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ANALYSIS OF PRETREATMENT AND POST TREATMENT PAIN USING VISUAL ANALOG SCALE IN TEMPOROMANDIBULAR JOINT DISORDERS

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Abstract

INTRODUCTION*: Temporomandibular joint disorder (TMD) is one of the common and painful disorders. Numerous factors aid the reason for TMD in individuals. Visual Analog Scale (VAS) is a measuring unit used to measure the intensity of the pain. VAS helps to quantify the patient's pain and can be used for any orofacial pain disorder. The study aims to evaluate the pre-treatment and post-treatment pain in patients present with TMD with VAS.*

MATERIALS AND METHODS: *A total of 70 patients were taken in the study and their pain was studied prior and post-treatment using VAS to quantify the intensity of the pain experienced by them. The study period was between July 2019 - March 2020.*

RESULTS: *Study results showed that the usage of VAS in understanding the intensity of pain was beneficial. Comparing the pre and posttreatment pain scores between the male and female populations, the female participants were able to accurately explain the difference in the intensity of the pain compared to their counterparts.*

CONCLUSION: *Evaluating the intensity of pain experienced by an individual may help in altering the treatment modalities and can account for a better quality of life (QoL).*

Keywords: *Analysis, Temporomandibular joint disorder, TMD, Visual Analog Scale, VAS*

Introduction

Fixed prosthodontic treatment deals with the replacement of teeth by artificial substitutes that are not readily removable from the mouth. Its focus is to restore function, esthetics and comfort[1]The fixed partial denture (FPD) is one of the most commonly preferred treatment options for a single missing tooth.[2] FPDs were considered to be the best treatment choice for replacing a single missing tooth[3] Fixed prosthodontics treatment can range from the restoration of a single tooth to rehabilitation [4]

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Various anomalies affecting the structures of the oral cavity which includes the hard and the soft tissues are frequently encountered in routine dental practice. [1] Pain is a multidimensional phenomenon with components of sensory, physiological, cognitive, affective, behavioral, and spiritual presence, and adaptation to the transmission of unpleasant stimuli to the brain component occurs. [2] The International Association for the study of Pain (IASP) defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. [3]

Temporomandibular joint (TMJ) is a load-bearing bilateral synovial joint that is formed by the head of the condyle and the squamous part of the temporal bone. [4] TMJ is a common orofacial condition which is present with symptoms that affect the joint and the muscles of the mastication [5,6] Temporomandibular joint disorder (TMD) is a group of complex disorders of various etiology. They can be caused due to trauma, anomalies of the masticatory muscles, occlusal abnormalities, associated with underlying systemic illness, bruxism, or patients involved in situations causing stress. World workshop of oral medicine VI, conducted a study for advanced training in oral medicine reported that the practitioner must be knowledgeable about the orofacial pain and eligible to recognize the potential high morbidity. [7]

TMJ pain is relatively common with a prevalence of 16-59% reporting symptoms and 33-86% exhibiting clinical signs with only 25% of these individuals proceeding to seek the treatment. [8] They can be present with clicking or popping sound from the joint, deviation of the jaw or stiffness on the affected side, deflection, supporting muscles of TMJ with spasms, and many times difficulty in opening the mouth can be encountered. Often such patients complain of radiating pain near the ear on the affected side and inability to eat or speak. TMD can be affected either unilaterally or bilaterally.

Visual Analog Scale (VAS) is a unidimensional scale measuring the pain intensity. [10] VAS is a continuous scale consisting of horizontal (HVAS) or vertical (VVAS) lines, usually 10 cm (100mm) in length, anchored by 2 verbal descriptors, one for each symptom extreme. [11,12] VAS is practiced universally and it is one of the frequently used pain scoring scales.

The study aims to evaluate the pre-treatment and post-treatment pain intensity accurately in patients present with TMD using Visual analog scale (VAS) which can be aided in enhancing better treatment modalities.

MATERIALS AND METHODS

Study design: Retrospective, descriptive study.

Study population: A total of 70 participants were taken into the study, of which 27 patients were excluded based on the study criteria.

Study period: The study was conducted between the period of July 2019 - March 2020.

Study setting: The participants attended the oral medicine clinic at Saveetha Dental College and Hospital in Chennai were taken into the study.

Ethical approval: Prior to starting the study, ethical approval (SDC/SIHEC/2020DIASDATA/0619-0320) was obtained from the Institutional Scientific Review Board.

