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Original Research Article

Assessment of psychological health profile in patients with temporomandibular disorders

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Abstract

Background: The management of TMD requires multidisciplinary approach on account of its complex and multifactorial etiology. Although the role of psychological factors has been considered in the etiology, they are often unattended in the dental set up. Hence, realizing the paucity the study was planned.
Aims: To assess psychological health profile in patients with temporomandibular disorders.

Material and method: 40 subjects who met the set inclusion and exclusion criteria were subjected for evaluation of sign and symptoms of TMD followed by psychiatric evaluation by Dukes health profile scale.

Result: A significant association of signs and symptoms of TMD including inter-incisal distance, clicking, TMJ pain, referred pain, muscle tenderness and deflection with anxiety and depression was found (p value <.05). Also, there was statistically significant association between inter-incisal distance, clicking, referred pain and locking with pain and disability scores. (p value <.05).
Conclusions: This study demonstrated significant association of anxiety and depression with signs & symptoms of TMD.
Keywords: Temporomandibular disorders, Anxiety, Depression, Duke.
Key message: Attending to the underlying psychological etiology could help in achieving better treatment response in TMD patients.

1. Introduction

TMD is recognized as one of the most common chronic orofacial pain condition confronting dentists and other health care providers and have been identified as a major cause of non-dental pain in the orofacial region with greatly varying prevalence of symptoms (6-93%) and clinical signs (0-93%).[1,2] The etiopathogenesis of TMD is complex and multifactorial with many contributing factors including occlusal disturbance, trauma, parafunctional habits and psychological factors.[3]

Several studies conducted across the world have reported an increasing burden of psychological illness over the past few decades with mental and behavioural disorders accounting for about 12 percent of the global burden of all the diseases.[4] Considering the fact that India has 17.5% of the world's population, the number of people suffering with psychological illness in India have also increased from 7.5 % in 1967 to 14 % in 2016.[5-7] The psychological factors like anxiety and depression have now been established to play a role in pathogenesis and management of TMDs as 50 % of patients with TMDs manifest with anxiety and 32.1% with depression.[8]

With increasing burden of psychiatric illness and complex etiopathogenesis of TMD's, it poses a great challenge to orophysicians in their management as TMD

pains are more refractory to treatment. Hence, successful management of TMD pain requires a multidisciplinary approach with emphasis on psychological factors, which are often unattended in the dental set up. This can aid in improving treatment response in such patients. Hence, realizing the paucity, the study was planned to assess psychological health profile in temporomandibular disorders.

2. Material and Methods

This study was conducted in Government Dental College & Research Institute, Bangalore after obtaining ethical clearance from institutional ethical board. 40 subjects aged between 18-60 years were selected based on set selection criteria.

2.1 Inclusion criteria for the study group include the following

1) Subjects of age 18 to 60 years with temporomandibular joint pain.
2) Subjects with TMJ pain of persistent, recurring or chronic nature at least for past 3 months
3) Subjects with a diagnosis of disc displacement without reduction with limited opening (Group II B), disc displacement without reduction without limited opening (Group II C) and arthralgia (Group III A) according to TMD Research Diagnostic Criteria Axis I.

2.2 Exclusion criteria for the study group include the following

1) Subjects with history of prior TMJ surgery or trauma to jaw in last 6 months
2) Subjects with history of TMJ intra-articular injections in preceding year
3) Subjects undergoing dental procedure or with history of dental treatment in last 3 weeks.
4) Subjects with any previous history of surgery to the maxillofacial area
5) Subjects with any history of malignancy of maxillofacial area
6) Subjects with history of connective tissue disorders like rheumatoid arthritis, SLE polyarthritis etc.
7) Subjects with history of psychiatric illness and also those with known psychiatric illness and ongoing treatment
8) Patients with a history of radiation treatment to head and neck region
9) Patients under antidepressants and NSAIDS at least three days prior to the study
10) Drug dependent patients on heroin, caffeine etc.
11) Subjects with any systemic conditions like hypertension, diabetes, asthma, epilepsy and so forth
12) Edentulous patients with TMJ pain

All the study participants were subjected to detailed history and thorough clinical examination, which was recorded in a specially structured case proforma, which was designed to evaluate the signs and symptoms of TMJ which included inter-incisal distance, clicking, crepitation, TMJ pain, referred pain, muscle tenderness, deviation, deflection and locking. The clinical examination technique for assessment of the signs of TMD was carried out by an oral medicine specialist.

