Personality Traits and Anxiety in Patients With Temporomandibular Disorders

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Abstract

Background

Temporomandibular disorders have long been suggested to result from psychological factors. Recent studies, however, tend to consider TMD a chronic psychosomatic illness. The present study was designed to explore the association between TMD and personality profile. The Minnesota Multiphasic Personality Inventory-2-Reconstructed form was used to evaluate the association for the first time.

Methods

A total of 258 subjects were participated in this case-control study. TMD cases as detected by Helkimo index were questioned regarding their personality characteristics and anxiety levels using MMPI-2-RF and Spielberger state and trait anxiety inventory.

Results

Patients with TMD scored higher on all personality characteristics except for Aberrant Experiences. The psychological profile of TMD showed no significant difference between theoretical and experimental ideas of persecution means. Patients with TMD reported significantly higher mean levels of state and trait anxiety than controls. The most frequently found anxiety levels in TMD cases have been mild state and trait anxiety (77.5% versus 74.4%).

Conclusion

Personality characteristic scores were considerably higher in TMD patients. TMD cases detected by Helkimo index manifest both trait and state anxiety as common findings.

Background

Chronic pain is a complex phenomenon, involving both psychological and physical aspects. Chronic pain has been studied for a long time using various behavioral and personality inventories [1]. In particular, chronic pain is conceptualized as multidimensional with sensory, cognitive, and social influences. A psychometric instrument called Minnesota Multiphasic Personality Inventory was designed to differentiate between the psychological and physical causes of chronic pain by identifying the personality traits common to these individuals [2]. The updated version of the inventory, assesses the contemporary models of personality and psychopathology. Practitioners are likely to find this to be a useful tool in detecting individuals who pretend to have physical health problems [3].

The assumption that psychological factors can contribute to temporomandibular joint dysfunction has been developed during 1950s [4]. Since then, the influence of emotional traits on TMDs has received much attention [5]. Psychological functioning has been associated with the duration of TMD pain, as with other types of pain [6]. A comparison of TMD and control subjects by Ferrando et al. revealed

different psychological characteristics [7]. The TMD cases are typically more prone to stress despite being no more anxious than controls [8]. Even so, many TMD patients are not aware of their emotional states [9]. There is however a need to pay attention to the multiple aspects of TMD in order to ensure their quality of life and general health. [10].

The American researchers recently found that somatic symptoms are strongly related to TMD onset [11]. In addition, psychological factors have a more significant impact on TMJ pain that is muscular in origin [12, 13]. A pain measure for TMD patients developed by Martti Helkimo in 1974 is called an amnestic index [14, 15].

The use of various inventories to measure personality traits in these patients, including earlier forms of the MMPI, has been widely discussed. Orofacial pain has been discussed in terms of older versions of the inventory, that is, the MMPI and MMPI-2 [5]. In this study we apply MMPI-2-RF to assess personality traits in TMD cases for the first time. Additionally, Spielberger state and trait anxiety inventory was used in the present study to assess patients' anxiety.

Methods

A case-control study was conducted to assess the anxiety and personality traits of random outpatients visiting the Golestan University of Medical Sciences (GOUMS). The inclusion criteria were as follows:

I. Conscious participation in the study

II. Adults aged 18 years old or older (80 years at most), according to MMPI-2-RF manual

III. No systemic disease affecting the lower jaw (e.g. RA, Scleroderma, Sarcoidosis, Psoriasis, Behcet’s disease)

IV. No previous trauma to the mandible

V. No previous orthodontic treatment

VI. No unilateral or bilateral loss of four posterior teeth

Cases of TMD were detected with Helkimo index (anamnestic component [AI] and clinical dysfunction component [Di]). Controls were also selected from GOUMS visitors who did not have TMD and were matched on the basis of their gender and age (5 years). A total of 129 individuals participated in each group. All methods were performed in accordance with the relevant guidelines and regulations. A number of variables were used to analyze this study, including the following: sex, age, educational level, personality traits (characteristics) based on the MMPI-2-RF, anxiety based on the Spielberger State - Trait Anxiety Inventory, and detection of TMD, based on the Helkimo index.