Inclusion criteria: The patients included in the study were a) patients present with all types of TMD. b) with the ability to understand and respond to the VAS. c) with regular follow-up. d) with treatment pertaining only to medications and supportive therapies.

Exclusion criteria: Patients with difficulty in responding to VAS or treated with surgical management and patients with irregular follow up were excluded from the study.

Study method: Two primary researchers were involved in the study – researcher 1 with experience of more than 30 years in the field and researcher 2 with an experience of fewer than 5 years. The necessary records of the participants were retrieved through the Institutional archival software and cross-references of the data was done. Patients were asked to quantify the intensity of pain experienced by them before treatment and their post-operative pain was consecutively analyzed during their review and follow-up period. Patients' consent was obtained priorly and were explained about VAS and the persistence of doubts regarding them was immediately clarified by the researchers.

The explanation of VAS was done in the patient's language for better understanding. Patients were asked to rate the pain intensity keeping 0cm as the lowest value a patient can quantify about pain and 10cm as the highest value. Recordings of the pain score were noted digitally and compared and analyzed for each individual.

Statistical analysis: Statistical analysis was done using SPSS v20.0 software. The data was grouped according to the age of the population, gender of the population, type of TMD, and pretreatment and posttreatment pain score. The frequency distribution and descriptive statistics of the age, gender, types of TMD and pretreatment and posttreatment pain score were calculated. Statistical significance was set at p value <0.05. Types of TMD, gender and age were compared separately using chi square test.

RESULTS

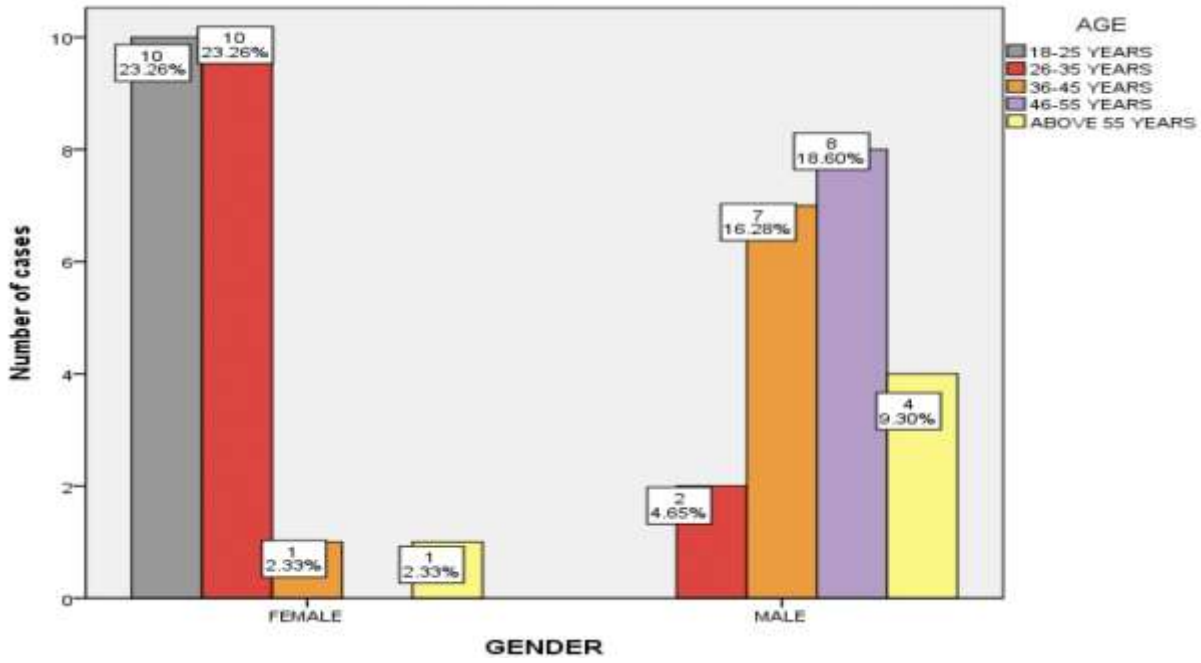
Of the 70 individuals with TMD taken into the study, 22 were advised surgical management and 5 patients had been dropped from the study due to irregular follow-up. Overall, a total of 43 individuals (22 female and 21 male) were examined and taken into consideration.

The frequency of the study is analyzed based on the pre-treatment and post-treatment pain, gender and age of the study population, and type of temporomandibular joint disorders - Myofascial Pain Dysfunction Syndrome (MPDS) and Disc-condyle disorder.

