

**ASSESSMENT OF THE PREVALENCE AND SEVERITY  
OF THE TEMPOROMANDIBULAR DYSFUNCTIONS IN  
YOUNG ADULTS**

*Dissertation Submitted to*  
**THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY**

*In partial fulfillment for the Degree of*  
**MASTER OF DENTAL SURGERY**



**BRANCH III**  
**ORAL AND MAXILLOFACIAL SURGERY**  
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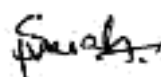
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CHENNAI**

**DECLARATION BY THE CANDIDATE**

I hereby declare that this dissertation title “**ASSESSMENT OF THE PREVALENCE AND SEVERITY OF THE TEMPOROMANDIBULAR DYSFUNCTIONS IN YOUNG ADULTS**” is a bonafide and genuine research work carried out by me under the guidance of **Dr. MALINI JAYARAJ, M.D.S.,** Professor, Department of Oral & Maxillofacial Surgery, Ragas Dental College and Hospital, Chennai.

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**Place:** Chennai

  
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## CERTIFICATE

This is to certify that this dissertation titled "ASSESSMENT OF THE PREVALENCE AND SEVERITY OF THE TEMPOROMANDIBULAR DYSFUNCTIONS IN YOUNG ADULTS" is a bonafide record of work done by **Dr. SARNU SIVAIAH** under our guidance and to our satisfaction during his postgraduate study period **2015-2018**.

This Dissertation is submitted to **THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY**, in partial fulfillment for the award of the Degree of **MASTER OF DENTAL SURGERY - ORAL AND MAXILLOFACIAL SURGERY, BRANCH III**. It has not been submitted (partial or full) for the award of any other degree or diploma.

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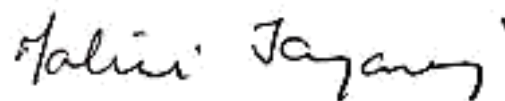
**PLAGIARISM CERTIFICATE**

This is to certify that this dissertation work titled "ASSESSMENT OF THE PREVALENCE AND SEVERITY OF THE TEMPOROMANDIBULAR DYSFUNCTIONS IN YOUNG ADULTS" of the candidate **Dr. SARNU SIVALAH** with registration Number .....for the award of Master of Dental Surgery in the branch of **ORAL AND MAXILLOFACIAL SURGERY**. I personally verified the urkund.com website for the purpose of plagiarism Check. I found that the uploaded thesis file contains from introduction to conclusion pages and result shows **5 percentage** of plagiarism in the dissertation.

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## **ABSTRACT**

### **AIM:**

The aim and objective of this study is to assess the prevalence and severity of temporomandibular disorders by evaluating the occlusal characteristics, headache, parafunctional habits, stress and TMJ clicking sounds by using Fonseca's and Helkimo questionnaires and clinical examination in young adults.

### **MATERIALS AND METHODS:**

This study was done in Ragas dental college and Hospital in the Department of Oral and Maxillofacial Surgery during the period of February 2016 to December 2017. We designed a study to assess the prevalence and severity of temporomandibular disorders (joint sounds, pain in TMJ and its associated structures, masticatory muscles, restricted mandibular movements, jaw stiffness, deviation of mandible during mouth opening/closing and limited mouth opening) by evaluating the occlusal characteristics, headache, parafunctional habits, stress, anxiety/depression and TMJ clicking by using, Fonseca's and Helkimo questionnaire and clinical examination in young adults. The study was conducted on 832 participants aged 18-50 years, using two strategies to assess the severity of TMD: a clinical examination of temporomandibular joint and its associated structures, and a set of 18 questions regarding TMD data. Informed consent was obtained from all the

participants who participated in the study. Out of the 832 participants that were included in the study, 617 participants satisfied the inclusion criteria. In the 617 participants who were included, at least one sign/symptom of TMD could be elicited from them. The obtained data was analyzed using chi-square test.