A Helmio index (1974) identifies TMD, maximal mouth opening, jaw deviation, TMJ function, and TMJ/muscle pain. The severity of TMD is determined by the sum of the measurements of approximately

25 points [14, 15].

MMPI-2-RF (2008) is a self-report inventory comprising 338 items designed to represent the clinically significant items in the MMPI-2. Six sets of scales are included in the test, including the validity, higher order, restricted clinical, specific problem, interest, and personality psychopathology five scales [3].

The Spielberger State-Trait Anxiety Inventory (1970) consists of two sets of twenty items, which provide scores that indicate both the level of anxiety the subject has at present (state) and the extent to which the person is prone to experience anxiety (trait) [8]. The sample size required for the current study was determined based on a study conducted by Meldolesi. et al [9]. It was determined that 129 subjects for each group, resulting in a total of 258 subjects, was required to achieve a CI level of 0.95, 80 percent power for analysis, and minimal error.

Statistical Analyses

SPSS version 18 was used for describing the means, standard deviation, ranking means, frequency, and percentage. Participants were assessed using MMPI-2-RF and Spielberger State - Trait Anxiety Inventory. An independent t-test or non-parametric Mann-Whitney test was used to compare anxiety levels and personal characteristics. A Chi-square test was used to test qualitative variables such as ranking means for anxiety levels. All analyses were considered significant at the level of 0.05.

Results

A total of 258 individuals participated in the study. Among the subjects were 130 men (50.38%) and 128 women (49.62%). The TMD group consisted of 65 men (50.38%) and 64 women (49.61%). In the healthy control group, the gender distribution was the same. The age range was 21 to 25 years (28.98 ± 7.01). The case group's age was 28.98 ± 6.93 years compared to 28.98 ± 7.25 years in the control group. A non-parametric Mann-Whitney test showed no significant difference between TMD and control group. In terms of education level, 63.8 % of control and 71.3 % of patient groups had a bachelor's degree or higher. According to the chi-square test, the difference in educational level - including those with less than a bachelor's degree - was non-significant.

The proportions of TMD patients with relatively mild, relatively severe, and mild traits of anxiety were 77.5 %, 19.4 %, and 3.1 %, respectively. Similarly, 74.4 %, 22.5 %, and 3.1 % of the TMD cases also had state anxiety that was relatively mild, relatively severe, and mild, respectively. TMD patients showed significantly higher means of both trait and state anxiety compared with controls (P-value < 0.0001).

In regards to the three facets; Difficulty Identifying Feelings, Difficulty Describing Feelings and Externally Oriented Thinking of personality characteristics, there is a significant difference between the experimental and theoretical means in TMD case (P-value < 0.0001; one sample t-test). Experimental means are lower than theoretical means in the present study. In other words, three facets are below the expected level or average. Other personality characteristics, with the exception of persecution ideas, have experimental

means significantly less than theoretical means, as shown in Table 1. Therefore, ideas of persecution are about average, while other characteristics are below average.

Personality features such as DIF, EOT, demoralization, somatic complaints, low positive emotions, antisocial behavior, ideas of persecution and dysfunctional negative emotions, are more pronounced among TMD groups than those of controls (Table 2 and 3).

According to the Helkimo index, anamnestic evaluations of TMD subjects revealed that 58.91 %, 24.8 %, and 41.86 % of them experienced joint sound, pain, and fatigue (Table 4). Within the Clinical dysfunction component, 58.13 % had limited mouth opening, 22.48 % had locked mandibles, and 24.80 % had jaw deviation. (Table 4).

There was mild, moderate, and severe dysfunction in 23.64 %, 20.54 %, and 5.81 % of the TMD subjects, respectively. Among the subjects, the majority (61.24%) were symptom-free, followed by 18.21% with mild symptoms, and 22.09% with severe symptoms. (Table 5).

