthesis conditions were evaluated. The DMFT index was evaluated as follows: the teeth were categorized as decayed if they were cavitated; missing if they were extracted or extraction was indicated; and filled if they presented amalgam, resin, or prosthetic crowns. Then, all of the these values were recorded as mean DMFT index value (16). Periodontal pocket depth, gingival index and bleeding on probing measurements were performed with a periodontal probe (UNC-15, Hu-Friedy, USA). All measurements were recorded at four sites around teeth.

Fibromyalgia Impact Questionnaire (FIQ)

FIQ is a self-administered questionnaire used to measure the current health status of FM participants. It contains substances that assess the difficulty of evaluating the severity of FM in common daily activities, physical impairment, general health, pain, anxiety, depression, and work activities (17).

The Turkish version of FIQ was filled out by FM participants in this study (18). Designed to measure the components of the health state believed to be most affected by the FM situation, the FIQ consists of 20 questions that evaluate the 10 sub-categorized questions (19). The first 11 questions provide information about the physical condition of participants and each item is rated on a 5-point Likert scale. Substances between numbers 14 and 20 are measured with visual analog scales in which the patient evaluates the difficulty of working, pain, fatigue, morning fatigue, stiffness, anxiety, and depression. Questions 1-13 are normalized to 10 points, and total points are added to the scores from the rest of the questions. The total FIQ score varies between 0 and 100, and higher values of FIQ score are correlated with disease severity.

Participants are divided into two groups according to the values of the FIQ scores according to de Souza et al. (20):

1. FM-Type I: group in which fibromyalgia subscale VAS values were scored lower according to cluster analysis and ROC curve analysis
2. FM-Type-II: group in which fibromyalgia subscale VAS values were scored higher according to cluster analysis and ROC curve analysis

Oral Health-Related Quality of Life Measurements

The impact of oral health and FM on QoL was assessed using two patient-centered outcome measures: the Turkish version of OHIP-14 (21) and GOHAI (22). The questions that give about functional limitations, pain and discomfort, psychological impacts, and behavioral impact values were gathered together and the evaluation was made similar in the two scales. While OHIP-14 provides especially functional limitations and pain-related information, GOHAI provides information about psychological and behavioral outcomes. The survey measurement evaluation was completed using the Likert scale. Five different answers were possible: never, seldom, sometimes, often, and always (9-11).

After receiving the anamnesis and detailed evaluations from all participants, it was explained to them how to respond to the OHIP-14 evaluation, and they were asked to score the questions. In order to make the OHIP-14 and the GOHAI health assessments, scoring was completed under four main groups by reference to a previously performed study: functional limitations, pain and discomfort, psychological impacts, and behavioral impacts (11,21).

Oral Health Impact Profile-14 (OHIP-14)

The OHIP-14 measurement technique is used to assess the effect of the oral condition on QoL of FM participants. Basically, the OHIP-14 contained seven different domains: functional limitation items, physical pain items, psychological discomfort items, physical disability items, psychological disability items, social disability items, and handicap items. In this study, OHIP-14 subheadings were evaluated under four groups in order to compare with GOHAI: functional limitations, pain and discomfort, psychological impacts, and behavioral impacts (11,23).

General Oral Health Assessment Index (GOHAI)

Essentially, the GOHAI contains 12 items assessing the physical function dimension, psychological function dimension, and pain or discomfort. GOHAI scoring is also scored under four main headings: functional limitations, pain and discomfort, psychological impacts, and behavioral impacts (11,23).

Statistical Analysis

Statistical analysis was performed with the software program SPSS 20.0. Kalmogorov-Smirnov test was performed to determine the normal distribution of all data. ROC Curve analysis were provided cut-off point for FIQ values. AUC values and cut-off point were determined according to FIQ measures. In the whole group, Spearman correlation analysis was conducted to determine the relationship of FS patients with DMFT index and OHIP-14 and GOHAI. The Mann Whitney U test was used to comparing OHIP-14 and GOHAI values between FM-Type I and FM-Type II groups. Demographic and descriptive data were given as percentages and mean \pm standard deviation. Non-parametric values were given as median (minimum-maximum). Significant p value is 0.05. To achieve a power of 80%, the minimum required sample size was determined to be 20 in the paired study groups.