## **RESULTS:**

Results of present study showed that study subjects according to with(or) without presence of TMD based on age and gender shows that among 617 participants in which 374 (60.6%) participants had at least one sign/symptom of TMD in which 74(48.4%) participants were in 18-25 years group, 94(59.4%) participants were in 26-33 years age group, 101(61.5%) participants in 34-41 years age group, 105(74.4%) participants were in 42-50 years age group had at least one symptoms/sign of TMD. Based on gender wise distribution 204(54.5%) females, males 170(45.5%). prevalence of one or more symptoms of TMD was present in 32.1% participants, while the prevalence of one or more signs of TMD was present in 64.6% participants which was mild in severity. Females reported higher prevalence of TMD signs and symptoms than males. Mild anamnestic dysfunction symptoms (AiI) were found in 46.02% and severe dysfunction symptoms (AiII) were found in 8.91%, while mild clinical sign (DiI) were found in 48.6%, moderate dysfunction clinical sign (DiII) were found in 22.73% and severe clinical dysfunction sign (DiIII) were found in 3.07%. Statistically there was no age

and gender difference. Regarding the association between TMD with psychological stress and anxiety/depression, 199 of the 338 participants (58.9%) with TMD symptoms also had signs of psychological stress and anxiety/depression ( $P < 0.001$ ).

### **CONCLUSION:**

Subclinical signs of TMD were observed in 64.6% of general population who showed at least one positive sign. Females were more commonly affected than males in the ratio of 1.6:1. The middle age people more commonly affected. Results showed significant association between the reporting sign/symptoms of TMD and hypothesised risk factors such as psychological stress, anxiety/depression, sleep disturbances, tension type of headache, occlusal characteristics like malocclusion, posterior cross bite, anterior open bite, deep bite, parafunctional habits, adverse habits, missing posterior teeth, preferred chewing side have a significant role in establishing progressive temporomandibular disorders.

**KEY WORDS: TMD, PSYCHOLOGICAL STRESS, ANXIETY / DEPRESSION, PARAFUNCTIONAL HABITS, ANAMNESTIC DYSFUNCTION INDEX, CLINICAL DYSFUNCTION INDEX.**

## CONTENTS

<b>S.No</b>	<b>TITLE</b>	<b>PAGE NO.</b>
1.	INTRODUCTION	1
2.	AIMS AND OBJECTIVE	5
4.	REVIEW OF LITERATURE	6
5.	MATERIALS AND METHODS	23
6.	RESULTS	42
7	DISCUSSION	52
8	SUMMARY AND CONCLUSION	66
9	BIBLIOGRAPHY	67
10	ANNEXURE	-

## LIST OF TABLES

TABLE NO	TITLE
1.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO AGE AND GENDER
2.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SYMPTOMS BASED ON GENDER
3.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SIGNS BASED ON GENDER
4.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE HELKIMO ANAMNESTIC DYSFUNCTION (Ai)
5.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE HELKIMO CLINICAL DYSFUNCTION (Di)
6.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SYMPTOMSBASED ON AGE AND GENDER
7.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SYMPTOMSBASED ON AGE AND GENDER
8.	ASSOCIATION OF STUDY SUBJECTS WITH POSTERIOR TEETH LOSS
9.	ASSOCIATION OF STUDY SUBJECTS CHEWING SIDE PREFERENCE

10.	ASSOCIATION BETWEEN POSTERIOR TEETH LOSS AND TMD
11.	ASSOCIATION BETWEEN CHEWING SIDE PREFERENCE RELATED TO TMD
12.	ASSOCIATION OF STUDY SUBJECTS WITH ANXIETY/DEPRESSION
13.	ASSOCIATION BETWEEN ANXIETY/DEPRESSION AND TMD

## LIST OF GRAPHS

GRAPH NO	TITLE
1.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO AGE AND GENDER
2.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SYMPTOMS BASED ON GENDER
3.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SIGNS BASED ON GENDER
4.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE HELKIMO ANAMNESTIC DYSFUNCTION (Ai)
5.	DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE HELKIMO CLINICAL DYSFUNCTION (Di)
6A.	ASSOCIATION OF STUDY SUBJECTS WITH ANXIETY/DEPRESSION
6B.	ASSOCIATION BETWEEN ANXIETY/DEPRESSION AND TMD
7.	ASSOCIATION BETWEEN POSTERIOR TEETH LOSS AND TMD
8.	ASSOCIATION BETWEEN CHEWING SIDE PREFERENCE RELATED TO TMD

## LIST OF FIGURES

FIGURE NO.	TITLE
1.	CASE 1: DISC DISPLACEMENT WITH REDUCTION
2.	CASE 2: DISC DISPLACEMENT WITH REDUCTION
3.	CASE 3: MPDS
4.	CASE 4: DISC DISPLACEMENT WITH OUT REDUCTION