2.3 Psychological Assessment

All the selected 40 patients were then made to comfortably sit on a chair and were administered Dukes health profile for psychiatric evaluation. Dukes Health Profile is a self-assessment scale that evaluates health or the health-related quality of life in any population, regardless of the pathology. It is a 17-item questionnaire which measures health parameters including physical health, mental health, social health, general health and dysfunction measures which includes anxiety, depression, pain and disability.[9]

General health score is calculated by adding the individual final scores of physical, mental, social health and dividing it by 3. For physical health, mental health, social health, general health 100 indicates the best health status, and 0 indicates the worst health status. For anxiety, depression, pain, and disability, 100 indicate the worst health status and 0 indicates the best health status. The phases of the questionnaire application, and result calculation by the examiners were supervised by a psychologist.

2.4 Statistical analysis:

The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables. Significance was assessed at 5 % level of significance. Proportions were compared using Chi-square (χ^2) test of significance. Spearman correlation coefficients were calculated to determine whether there was any correlation between various psychological parameters.

3. Results

All the 40 subjects were in the age range of 18 to 60 years with mean age of 28.7±11.34 yrs. Out of which 31(77.5%) were females and 9 (22.5%) were males. The most common TMD finding reported was referred pain in 40 (100%) whereas the least common symptom was crepitation in 2(5%) subjects (Figure 1). On evaluation of general health profile it was observed that majority of the subjects i.e. 16(40%) had score ranging from 51-75 and 10(25 %) subjects were in 76-100 score range indicating majority of the subjects towards “Best” general health status (Figure 2). On evaluation of anxiety and depression score it was found that majority of the subjects i.e. 19(47 %) had high anxiety and depression score ranging from 51-75. However, majority of subjects with pain i.e. 19(47%) and disability in 26 (65%) had score range of 0-25 (Figure 3).

Figure 1: Showing distribution of sign & symptoms amongst study subjects

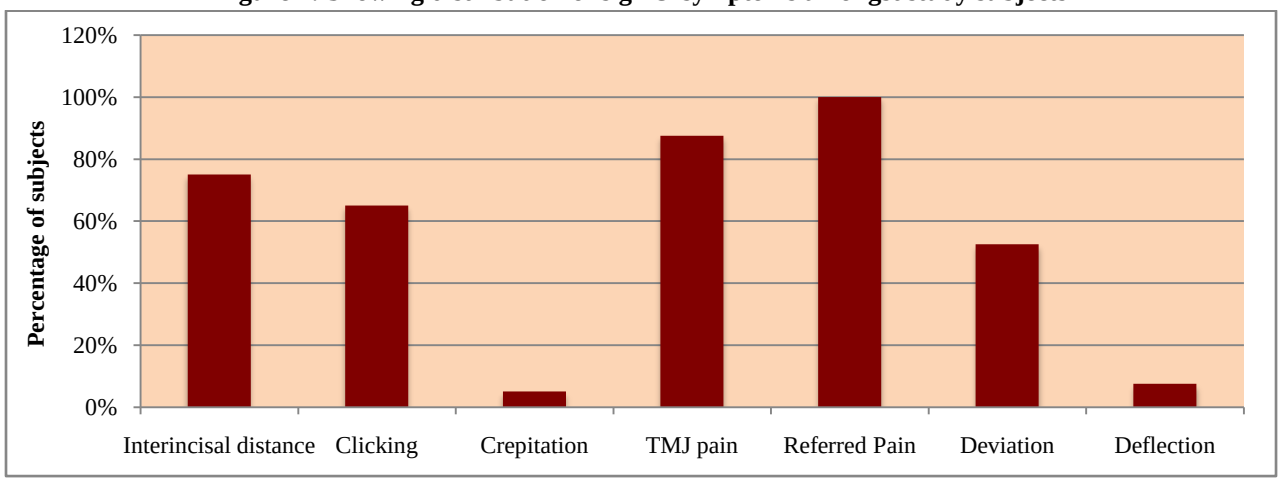


Figure 2: Pie chart showing percentage distribution of study subjects according to General Health Profile scores