Discussion

TMJ literature indicates increased levels of stress and anxiety in TMD cases. According to the Spielberger State Trait Anxiety Inventory, TMD patients showed a markedly greater anxiety level compared with control participants in the present study. Our study was consistent with a study by Vojdani and her colleagues that demonstrated higher levels of state and trait anxiety in TMD patients than in healthy controls [16].

As a result of such components as personality characteristics, our study also reported significantly higher scores in TMD patients than in controls. Tables 4 and 5 listed three facets and personality characteristics that were more prevalent in the TMD group than in the control group. These are DIF and EOT, demoralization, somatic complaints, low positive emotions, antisocial behavior, ideas of persecution and dysfunctional negative emotions. The results may not be compared to previous research, as MMPI-2-RF has not been used for TMD. The Spielberger anxiety inventory and MMPI-2-RF findings of the present study can be understood in light of Aurebach's comments that TMD cases are more likely to be exposed to stressful experiences in their lives. [13].

With respect to personal characteristics such as EOT, cynicism and aberrant experiences in TMD and control groups, there was no significant differences between ranking means. In line with this, McNeil et al. found no difference between TMD and the control group in terms of those characteristics [17]. In our study, however, we found that the ranking means for difficulty describing feelings and hypomanic activation were higher for controls than for TMD patients (Tables 2 and 3).

TMD patients and dysfunctional patients with higher levels of emotional problems show significant improvement when offered treatments such as stress management/biofeedback and intraoral appliances. This clearly shows that psychological factors have a significant effect on TMD [18, 19].

Similarly, Tversky and Reade provided supportive psychotherapy to TMD patients rather than occlusal splints and anti-depressants [20]. According to Blackburn et al., cognitive therapy was superior to drug treatment [21].

Additionally, our study did not differentiate between sample means of psychological profiles, such as anxiety and personality characteristics, according to the level of education. We may announce that education levels did not affect anxiety and personality characteristics. In a study by Adriani and colleagues, there was no difference between graduate students seeking a master's or a doctorate degree regarding anxiety levels or emotional stress; our results appear to be comparable [22]. Despite this, graduates from community colleges were more likely to experience anxiety than graduates from universities [23]. TMD patients may be caused to engage in pain-evoking behaviors as a result of adjunctive behaviors, such as uncertainty in their illness [24, 25].

Limitation

As MMPI2-RF is a lengthy questionnaire, sufficient time and effort was required for patient cooperation.

Conclusion

Based on the results of this study, there are significant differences between the means of State/Trait anxiety in TMD patients and controls. Trait anxiety and state anxiety are common findings in TMD cases detected by the Helkimo index. TMD patients' personality characteristic scores tend to be significantly higher than those of controls.

Abbreviations

TMD: Temporomandibular disorders; TMJ: Temporomandibular joint; MMPI-2-RF**:** Minnesota Multiphasic Personality Inventory-2-Reconstructed form**;** MMPI: Minnesota Multiphasic Personality Inventory**;** STAI**:** Spielberger State - Trait Anxiety Inventory**;** DIF: Difficulty Identifying Feelings; DDF: Difficulty Describing Feelings; EOT: Externally Oriented Thinking.

Declarations

Ethics approval and consent to participate

This research was approved by the Ethical Committee of Golestan University of Medical Sciences, Iran (IR.GOUMS.1397.022), which was performed in accordance with the current and seventh edition of the Declaration of Helsinki. Written consent was obtained from participants after they were informed about the study.

Consent for publication

Not applicable

Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available due to confidentiality of information, but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

NM assisted in Conceptualization, Methodology, Supervision, Original draft preparation, Review and editing. RBOD assisted in Data collection, Original draft preparation, Review and editing. MAV assisted in Methodology, Data Analysis, Original draft preparation, Review and editing. AH assisted in Data collection, Original draft preparation. All authors have read and approved the final manuscript.