## **INTRODUCTION**

The TMJ is a bilateral synovial joint between the squamous portion of the temporal bone and condylar head of mandible. Two articulated bones of TMJ are separated by an articular disk into superior compartment and inferior compartment. TMJ is also called as a “ginglymodiarthroidal joint” because it allows hinge and sliding movements. Temporomandibular joint allows painless mandibular movements like mouth opening and closing, lateral excursion movements, protrusion and retrusion of the mandible. Articulating surfaces of temporomandibular joint was covered by avascular and non-innervated fibrous cartilage and it has significant capacity to withstand the effect of degenerative changes and also has regenerative capacity. joint capsule, bilamellar zone of articular disk/ retrodiscal tissue and associated masticatory muscles are innervated by nerves and which are responsible for pain and discomfort in presence of TMD .<sup>60</sup>

Temporomandibular (TMJ) disorder is an array of condition characterized by pain in mouth opening, pain in orofacial region, temporomandibular joint sounds with or without pain. limited mouth opening, restricted mandibular movements, pain and tenderness of temporomandibular joint or associated structures, orofacial muscles and masticatory muscles and deviation/deflection of mandible during movements of joint.<sup>12</sup>

Costen first recognised Signs and symptoms of temporomandibular disorders in 1934. Bell first introduced the name temporomandibular dysfunction. Temporomandibular disorders are also called as Costen syndrome, facial arthromyalgia, pain dysfunction syndrome, temporomandibular joint dysfunction syndrome.<sup>54,1</sup>

The aetiology of TMD are more complex and multifactorial with initiating factors, predisposing and perpetuating factors. TMD causes may be related to stress, anxiety/depression, tension type of headache, preferred chewing side, abnormal occlusion, parafunctional habits (bruxism, grinding, clenching, nail biting), posterior teeth loss, posterior crossbite, anterior deep bite, anterior open bite, adverse oral habits and masticatory muscle pain.<sup>16</sup>

Abnormal dental occlusion like anterior open bite, overjet more than 6mm, unilateral lingual cross bite, missing posterior teeth are always associated with TMD patients. however, parafunctional habits such as clenching, grinding, jaw play, are also significantly present in general population without any symptoms of temporomandibular disorders. Therefore, parafunctional habits may play a role in initiating or perpetuating symptoms in some patients.

Awake Bruxism and Sleep Bruxism are two types of bruxism that these seem to have different pathophysiological mechanisms. Approximately

90% of episodes are eccentric (grinding) in sleep bruxism, where as in awake bruxism more 10% episodes are tended to be centric called as clenching.<sup>6</sup>

Disc displacement is common in TMD patients and disc displacement divided into disc displacement with reduction and disc displacement without reduction. Early detection of disc displacement is possible by assessing the TMJ sounds or TMJ clicking and mandible deviations while mouth opening and closing.<sup>21</sup>

More frequent symptoms of TMD are discomfort and stiffness of temporomandibular joint or its associated masticatory muscle region. Pain in temporomandibular joint and orofacial region with restricted mandibular movements. The most common signs of TMD are temporomandibular joint click/sounds with or without pain, limited mouth opening, restricted mandibular movements, locking of the mandible, deviation/deflection of the mandible during mouth opening and closing.<sup>43</sup>

A change in life style of people in this rapidly emerging progressive world drives people to lead stressful lives. Stress due to various reasons can affect the normality of the human body which can leads to stress related diseases. Educated young individual who are prone to stress related diseases are increased in number of the general people.

Stress induced tension type of headache was more commonly seen in general populations are significantly associated with TMD.<sup>11,26</sup>

Clinical studies have shown 45-50% of signs and symptoms of temporomandibular disorders were identified in moderate to severely affected patients. However 16% to 59% of TMD symptoms lie dormant in general population out of which, the dormant symptoms become pronounced in 15-20% of patients, drives them to seek treatment.<sup>10</sup>

The purpose of this study is to assess the prevalence and severity of temporomandibular disorders by evaluating the occlusal characteristics, headache, para functional habits (clenching, grinding, bruxism), malocclusion, stress/depression of the individual, missing posterior teeth and preferred side of chewing which were checked meticulously if they had an influence on the TMDs by using Fonseca's and Helkimo questionnaires and clinical examination in young adults.