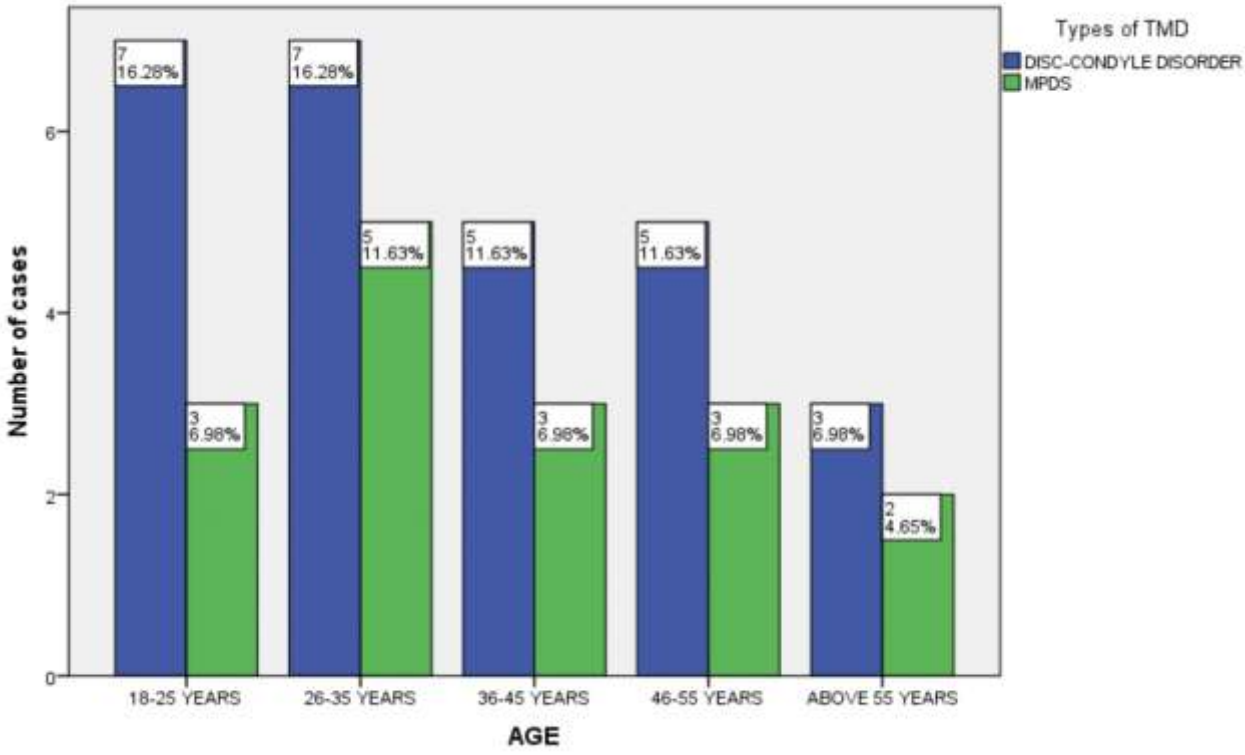
Analysing the age and the gender of the population, Female patients had a higher prevalence of 23.26% between the age groups 18-25 years and 26-35 years. Male patients showed the highest prevalence of 18.6% between the age group 46-55 years. (Graph 1) Highest prevalence of 16.28% was noted in disc-condyle disorder of age groups 18-25 years and 26-35 years respectively. In MPDS, the highest prevalence of 11.63% was noted in age groups 36-45 years and 46-55 years. (Graph 2) In disc-condyle disorder, females showed the highest prevalence of 32.56% and in MPDS both male and female showed an equal prevalence of 18.6%. (Graph 3)

The frequency distribution of the demographic data of the population involved in the study is explained in table 1. Characteristics of the study population included in the table were age and gender. Observing the frequency of the age of the population, the highest prevalence of patients with TMD 27.9% were between the age 26-35 years. Female patients were largely affected (51.2%) than male patients.