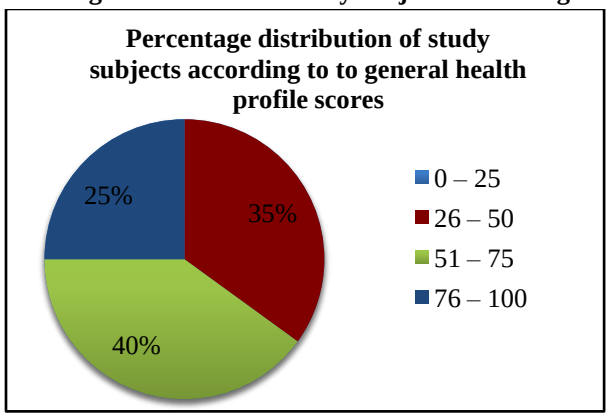
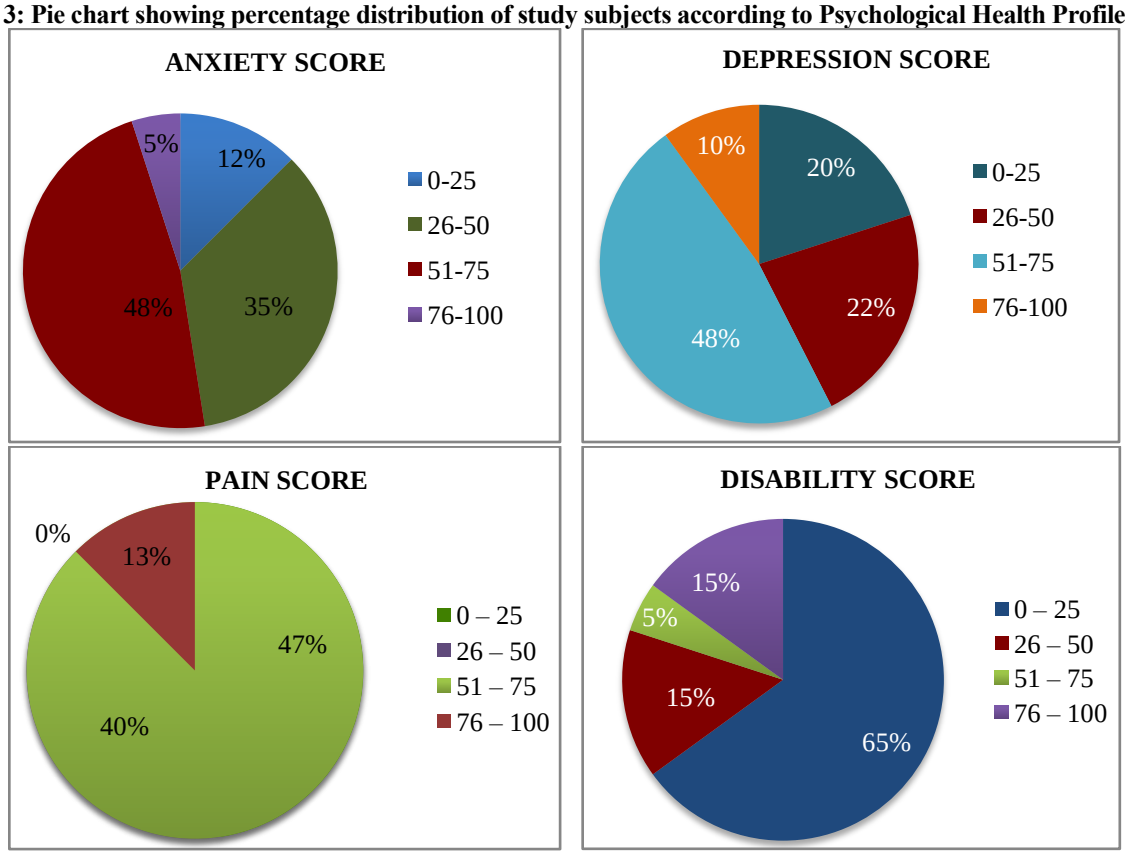


Figure 3: Pie chart showing percentage distribution of study subjects according to Psychological Health Profile Scores



There was statistically significant association of reduced inter-incisal distance, TMJ Pain, referred pain, muscle tenderness, deflection on opening with anxiety and depression (p value <. 05) (Table 1). On association of pain & disability score with TMD symptoms, there was statistically significant association between inter-incisal distance, clicking, referred pain and locking with pain and disability (Table 2).