## **AIM AND OBJECTIVE**

The aim and objective of this study is to assess the prevalence and severity of temporomandibular disorders by evaluating the occlusal characteristics, headache, parafunctional habits, stress and TMJ clicking sounds by using fonseca's and Helkimo questionnaires and clinical examination in young adults.

## **REVIEW OF LITERATURE**

**R.J.SPRUIJT,K.B.WABEKE et al (1995)<sup>46</sup>**

Study focused on the association between psychological factors and TMJ sounds. study concluded that there is little support for postulating mechanisms that relate psychological factors to the presence of TMJ sounds.

**J. A. DE BOEVER, G. E. CARLSSON, I. J. KLINEBERG et al (2000)<sup>3</sup>**

Study conducted to assessed the influence of dental occlusion therapy for the management of signs and symptoms of temporomandibular disorders. They concluded that combination of occlusal therapy, physiotherapy and splints can contribute significant positive effects in treatment outcome in selected patients with TMD. Occlusal therapy in children and adolescents might be reduce the later occurrence of TMD signs.

**Birgit Thilander, Guillermo Rubio, Lucia Pena, Clara de Mayorga, et al (2001)<sup>2</sup>**

Study conducted to find out the influence of malocclusions on temporomandibular joint. They found that signs and symptoms of TMD was significantly associated with overjet more than normal, posterior crossbite, anterior open bite, Angle Class III malocclusion.

**Visscher CM, Lobbezoo F, de Boer W, van der Zaag J, Naeije M. et al (2001)<sup>29</sup>**

This study conducted in 250 participants to assess the relationship between cervical spinal pain and subjects with or without signs and symptoms of TMD. study concluded that cervical spinal pain significantly associated with positive temporomandibular joint pain subjects.

**E. WINOCUR, A. GAVISH, T. FINKELSHTEIN, M. HALACHMI & E. GAZIT et al (2001)<sup>22</sup>**

Study conducted in teenage participants to assessed the relationship of clenching habits on signs and symptoms of temporomandibular joint disorders. Study concluded that clenching habits were more often associated with internal derangement.

**R. Ciancaglini, G. Radaelli et al (2001)<sup>26</sup>**

Study conducted in general population to investigated the relationship between signs and symptoms of temporomandibular disorder (TMD) and headache. Study found that subjects with tension type of headache significantly associated with signs and symptoms of temporomandibular disorders.

**Stephen M. Auerbach, Daniel M. Laskin, Lisa Maria E. Frantsve, MA,  
and Tamara, et al (2001)<sup>20</sup>**

Study conducted in 258 participants to assess the influence of psychological factors on functions of masticatory muscles and signs and symptoms of TMD and study concluded that psychological factors play major role in orofacial pain and signs and symptoms of TMD.

**RICCARDO CIANCAGLINI, ENRICO F. GHERLONE and  
GIOVANNI RADAELLI et al (2001)<sup>24</sup>**

This study conducted in general population to assessed the relationship of bruxism on masticatory muscle pain and signs/symptoms of TMD. Study finding shows that bruxism significantly associated with masticatory muscle pain with restricted mandibular movements.

**Tallents RH, Macher DJ, Kyrkanides S, Katzberg RW, Moss ME. et al  
(2002)<sup>27</sup>**

Assessed the influence of posterior teeth loss on temporomandibular joint disorders. Study shows that posterior tooth loss can cause more loading in joint that put together leads to disc displacement with or without reduction and degenerative joint diseases.



**Joseph Katz, DMD; Marc Heft, DMD, PhD et al (2002)<sup>47</sup>**

Study investigated to assessed the relationship between temporomandibular joint clicking/sounds and pain in masticatory muscle. Results shows that temporomandibular joint clicking/sounds was more prevalent in patients with masticatory muscle pain than subjects without masticatory muscle pain.

**R. H. PAHKALA, M. T. LAINE-ALAVA et al (2002)<sup>59</sup>**

Study reported that patients with anterior open bite, malocclusion, posterior cross bite, deep bite more than 6mm, increased overjet were significantly associated with signs and symptoms of TMD.

**C. M. VISSCHER, W. DE BOER, F. LOBBEZOO, L. L. M. H. HABETS,  
M. NAEIJE (2002)<sup>28</sup>**

This study assessed the influence of head posture on symptomatic TMD patients with or without cervical pain. Results shows that symptomatic TMD patients with or without cervical pain were not associated with head posture.