RESULTS

The participants included in the study were aged between 20 and 58, and the mean age was 46.18 ± 8.91 years old. Information about the sociodemographic and systemic health of the participants was shown in Table 1. The education levels of the participants are as follows: primary school graduate is 46.2%, high school graduate is 43.6% while undergraduate degree is 10.2%. In addition to FM, the patients are accompanied by diabetes mellitus, hypertension, asthma, thyroid disease and anxiety disorder under control; also while the employment status of the participants was 53.8%, only 10.3% were smoking.

The number of teeth remaining in the mouth of the participants was 23.30 ± 5.006 , whereas the DMFT value was 12.65 ± 9.56 . Periodontitis was observed in 13.8% of the participants in this study, and 86.2% had gingivitis. Twenty percent of participants had at least one removable prosthetic (Table 1).

Table 1. Sociodemographic and dental characteristics of included total Fibromyalgia patients

Characteristics	Values
Age (Mean \pm SD)	46.18 \pm 8.91
Education	
Primary school(%)	46.2 %
High school (%)	43.6 %
Undergraduate degree (%)	10.2 %
Systemic Diseases	
Diabetes Mellitus (n)	2
Hypertension (n)	4
Asthma (n)	2
Thyroid disease (n)	2
Anxiety Disorder (n)	2
Employment (%)	53.8 %
Smoking (%)	10.3 %
Number of remaining teeth	23.30 \pm 5.006
DMFT	12.65 \pm 9.56
Gingivitis/Periodontitis (%)	93.48% / 6.52%
Removable partial denture (%)	25%

The values of total FIQ scores were obtained on a wide scale between 34.08 and 93.34, and the mean value was measured as 67.06 ± 16.06 . The FIQ median cut-off score was detected as 66.42 according to ROC curve analysis. Also, Cluster analysis showed that mean FIQ scores were 54.11 ± 10.47 between 34.08 and 66.42 for the FM-Type I subgroup, and mean FIQ scores were detected as 80.68 ± 6.83 between 69.98 and 93.34 for the FM-Type II subgroup (Table 2).

Table 2. Relationship between oral and periodontal conditions and fibromyalgia subgroups

	FM-Type I (Mean \pm SD) (n=20)	FM-Type II (Mean \pm SD) (n=20)	p values
DMFT	11.62 \pm 9.28	16.75 \pm 10.96	0.351
Removable Partial Denture	0.19 \pm 0.40	0.50 \pm 1	0.323
Periodontal Diseases	0.13 \pm 0.342	0.25 \pm 0.5	0.556

Spearman correlation analysis evaluated relationship between clinical recordings and Fibromyalgia subgroups. DMFT: decayed, missing and filled teeth (DMFT) index. Statistically significant value: 0.05

When the relationship between the OHIP-14 values and FM-Type I and FM-Type II subgroups was evaluated, no statistically significant relationship was found between the groups in terms of functional limitations, pain and discomfort, and behavioral impacts. ($p>0.05$) However, there was a statistically significant relationship between OHIP-14 psychological impacts ($p=0.031$) and OHIP-14 total values ($p=0.023$). According to this, total OHRQoL and psychological effects were evaluated as more negative in participants with severe fibromyalgia (Table 3).