Further, on correlation of general health score with anxiety & depression scores, a strong negative correlation was found whereas pain scores were positively correlated with disability scores (Table 3).

Table 1: Showing association of sign & symptoms of TMD with anxiety and depression scores

Signs & symptoms		Anxiety score				Depression score			
		0-25	**26-50**	**51-75**	**76-100**	**0-25**	**26-50**	**51-75**	**76-100**
Interincisal distance	**Limited**	0 (0%)	3 (30.0%)	5 (50.0%)	2 (20.0%)	3 (30.0%)	0 (0%)	3 (30.0%)	4 (40.0%)
	Adequate	5 (16.7%)	11 (36.7%)	14 (46.7%)	0 (0%)	5 (16.7%)	9 (30.0%)	16 (53.3%)	0 (0%)
	p value	**0.051***				**0.001****			
Clicking	**Present**	3 (11.5%)	12 (46.2%)	9 (34.6%)	2 (7.7%)	6 (23.1%)	9 (34.6%)	9 (34.6%)	2 (7.7%)
	Absent	2 (14.3%)	2 (14.3%)	10 (71.4%)	0 (0%)	2 (14.3%)	0 (0%)	10 (71.4%)	2 (14.3%)
	p value	0.095				**0.042***			
Crepitation	**Present**	0 (0%)	2 (14.3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (10.5%)	0 (0%)
	Absent	5 (100%)	13 (85.7%)	19 (100%)	2 (100%)	8 (100%)	9 (100%)	17 (89.5%)	4 (100%)
	p value	0.271				0.507			
TMJ pain	**Present**	0 (0%)	14 (40.0%)	19 (54.3%)	2 (5.7%)	3 (8.6%)	9 (25.7%)	19 (54.3%)	4 (11.4%)
	Absent	5 (100%)	0 (0%)	0 (0%)	0 (0%)	5 (100%)	0 (0%)	0 (0%)	0 (0%)
	p value	**0****				**0****			
Referred pain	**Absent**	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Headache	0 (0%)	3 (37.5%)	5 (62.5%)	0 (0%)	3 (37.5%)	3 (37.5%)	2 (25.0%)	0 (0%)
	Earache	5 (19.2%)	11 (42.3%)	10 (38.5%)	0 (.0%)	5 (19.2%)	6 (23.1%)	15 (57.7%)	0 (0%)
	Neckpain	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Multiple sites	0 (0%)	0 (0%)	4 (66.7%)	2 (33.3%)	0 (0%)	0 (0%)	2 (33.3%)	4 (66.7%)
	p value	**0.007****				**0.000****			
Muscle tenderness	**Present**	0 (0%)	9 (34.6%)	15 (57.7%)	2 (7.7%)	0 (0%)	5 (19.2%)	17 (65.4%)	4 (15.4%)
	Absent	5 (35.7%)	5 (35.7%)	4 (28.6%)	0 (0%)	8 (57.1%)	4 (28.6%)	2 (14.3%)	.0 (0%)
	p value	**0.007****				**0.000****			
Deviation	**Present**	0 (0%)	7 (33.3%)	12 (57.1%)	2 (9.5%)	3 (14.3%)	4 (19.0%)	12 (57.1%)	2 9.5%)
	Absent	5 (26.3%)	7 (36.8%)	7 (36.8%)	0 (0%)	5 (26.3%)	5 (26.3%)	7 (36.8%)	2 (10.5%)
	p value	**0.041***				0.608			
Deflection on opening	**Present**	3 (100%)	0 (0%)	0 (0%)	0 (0%)	3 (100%)	0 (0%)	0 (0%)	0 (0%)
	Absent	2 (5.4%)	14 (37.8%)	19 (51.4%)	2 (5.4%)	5 (13.5%)	29 (4.3%)	19 (51.4%)	4 (10.8%)
	p value	**0.000****				**0.005***			
Locking	**Present**	0 (0%)	0 (0%)	5 100.0%	0 (0%)	0 (0%)	0 (0%)	5 100.0%	0 (0%)
	Absent	5 (14.3%)	14 (40%)	14 (40.0%)	2 (5.7%)	8 (22.9%)	9 (25.7%)	14 (40.0%)	4 (11.4%)
	p value	0.097				0.097			