**Adrian U. J. Yap, Keson B. C. Tan, Ee Kiam Chua, and Hee Hon Tan,  
(2002) et al<sup>19</sup>**

This study conducted to assess the influence of anxiety/depression levels on signs and symptoms of TMD. Results shows that patients with

mandibular dysfunction significantly associated with higher levels of anxiety/depression.

**Frank Lobbezoo, Corine M. Visscher, Machiel Naeije et al (2004)<sup>57</sup>**

This study investigated the influence of signs and symptoms of TMD and cervical spinal pain on quality of life, sleep disorders and musculoskeletal pain by using questionnaire. Study concluded that patients with chronic pain signs and symptoms of TMD and cervical pain were significantly associated with sleep disorders and psychological impact on quality of the life.

**Leonardo Rigoldi Bonjardim, Maria Beatriz Duarte Gavião, Luciano José Pereira (2005)<sup>14</sup>**

Study assessed the prevalence of severity of temporomandibular disorders in adolescents. Study concluded that TMJ sounds and tenderness of masticatory muscles were significant prevalent signs of TMD and lateral pterygoid muscle tenderness was more commonly found in females than males

**Anamaria Siriani de Oliveira, Elton Matias Dias, Rogério Guimarães Contato, Fausto Berzin et al (2006)<sup>15</sup>**

Study conducted in 2396 Brazilian college students for assessed the prevalence and severity of signs and symptoms of TMD by using fonseca's questionnaire. The study revealed that more participants shows mild TMD dysfunction signs and symptoms of TMD with female predilection.

**Hassel AJ, Rammelsberg P, Schmitter M. et al (2006)<sup>38</sup>**

Assessed the influence of age on signs and symptoms of TMD and study shows that age factors were not influenced on reliability of detecting TMJ sounds and masticatory muscles tenderness.

**Gary D. Klasser, Jeffrey P. Okeson, et al (2006)<sup>51</sup>**

Study shows that clinical examination of TMJ, masticatory muscle and patient history like medical and dental history were plays major role for diagnosis of signs and symptoms of TMD.

**NEKORA-AZAK, G. EVLIOGLU, M. ORDULU, H.IS,SEVER et al (2006)<sup>62</sup>**

Study assessed symptoms of TMD in treated and non-treated TMD participants. Results shows that parafunctional habits and TMD symptoms were significantly associated with treated TMD participants than non-treated TMD participants.

**D. A. SELIGMAN, A. G. PULLINGER et al (2006)<sup>50</sup>**

Study results shows that anterior attrition significantly associated with signs and symptoms of temporomandibular disorders among which disc displacement with or without reduction was most prevalent sign of temporomandibular disorders.

**Rabab M Feteih (2006)<sup>44</sup>**

Cross sectional epidemiological study conducted in adolescent school children for assessment of prevalence and severity of signs and symptoms of temporomandibular joint disorders. Study concluded that temporomandibular joint sounds and headache were reported as frequent signs and symptoms of temporomandibular disorders.

**Juan Fernando Casanova-Rosado. Carlo Eduardo Medina-Solís. Ana Alicia Vallejos-Sánchez. Alejandro José Casanova-Rosado. Bernardo Hernández-Prado. Leticia Ávila-Burgos et al (2006)<sup>40</sup>**

Determined the prevalence and associated factors for signs/symptoms of temporomandibular disorders (TMD) by using questionnaires and study concluded that factors like parafunctional habits, preferred chewing side, posterior tooth loss and stress always associated with signs and symptoms of temporomandibular disorders.

**Daniel R. Reißmann, Mike T. John, Oliver Schierz, Robert W. Wassell et al (2007)<sup>56</sup>**

This study designed to compared the quality of life between patients with signs and symptoms of TMD and patients without TMD. Study concluded that patients with pain related signs and symptoms of temporomandibular disorders were significantly associated with psychological

impact on quality of life compared with patients without signs and symptoms of temporomandibular disorders.

**S. DIERNBERGER, O. BERNHARDT, C. SCHWAHN, B. KORDASS et al (2007)<sup>31</sup>**

Study investigated to evaluate the influence of chewing side preference on signs and symptoms of TMD and study concluded that balancing side/ non-working joint getting more load than working joint which cause pain in non-working joint or balancing side TMJ and its associated masticatory muscles. Temporomandibular joint sounds with or without pain significantly associated with preferred chewing side.