The comparative evaluation of pain in disc-condyle disorder and MPDS prior and post-treatment with VAS. Reduction in pain intensity is calculated and analyzed. Of which the female participants with disc-condyle disorder showed a significantly higher reduction in pain of 55.08%. Male participants showed a lesser difference in the intensity of the pain of all groups (40.57%). The mean of each group is calculated and tabulated. (Table 2)

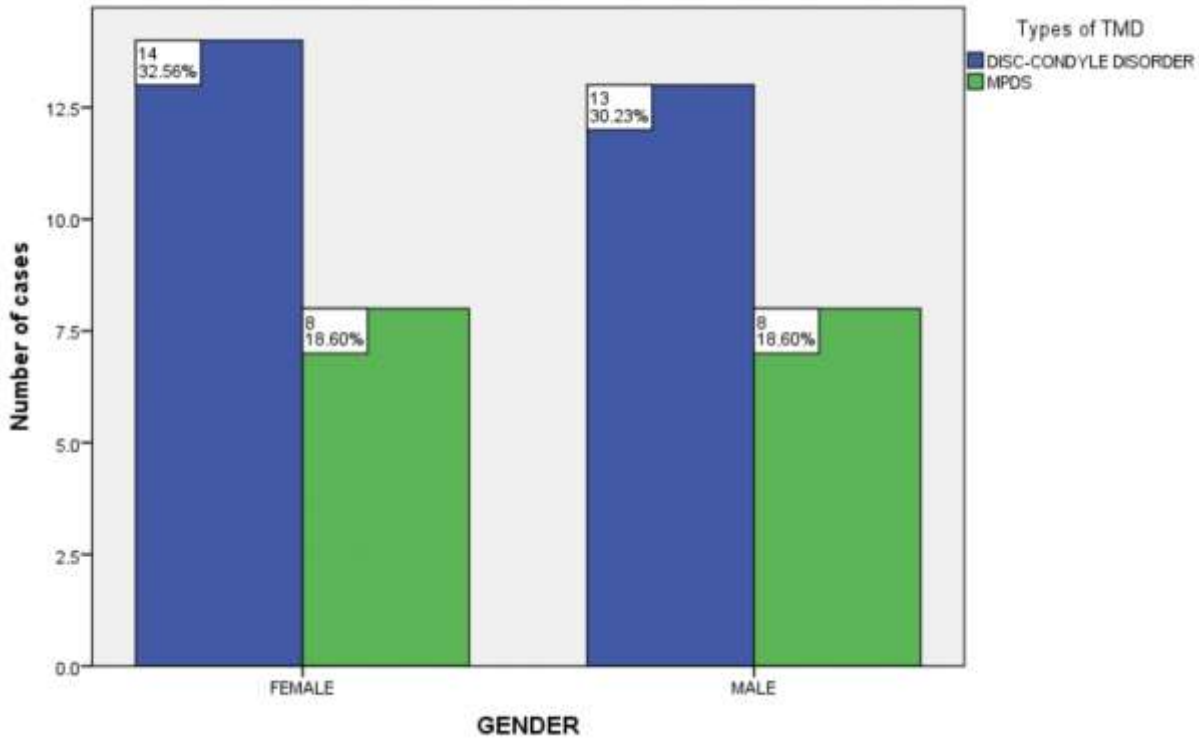


Graph 1 reveals the frequency distribution of the age and gender of the population. X-axis denotes the gender of the patients - male and female and Y axis denotes the number of cases involved in the study. Grey bar represents the age group between 18-25 years, red bar represents the age group 26-35 years, orange bar represents the age 36-45 years, purple bar represents age 46-55 years and yellow bar represents the age above 55 years. Female patients had higher prevalence of 23.26% between the age groups 18-25 years and 26-35 years. Male patients showed the highest prevalence of 18.6% between the age group 46-55 years.



Graph 2 reveals the association between age and types of temporomandibular joint disorders. X- axis denotes the age of the population and Y axis denotes the number of cases. Blue bar represents the Disc-condyle disorder and Green bar denotes the Myofascial pain dysfunction syndrome (MPDS). Highest prevalence of 16.28% was noted in disc-condyle disorder of age groups 18-25 years and 26-35 years respectively. In MPDS, the highest

prevalence of 11.63% was noted in age groups 36-45 years and 46-55 years. Pearson chi square value = 0.91 and p value = 0.90 (p >0.05) shows the study is statistically not significant.



Graph 3 reveals the association between gender and types of temporomandibular joint disorders. X- axis denotes the gender of the population as female and male and Y axis denotes the number of cases. Blue bar represents the Disc-condyle disorder and Green bar denotes the Myofascial pain dysfunction syndrome (MPDS). In disc-condyle disorder, females showed the highest prevalence of 32.56% and in MPDS both male and female showed an equal prevalence of 18.6%. Pearson chi square value = 0.98 and p value = 0.70 (p >0.05) shows the study is statistically not significant.