*denotes significant 'p' value, **denotes highly significant 'p' value

Table 2: Showing association of sign & symptoms of TMD with Pain and disability scores

		Pain score				Disability score			
		0-25	**26-50**	**51-75**	**76-100**	**0-25**	**26-50**	**51-75**	**76-100**
Interincisal distance	**Limited**	2 (20%)	3 (30%)	0 (0%)	5 (50%)	0 (0%)	4 (40%)	0 (0%)	6 (60.0%)
	Adequate	17 (56%)	13 (43%)	0 (0%)	0 (0%)	26 (86%)	2 (6.7%	2 (6.7%)	0 (0%)
	p value	**0.000****				**0.000****			
Clicking	**Present**	16 (61%)	7 (26%)	0 (0%)	3 (11%)	17 (65%)	4 (15%)	2 (7.7%)	3 (11.5%)
	Absent	3 (21%)	9 (64%)	0 (0%)	2 (14%)	9 (64%)	2 (14%)	0 (0%)	3 (21.4%)
	p value	**0.043***				0.642			
Crepitation	**Present**	0 0%	2 12.5%	0 0%	0 0%	2 7.7%	0 (0%)	0 (0%)	0 (0%)
	Absent	19 100.0%	14 87.5%	0 0 %	5 100.0%	24 92.3%	6 100%	2 100%	6 100%
	p value	0.206				0.769			
TMJ pain	**Present**	16 (45%)	14 (40%)	0 (0%)	5 (14%)	21 (60%)	6 (17%)	2 (5.7%)	6 (17.1%)
	Absent	3 (60%)	2 (40%)	0 (0%)	0 (0%)	5 100%	0 (0%)	0 (0%)	0 (0%)
	p value	0.637				0.380			
Referred pain	**Absent**	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Headache	0 (0%)	5 (62%)	0 0%)	3 37.5%	3 (37%)	0 (0%)	2 (25%)	3 (37.5%)
	Earache	17 (65%)	9 (34%)	0 (0%)	0 (0%)	21 (80%)	2 7.7%)	0 (0%)	3 (11.5%)
	Neck pain	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Multiple sites	2 33.3%	2 33.3%	0 (0%)	2 33.3%)	2 33.3%	4 66.7%	0 (0%)	0 (0%)
	p value	**0.003****				**0.000***			
Muscle tenderness	**Present**	12 46.2%	12 46.2%	0 (0%)	2 (7.7%)	15 57.7%	6 23.1%	2 (7.7%)	3 (11.5%)
	Absent	7 50.0%	4 28.6%	0% (0%)	3 21.4%	11 78.6%	0 (0%)	0 (0%)	3 (21.4%)
	p value	0.349				0.138			
Deviation	**Present**	9 42.9%	9 42.9%	0 (0%)	3 14.3%	9 42.9%	4 19.0%	2 (9.5%)	6 (28.6%)
	Absent	10 52.6%	7 36.8%	0 (0%)	2 10.5%	17 89.5%	2 10.5%	2 (0%)	0 (0%)
	p value	0.817				**0.011***			
Deflection on opening mouth	**Present**	3 100.%	0 (0%)	0 0%	0 (0%)	3 100%	0 (0%)	0 (0%)	0 (0%)
	Absent	16 43.2%	16 43.2%	0 (0%)	5 13.5%	23 62.2%	6 16.2%	2 (5.4%)	6 (16.2%)
	p value	0.167				0.627			
Locking	**Present**	0 (0%)	5 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 40.0%	3 (60.0%)
	Absent	19 54.3%	11 31.4%	0 (0%)	5 14.3%	26 74.3%	6 17.1%	0 (0%)	3 (8.6%)
	p value	**0.014***				**0.000****			