Table 3. Relationship between OHIP-14 and fibromyalgia subgroups

	FM-Type I (Mean \pm SD) (n=20)	FM-Type II (Mean \pm SD) (n=20)	p values
Functional Limitation	1.55 \pm 2.11	2.37 \pm 2.14	0.237
Pain and Discomfort	2.75 \pm 2.63	4.26 \pm 2.13	0.057
Psychological Impacts	5.05 \pm 3.57	8.21 \pm 5.21	0.031*
Behavioral Impacts	2.90 \pm 2.673	4.37 \pm 3.84	0.173
OHIP-14 Total	12.25 \pm 9.17	19.74 \pm 10.48	0.023*

Spearman correlation analysis were used for relationship. Statistically significant value: 0.05

When the GOHAI index was evaluated, no statistically significant differences were found between the FM-Type I and FM-Type II groups with all functional limitations, pain and discomfort, psychological impacts, behavioral impacts, and total GOHAI values ($p>0.05$) (Table 4).

Table 4. Relationship between GOHAI and fibromyalgia subgroups

	FM-Type I (Mean \pm SD) (n=20)	FM-Type II (Mean \pm SD) (n=20)	p values
Functional Limitation	6.10 \pm 2.88	6.84 \pm 2.67	0.410
Pain and Discomfort	7.10 \pm 2.77	6.21 \pm 2.93	0.337
Psychological	6.90 \pm 3.12	7.68 \pm 3.51	0.466
Behavioral	2.10 \pm 1.97	2.58 \pm 2.16	0.475
GOHAI-Total	22.20 \pm 7.95	23.32 \pm 8.62	0.677

Spearman correlation analysis were used for relationship. Statistically significant value: 0.05

DISCUSSION

Chronic rheumatic disorders such as FM and RA are known to negatively affect daily life. FM is a chronic syndrome with unknown etiology affecting many muscle groups, and some studies on these diseases also include the temporomandibular joint, as well as the masticatory system. To our knowledge, the present study is the first trial about OHRQoL and FM, and there was no study evaluating oral health and FM in terms of participants' perceptions.

Oral health should not only be associated with the absence

of disease, as oral health affects the general health and quality of daily life of the patient. OHIP-14 contains more information on the evaluation of pain with more functional limits, while GOHAI provides more information on psychological and behavioral outcomes (11,23). For this reason, the two indices were evaluated for two different OHRQoL perceptions in this study.

FM is a disease that is seen in women at a rate of 90%, especially between 45–60 years of age. The incidence of fibromyalgia in the general population is between 3%–10%. The prevalence of FM shows that it is associated with low family income, low educational level, and increased stress (3,24). Demirbag et al have reported that 6 (26.5%) of FM patients had primary school degree; 104 (76.5%) had middle income level, and 55 (40.4%) had never smoked (25). Galvez-Sanchez et al have shown that it has concluded that the average education duration of FM patients is lower than the control group (26). In this study, 10.2% of patients had undergraduate degrees and 53.88% of the patients were employed; also in our study, it was found that only 10.3% of the participants smoked.

In a study, the periodontal status of participants have reported to be significantly related to OHRQoL (27). Santos-Garcia et al have shown that the incidence of periodontitis in FM participants was as %5 (28). Yüce et al have concluded that the rate of periodontitis was recorded as 13.8% and it has reported that associations with non-steroidal anti-inflammatory and other drugs may be the cause of a lower proportion of periodontitis in the FM group compared to the control group (29). In this study, the rate of periodontitis was shown to be 6.52%, and there was no statistically significant difference between the FM-Type I and FM-Type II groups. Therefore, there is no relationship between FIQ score and periodontal disease.

FIQ is a scale that frequently evaluates the effect of FM on QoL associated with participants' health. It evaluates the efficacy of the patient regarding their psychological wellbeing, daily work life, and QoL. In a study, FM participants were evaluated by being divided into two different subgroups according to the FIQ score. It has been shown that in FM-Type I, anxiety, depressive, and morning fatigue symptoms are seen at low degrees, while in FM-Type II, there are high levels of pain, fatigue, morning stiffness, severe anxiety, and depressive symptoms (20). Also, Bennett et al. have shown that in 2,228 FM participants, according to the severity of the total FIQ scores, FIQ score was defined as 0 to < 39 a mild effect, ≥ 39 to < 59 a moderate effect, and ≥ 59 to 100 a severe effect (30). To relate the effect of FM on OHRQoL by reference from these studies, the FIQ score is divided into two parts according to the cluster analyses in our study. Higher negative GOHAI and OHIP-14 values have been obtained in participants with high FIQ scores, and participants with a higher degree of exposure to FM are considered to be able to provide higher negative feedback on oral conditions.