Table 1 denotes the overall individual frequency and percentage of the demographic data of the study population

Characteristics of the study population		Frequency	Percentage
Age	18-25 YEARS	10	23.3
	26-35 YEARS	12	27.9
	36-45 YEARS	8	18.6
	46-55 YEARS	8	18.6

	ABOVE 55 YEARS	5	11.6
	Total	43	100.0
Gender	FEMALE	22	51.2
	MALE	21	48.8
	Total	43	100.0

Table 2 denotes comparative evaluation of pain in disc-condyle disorder and MPDS pre and post-treatment using VAS

GENDER	**TYPES OF TMD**	**PERCENTAGE OF PAIN INTENSITY (VAS)**			**MEAN**	
		PRE-TREATMENT	**POST-TREATMENT**	**△ REDUCTION IN PAIN**	**PRE-TREATMENT**	**POST-TREATMENT**
FEMALE (n=22)	DISC-CONDYLE DISORDER	84.2%	37.8%	4.642 (55.08%)	8.42	3.78
	MPDS	85%	52.5%	4.307 (50.90%)	8.46	4.23
MALE (n=21)	DISC-CONDYLE DISORDER	84.6%	42.3%	3.5 (40.57%)	8.65	5.12
	MPDS	83.7%	45%	3.875 (46.26%)	8.37	4.5

DISCUSSION

Mir Mohammad Sadeghi et.al., (2019) conducted a study in the Iranian population and found that there was an increase in TMD post third molar removal which was quantified with the help of VAS. [13] Few recent studies advise the extraction of the third molar if the etiology of TMD is impacted teeth and suggests for an atraumatic removal as it might aggravate the pain. In patients with poor oral hygiene, there are possibilities for third molars to be present with dental caries. In such conditions, the origin of the pain is difficult to understand as there is a

presence of irreversible pulpitis in an impacted tooth accounting for pain and difficulty in mouth opening. [14–16]

A study conducted in the Nigerian population by Elijah Olufemi Oyetola et.al., (2017) states a total of 50 population in which 13% of the female predilection compared to male and the scoring criteria to assess the pain used as VAS. [17]

The role of molecular pain biomarkers for TMD comes into the picture when the TMJ synovial fluid is present with cytokines and matrix metalloproteinase (MMPs) in higher concentrations in individuals with painful internal disc derangements and it is shown to be associated with the degree of degeneration as the cytokines promote the release of matrix metalloproteinases (MMPs), and due to hypoxia, vascular endothelial growth factor (VEGF) is released. [18–20]

Exposing the individuals to investigations like conventional 2-dimensional or 3-dimensional radiographs like cone-beam CT and CT are very helpful in treatment planning. [21] Encountering the inability to open the mouth or pain during the mouth opening should be evaluated for the absence of other oral conditions., for eg., oral submucous fibrosis can be present with trismus.[9] The management of the etiology of TMD once identified and treated can result in a decrease in the pain.

The management is usually either conservative therapy or a surgical approach. The factors causing TMD can be readily targeted and treated with medications like NSAIDs, anxiolytics, TCA, or muscle relaxants. [22] Participants involved in the study were treated with necessary medications, supportive therapies and cognitive behavioral therapy (CBT) was advised if necessary.[23] Each patient was called for a review for three months regularly and depending upon the response the patients were further called upon. The first review was within 2 weeks of starting medical management. Patients were also monitored on the prescribed medications in order to avoid adverse effects or the occurrence of any new diseases. [24,25]

This study had evaluated the pain intensity of TMD, which is managed conservatively and the results show that it is necessary to identify the intensity of the pain using pain measuring scale, or questionnaires to identify the level of pain accurately and to emphasize the required management.

CONCLUSION

There was a significant difference observed between pretreatment and posttreatment pain intensity 55.08%, which was assessed using visual analog scale (VAS) in the female population present with temporomandibular joint disorders (TMD) at the Oral Medicine clinic after medically managed by the institutional doctors.

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AUTHORS CONTRIBUTION

The first author (Dr. Indra.G) performed the data collection, analysis, interpretation, and wrote the manuscript.

The second author (Dr. Maragathavalli.G) contributed to the conception, data design and analysis, interpretation, and critically revised the manuscript.

The third author (Dr. Deepika Rajendran) participated in the study and revised the manuscript.

All three authors discussed the results and contributed to the final manuscript.

CONFLICT OF INTEREST

The authors of the manuscript declare no conflicts of interest.

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