*denotes significant 'p' value, **denotes highly significant 'p' value

Table 3: Showing correlation among various psychological parameters

Parameters		General health score	Anxiety score	Depression score	Pain score	Disability score
General health score	**r value**	1.000	**-0.422****	**-0.483****	-0.204	-0.227
	p value	**0**	**0.007**	**0.002**	0.206	0.160
Anxiety score	**r value**	**-0.422****	1.000	**0.653****	0.156	0.240
	p value	**0.007**	-	-	0.337	0.135
Depression score	**r value**	**-0.483****	**0.653****	1.000	-0.117	0.116
	p value	**0.002**	-	0	0.473	0.478
Pain score	**r value**	-0.204	0.156	-0.117	1.000	**0.470****
	p value	0.206	0.337	0.473	0	**0.002**
Disability score	**r value**	-0.227	0.240	0.116	**0.470****	1.000
	p value	0.160	0.135	0.479	**0.002**	-

4. Discussion

Being a multifactorial disease affecting the stomatognathic system, TMD is influenced by many factors, which includes elevated anxiety levels, symptoms of depression and somatization, and psychological stress.[10] These biopsychosocial factors may be involved in predisposition as well as progression of TMD. The results of this study indicate higher incidence of TMD among women (31, 77.5%) which could be due to the presence of estrogen receptors in women's TMJ which changes metabolic functions thereby increasing ligament laxity. Estrogen also increases susceptibility to painful stimuli by modulating the limbic system. The findings were in accordance with Bonjardim *et al*[11] and Widmalm *et al*[12].

TMD's presents with variety of signs of symptoms ranging from restricted jaw movements, clicking, jaw locking and tenderness in the muscles of mastication, accompanied by recurring headaches and pain in the neck. Referred pain was the most common symptom reported that could be due to improper maxillo-mandibular positioning, resulting in a posteriorly displaced mandibular condyle thereby increasing pressure on the eustachian tube and chorda tympani nerve. The resulting retruded mandible may affect the auriculo-temporal nerve resulting in symptom of ear pain. Also, increased muscle tension from clenching and grinding of teeth may also cause similar symptoms. The least common signs reported were crepitation and deflection in 5% and 7.7% subjects respectively. These findings were in accordance with the study conducted by Ferriera *et al* [13] and Feteih *et al* [14].

The signs and symptoms of TMD (reduced inter-incisal distance, TMJ Pain, referred pain, muscle tenderness, deflection with anxiety and depression) were significantly associated with anxiety and depression. This is in concurrence with previous studies, which reported that stress and psychological elements are associated with pain related TMD signs. The pathophysiologic basis for the association between psychological distress and pain related TMD symptom might be related to dysregulation of the hypopthalamic-pituitary adrenal (HPA) axis. High levels of cortisol, indicating HPA hyperactivity, have been noted to occur in both anxiety and depression. Also it is proposed that depression and anxiety may initiate muscular hyperactivity followed by muscle abnormality and altered muscle mechanics, a sequence in which each state can provoke muscle pain.

Stress and anxiety increase sympathetic activity as well as the release of epinephrine at sympathetic terminals, which can enhance acetylcholine activity at the motor endplate and triggers a cascade of events, ending with a decreased threshold at muscle nociceptors and pain. They may also initiate joint inflammation followed by biomechanical alterations, which provoke TMJ pain. Similar findings were recorded in the study conducted by Majumder *et al* [15] and Smriti *et al* [16].

The pain & disability scores were also significantly associated with TMD symptoms (reduced inter-incisal distance, clicking, referred pain and locking with pain and disability). TMD might be related to abnormal pain processing in the trigeminal systemcaused by imbalancesin common neurotransmitters such as serotonin and catecholamines.Serotonin is probably the most important transmitter in descendent inhibitory pathways and a lowered activity of serotonergic system is considered responsible for painful symptoms in depressive or anxious patients. Similar findings were recorded in the study conducted by Bonjardim *et al* [11] and Gatchel *et al* [17].

Further, general health score was negatively correlated with anxiety & depression score, which indicates decrease in general health score with increase in anxiety and depression score.

5. Conclusion

This study demonstrated significant association of anxiety and depression with signs & symptoms of TMD. This study encourages further research on larger sample size to conclude the association of the effect of psychological factors like anxiety and depression with manifestations of temporomandibular disorders.

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