Studies on fibromyalgia syndrome are often focused on

musculoskeletal problems such as TMDs and bruxism (29,31). Yuce at al. have reported that the rate of bruxism in FM participants was higher than in the control group, but there was no statistically significant correlation between the groups in terms of TMD (29). In a study that evaluated the effect of TMD and QoL on FM participants, it was reported that there was no statistically significant correlation between the FIQ questionnaire and TMD symptoms. In addition, QoL scores have been found to be similar between groups with and without TMD disease (32). In this study, there were no statistically significant results between functional limitations and pain and discomfort subcategories with questions for TMD.

In a study, the OHRQoL of RA participants was evaluated, and those with fewer than 14 teeth had higher negative GOHAI values (32). In another study, it was reported that after the oral status of Parkinson's participants were evaluated and there was no statistically significant correlation in the relationship between the number of remaining teeth, the DMFT index, removable prosthesis, the gingival index, and GOHAI values (14). In this study, although there was no statistically significant correlation between the remaining number of teeth, the DMFT index, the use of removable partial dentures, and FIQ subgroups, DMFT values were found to be higher in the FM-Type II group than in the FM-Type I group.

The study have evaluated geriatric individuals who have at least one chronic disease and who regularly use medications, and they have reported GOHAI values to be 41.27 before treatment (34). Also, in a study on hemodialysis participants, the mean OHIP-14 and GOHAI scores were 19.40 ± 7.74 and 15.72 ± 8.68 , respectively (35). The effect of chronic diseases like FM and RA on QoL is reported to show lower mental health scores compared to using SF-36 (18). Other studies have reported that RA and FM have a negative effect on QoL, but there is no statistically significant difference between FM and RA (34). In our study, a statistically significant correlation was found between all FM patient groups and the negative high values of OHIP-14 values, especially related to psychological impacts.

Recently, studies have also mentioned that there are changes in psychological impact and pain perception with fibromyalgia (37). In the present study, participants whose FM was caused by physical trauma were reported to have more negative FIQ values than idiopathic FM participants (38). In an epidemiological study, it was reported that major depression, bipolar disorders, and panic disorder can be seen at a higher rate in FM participants than the control group over the long term (39). In this study, psychological impact values in OHIP-14 subgroups were found to result in higher negative values in the FM-Type II group.

The most important limitation of this study was the absence of a control group. In addition to the medical treatment of FM participants, evaluation of QoL after periodontal treatment and even whole oral rehabilitation may provide more information. In this study, the

participants' complaints about TMD and its effect on QoL were not assessed. The treatments aimed at reducing TMD complaints and the evaluation of FIQ and OHRQoL after a full month of rehabilitation can be more effective in the medical treatment of FM participants. The evaluation of function- and psychology-related subgroups in the FIQ scores, and the exact correlation of the substances that determine function and psychological problems in the GOHAI and OHIP-14 indices, can give better results. In this study, participants who were diagnosed with FM and received drug therapy were included. The inability to standardize participants is an important limitation of this study. If the treatment concepts of the participants are performed after the depression and anxiety measurements used to determine the standardized detection of the medication used, other accompanying systemic disorders, and especially their psychological status, can provide more precise results. However, making a determination in this way is quite difficult when considering the variety in participants and treatments.

CONCLUSION

In this study, it was concluded that the higher the FIQ values, the more severe the effects of the disease and the more negative the QoL. In particular, as the severity of the FIQ value increases, the psychological effects of OHRQoL are reported to be more negative. Therefore, according to the severity of FIQ values in FM participants, it should be considered that the patient-based outcome obtained from dental treatment may be associated with FM and should be encouraged to enter the dental treatment process in addition to medical and psychological support in the treatment of FM participants..