**K. IKEBE, T. HAZEYAMA, K. IWASE, H. SAJIMA, T. GONDA, Y. MAEDA T. NOKUBI et al (2008)<sup>4</sup>**

Study investigated to assessed the influence of posterior occlusal support on TMJ sounds and masticatory muscle functions. Study results shows that temporomandibular joint sounds with pain or without pain always associated with reduced masticatory muscles functional performance and lower occlusal force.

**Muhamed Ajanovic, Benjamin Bejtovic et al (2009)<sup>8</sup>**

Study conducted in post-traumatic stress disorders participants to assessed the relationship between the Helkimo clinical dysfunction index and

Helkimo anamnestic dysfunction index. Results shows that values of Helkimo anamnestic dysfunction index (symptoms) and values of Helkimo clinical dysfunction index (signs) significantly associated with each other's.

**Pereria TC, brasolotto et al (2009)<sup>18</sup>**

Study Investigated the influence of temporomandibular disorders in dysphonia and quality of life in women. Study concluded that TMD etiologic factors are common to dysphonia and also associated with excessive tension in the cervical spinal region and orofacial region. Which leads to restricted mandibular movements during speech can affect the dysphonia.

**O. GURBUZ, G. ALATAS, E. KURT et al (2009)<sup>36</sup>**

Assessed the prevalence of the signs of TMD patients with schizophrenia compared with general population. Study concluded that patients with schizophrenia were more prevalent to the development of signs and symptoms of temporomandibular disorders compared with general population.

**Koh H, Robinson P et al (2009)<sup>52</sup>**

Assessed the effectiveness of occlusal adjustment for treatment or prevention of TMD in adults. Study concluded that Occlusal adjustment alone cannot be suggested as a treatment protocol for TMD.

**G. CHIAPPE, F. FANTONI, N. LANDI, K. BIONDI, M. BOSCO et al  
(2009) <sup>39</sup>**

This study assessed the influence of occlusal variables on signs and symptoms of temporomandibular disorders. Study results shows that disc displacement with or without reduction always associated with occlusal variables such as absence canine guidance, maximum intercuspation

**Daniela Aparecida de Godoi Gonçalves, DDS, Marcelo E. Bigal, MD,  
PhD. et al (2010) <sup>35</sup>**

Study conducted in Brazilian population to assess the influence of age and gender on prevalence and severity of signs and symptoms of temporomandibular disorders by using questionnaire. Study shows that at least one TMD symptom was reported by almost 40% of the individuals from the population and TMJ sounds represented the most common symptom of TMD, followed by TMJ pain and MMP and also symptoms were significantly associated with headaches and neck pain.

**O. GURBUZ, P. KURSOGLU, G. ALATAS, K. ALTINBAS et al (2010) <sup>37</sup>**

This study results shows that mandibular deviation/deflection during mouth opening and closing, restricted mouth opening, mandibular deviation/deflection during mouth opening and closing, temporomandibular joint sounds were found more in patients with mental retardation compared to normal population.

**Pei Feng Lim, Shad Smith, Kanokporn Bhalang, et al (2010)<sup>61</sup>**

Study conducted in 266 participants on a 3 year of follow up show that headache, neck pain and shoulder pain were higher in patients with temporomandibular disorders than subjects without TMD.

**Daniele Manfredini, Luca Guarda-Nardini, Ephraim Winocur, et al (2011)<sup>55</sup>**

This study systematically reviewed about literature for assessment of prevalence and severity of signs and symptoms of temporomandibular disorders in general population according to RDC/TMD diagnoses criteria. Study results shows that myofascial pain, limited mouth opening and restricted mandibular movements were the commonest diagnosis in patients with TMD and disc displacement with reduction was the commonest diagnosis in participants without TMD.

**Kirsi Sipilä, Anna Liisa Suominen, Pentti Alanen, Markku Heliövaara, Pekka Tiittanen, Mauno Könönen et al (2011)<sup>49</sup>**

This conducted in 6227 participants in Finland to investigated the association between masticatory muscle pain and multiple several body parts pains. Study concluded that 6% participants with signs and symptoms of temporomandibular disorders were significantly associated with neck pain and shoulder pain.