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Tables

Table 1. Evaluation of Personality Characteristic Scores in TMD cases

Personality Characteristic Scores	Theoretical Mean	Experimental Mean	P-value
Demoralization	65	59.18	< 0.0001
Somatic Complaints	65	58.89	< 0.0001
Low Positive Emotions	65	58.79	< 0.0001
Cynicism	65	59.43	< 0.0001
Ideas of Persecution	65	63.15	0.146
Dysfunctional Negative Emotions	65	59.12	< 0.0001
Aberrant Experiences	65	58.49	< 0.0001
Hypomanic Activation	65	51.03	< 0.0001
Antisocial Behavior	65	49.02	< 0.0001

Table 2. Comparison of Personality Characteristic Scores in TMD cases / controls

Studied Groups							Statistics
Personality Characteristic Scores	Case			Control			Mann-Whitney U P-value
	Mean	Std. Dev.	Ranking Mean	Mean	Std. Dev.	Ranking Mean	
Demoralization	59.18	6.63	151.80	54.36	6.01	107.20	5443.500 < 0.0001
Somatic Complaints	58.89	8.58	154.21	52.99	9.05	104.79	5132.500 < 0.0001
Low Positive Emotions	58.79	9.66	144.49	54.58	8.13	114.51	6387.000 0.001
Cynicism	59.43	7.60	137.92	58.23	5.50	121.08	7234.000 0.050
Ideas of Persecution	63.15	13.25	143.78	59.48	4.37	115.22	6478.500 0.002
Dysfunctional Negative Emotions	59.12	8.22	138.74	56.65	6.54	120.26	7129.000 0.045
Aberrant Experiences	58.49	10.64	124.61	59.15	7.04	134.39	7690.000 0.287
Hypomanic Activation	51.03	7.83	111.43	54.17	5.10	147.57	5989.000 < 0.0001
Antisocial Behavior	49.02	7.16	146.02	45.91	4.73	112.98	6189.500 < 0.0001

Table 3. Comparison of Three Facet* Scores in TMD cases / controls

Studied Groups							Statistics
Score	Case			Control			Mann-Whitney U P-value
	Mean	Std. Dev.	Ranking Mean	Mean	Std. Dev.	Ranking Mean	
Difficulty Identifying Feelings (DIF)	56.86	8.08	157.99	50.48	5.40	101.01	4645.500 < 0.0001
Difficulty Describing Feelings (DDF)	51.31	7.30	113.72	54.04	4.73	145.28	6285.000 0.001
Externally Oriented Thinking (EOT)	59.51	12.66	135.27	57.15	5.70	123.73	7576.000 0.204

* DIF, DDF and EOT are also considered as Personal Characteristics

Table 4. Prevalence of signs and symptoms among TMD cases

INDEX		Men	Women	Total
		Number (%)	Number (%)	Number (%)
Anamnestic Component	TMJ Sound	38 (50%)	38 (50%)	76 (58.91%)
	TMJ Pain	16 (50%)	16 (50%)	32 (24.80%)
	TMJ Fatigue	27 (50%)	27 (50%)	54 (41.86%)
Clinical Dysfunction	Limited Mouth Opening	37 (49%)	38 (51%)	75 (58.13%)
	Locked Mandible	12 (41.37%)	17 (58.62%)	29 (22.48%)
	Jaw Deviation	19 (59.37%)	13 (40.63%)	32 (24.80%)

Table 5. Evaluation of TMD severity by Helkimo index

INDEX		Men	Woman	Total
		Number (%)	Number (%)	Number (%)
Anamnestic Index	Ai 0 (free of symptoms)	77 (50%)	77 (50%)	154 (61.24%)
	Ai I (mild symptoms)	24 (51.07%)	23 (48.93%)	47 (18.21%)
	Ai II (severe symptoms)	29 (50.88%)	28 (49.12%)	57 (22.09%)
Dysfunction Component	Di 0 (no dysfunction)	65 (50.39%)	64 (49.61%)	129 (50%)
	Di I (mild dysfunction)	32 (46.52%)	29 (47.54%)	61 (23.64%)
	Di II (moderate dysfunction)	27 (50.97%)	26 (49.05%)	53 (20.54%)
	Di III (severe dysfunction)	6 (40%)	9 (60%)	15 (5.81%)