Conflict of interest : The authors declare that they have no competing interest.

Financial Disclosure: There are no financial supports.

Ethical approval: The study was approved by the Local Clinical Ethics Committee (Decision no:2018-6.10) and was conducted in compliance with the Helsinki Declaration revised in 2008.

REFERENCES

1. Queiroz LP. Worldwide epidemiology of fibromyalgia. *Curr Pain Headache Rep* 2013;17:356.
2. Wolfe F, Brahler E, Hinz A, et al. Fibromyalgia prevalence, somatic symptom reporting, and the dimensionality of polysymptomatic distress: results from a survey of the general population. *Arthritis Care Res (Hoboken)* 2013;65:777-85.
3. Wolfe F, Ross K, Anderson J, et al. The prevalence and characteristics of fibromyalgia in the general population. *Arthritis Rheum* 1995;38:19-28.
4. Naito M, Yuasa H, Nomura Y, Nakayama T, et al. Oral health status and health-related quality of life: a systematic review. *J Oral Sci* 2006;48:1-7.
5. McGrath C, Bedi R. Understanding the value of oral health to people in Britain-importance to life quality. *Community Dent Health* 2002;19:211-4.

6. Frisch M. Quality of life therapy and assessment in health care. *Clin Psychol (New York)* 1998;5:19-40.
7. Allen PF. Assessment of oral health related quality of life. *Health Qual Life Outcomes* 2003;1:40.
8. Larson JS. The conceptualization of health. *Med Care Res Rev* 1999;56:123-6.
9. Slade GD. Derivation and validation of a short-form oral health impact profile. *Community Dent Oral Epidemiol* 1997;25:284-90.
10. Atchison KA, Gift HC. Perceived oral health in a diverse sample. *Adv Dent Res* 1997;11:272-80.
11. Locker D, Matear D, Stephens M, et al. Comparison of the GOHAI and OHIP-14 as measures of the oral health-related quality of life of the elderly. *Community Dent Oral Epidemiol* 2001;29:373-381.
12. de Azevedo Branco LG, Oliveira SR, Correa JD, et al. Oral health-related quality of life among individuals with rheumatoid arthritis. *Clin Rheumatol* 2019;38:2433-41.
13. Einarsdottir ER, Gunnsteinsdóttir H, Hallsdóttir MH, et al. Dental health of patients with Parkinson's disease in Iceland. *Spec Care Dentist* 2009;29:123-7.
14. Ribeiro GR, Campos CH, Garcia RC. Oral health in elders with parkinson's disease. *Braz Dent J* 2016;27:340-4.
15. Wolfe F, Clauw DJ, Fitzcharles MA, et al. Revisions to the 2010/2011 fibromyalgia diagnostic criteria. *Semin Arthritis Rheum* 2016;46:319-29.
16. Organization WH. Oral health surveys: basic methods - 5th edition. 2013
17. Burckhardt CS, Clark SR, Bennett RM. The fibromyalgia impact questionnaire: development and validation. *J Rheumatol* 1991;18:728-33.
18. Sarmer S, Ergin S, Yavuzer G. The validity and reliability of the Turkish version of the Fibromyalgia Impact Questionnaire. *Rheumatol Int.* 2000;20:9-12.
19. Birtane M, Uzunca K, Tastekin N, et al. The evaluation of quality of life in fibromyalgia syndrome: a comparison with rheumatoid arthritis by using SF-36 Health Survey. *Clin Rheumatol* 2007;26:679-84.
20. de Souza JB, Goffaux P, Julien N, et al. Fibromyalgia subgroups: profiling distinct subgroups using the Fibromyalgia Impact Questionnaire. A preliminary study. *Rheumatol Int* 2009;29:509-15.
21. Başol ME, Karağaçlıoğlu L, Yılmaz B. Developing a Turkish Oral Health Impact Profile-OHIP-14-TR. *Türkiye Klinikleri J Dental Sci* 2014;20:85-92.
22. Ergul S, Akar GC. Reliability and validity of the Geriatric Oral Health Assessment Index in Turkey. *J Gerontol Nurs* 2008;34:33-9.
23. Ozcelik O, Haytac MC, Seydaoglu G. Immediate post-operative effects of different periodontal treatment modalities on oral health-related quality of life: a randomized clinical trial. *J Clin Periodontol* 2007;34:788-96.
24. Wolfe F, Smythe HA, Yunus MB, et al. The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis Rheum* 1990;33:160-72.
25. Demirbag BC, Bulut A. Demographic characteristics, clinical findings and functional status in patients with fibromyalgia syndrome. *J Pak Med Assoc* 2018;68:1043-7.
26. Galvez-Sánchez CM, Montoro CI, Duschek S, et al. Pain catastrophizing mediates the negative influence of pain and trait-anxiety on health-related quality of life in fibromyalgia. *Qual Life Res.* 2020 (In press)
27. Needleman I, McGrath C, Floyd P, Biddle A. Impact of oral health on the life quality of periodontal patients. *J Clin Periodontol* 2004;31:454-7.
28. Santos-García R, Sánchez-Domínguez B, Cordero MD, Rios-Santos JV, Jaramillo-Santos MR, Mariano H, et al. Utility of Periodontal exploration in patients with Fibromyalgia. *J Clin Exp Dent* 2012;4:40-2.
29. Yuce HB, Inanir A, Gokturk O, et al. Prevalence of Chronic Periodontitis, Bruxism and Temporomandibular Joint Disorders in Patients with Fibromyalgia Syndrome. *Meandros Med Dent J* 2017;18:47-54.
30. Bennett RM, Bushmakina AG, Cappelleri JC, et al. Minimal clinically important difference in the fibromyalgia impact questionnaire. *J Rheumatol* 2009;36:1304-1311.
31. Pimentel MJ, Gui MS, Martins de Aquino LM, et al. Features of temporomandibular disorders in fibromyalgia syndrome. *Cranio* 2013;31:40-5.
32. Di Venere D, Corsalini M, Stefanachi G, et al. Quality of life in fibromyalgia patients with craniomandibular disorders. *Open Dent J* 2015;9:9-14.
33. Blaizot A, Monsarrat P, Constantin A, et al. Oral health-related quality of life among outpatients with rheumatoid arthritis. *Int Dent J* 2013;63:145-53.
34. İlhan B, Cal E, Dunder N, et al. Oral health-related quality of life among institutionalized patients after dental rehabilitation. *Geriatr Gerontol Int* 2015;15:1151-7.
35. Guzeldemir E, Toygar HU, Tasdelen B, et al. Oral health-related quality of life and periodontal health status in patients undergoing hemodialysis. *J Am Dent Assoc* 2009;140:1283-93.
36. Martinez JE, Barauna Filho IS, Kubokawa K, et al. Evaluation of the quality of life in Brazilian women with fibromyalgia, through the medical outcome survey 36 item short-form study. *Disabil Rehabil* 2001;23:64-8.
37. Giesecke T, Williams DA, Harris RE, et al. Subgrouping of fibromyalgia patients on the basis of pressure-pain thresholds and psychological factors. *Arthritis Rheum* 2003;48:2916-22.
38. Carta MG, Moro MF, Pinna FL, et al. The impact of fibromyalgia syndrome and the role of comorbidity with mood and post-traumatic stress disorder in worsening the quality of life. *Int J Soc Psychiatry* 2018;64:647-55.
39. Jiao J, Vincent A, Cha SS, et al. Physical trauma and infection as precipitating factors in patients with fibromyalgia. *Am J Phys Med Rehabil* 2015;94:1075-82.