**A.EMODI-PERLMAN, I. ELI, P. FRIEDMAN-RUBIN, C. GOLDSMITH, S. REITER, E. WINOCUR et al (2012)<sup>32</sup>**

This study examined 244 children to investigate the influence of the stressful life events on the prevalence of bruxism, oral parafunctions, and signs and symptoms of temporomandibular disorders. Study concluded that Stressful life events in children significantly associated with oral parafunctional habits.

**Kazunori Ikebe, Ken-ichi Matsuda, Ryosuke Kagawa, Kaori Enoki, Tadashi Okada, Minoru Yoshida, Yoshinobu Maeda et al (2012)<sup>42</sup>**

Did a study to investigated the influence of dental occlusion and salivary flow, missing posterior tooth loss on signs and symptoms of temporomandibular disorders. Study concluded that patients with improper dental occlusion and posterior tooth loss significantly associated with joint dysfunction.

**K. NIEMELA, M. KORPELA, A. RAUSTIA, P. YLOSTALO, K. SIPILA et al (2012)<sup>63</sup>**

Study results shows that stabilization splints with physiotherapy and mouth exercises were reduce the signs and symptoms of temporomandibular disorders and increasing the functional efficacy of temporomandibular joint.

**J. C. TU RP, H. SCHINDLER et al (2012) <sup>34</sup>**

The study assessed the influence of dental occlusion on signs and symptoms of temporomandibular disorders and study found that participants with parafunctional habits, missing posterior teeth and cross bite were more significantly associated with signs and symptoms of temporomandibular disorders.

**Marina Fernandes de Sena, Késsia Suênia F. de Mesquita, Fernanda Regina R. Santos, Francisco Wanderley G. P. Silva, Kranya Victoria D. Serrano et al (2013)<sup>9</sup>**

This study assessed the prevalence of signs and symptoms of temporomandibular disorders in children and adolescents. Study concluded that hormonal imbalance plays major role in signs and symptoms of temporomandibular disorders.

**Ariovaldo Alberto da Silva<sup>1</sup>, Karina Viana Brandão, Bruno Engler Faleiros, Rafael Mattos Tavares et al (2013) <sup>12</sup>**

Study conducted in 289 participants to assess influence of primary headache on signs and symptoms of temporomandibular disorders. Study results shows that patients with chronic and tension type of head ache significantly associated with painful symptoms of TMD.

**José Gustavo Dala Déa Camacho, Paula Vanessa Pedron Oltramari-Navarro et al (2013)<sup>13</sup>**

The study conducted in 200 elderly participants to evaluate the influence of age and gender on joint sounds and masticatory muscle tenderness. Study concluded that patients more than 60 years of age significantly associated with masticatory muscle pain and cervical muscle pain along with joint sounds.

**A.BLANCO AGUILERA, L. GONZALEZ LOPEZ, E. BLANCO AGUILERA, J. L. DE LA HOZ AIZPURUA, A. RODRIGUEZ TORRONTERAS, R. SEGURA SAINTGERONS & A. BLANCO HUNGRIA et al (2014)<sup>6</sup>**

Conducted a study in 1220 subjects to assessed the influence of sleep bruxism on signs and symptoms of temporomandibular disorders by using RDC/TMD questionnaire. Study concluded that significant association found in between sleep bruxism and signs and symptoms of temporomandibular disorders. Parafunctional commonly seen in female and in patients under age 60 years.

**Victor Villaça Cardoso de Mello, André Cavalcante da Silva Barbosa, Mariana Pacheco Lima de Assis Morais, et al (2014)<sup>10</sup>**

This Study investigated the influence of socioeconomic status on signs and symptoms of temporomandibular disorders and masticatory muscle pain.

Study concluded that socioeconomic class significantly associated with signs and symptoms of temporomandibular disorders and masticatory muscle pain.

**Mohamed H. Abdelnabi, Amal A. Swelem et al (2015)<sup>17</sup>**

Study evaluated the influence of complete dentures on signs and symptoms of temporomandibular disorders in elder people. study results show that corrected occlusion significantly improves the functional capacity of TM joint by reducing the signs and symptoms of TMD.

**Claudia Lúcia Pimenta Ferreira, Marco Antônio Moreira Rodrigues da Silva, Cláudia Maria de Felício et al (2015)<sup>33</sup>**

Study investigated to assess the influence of age and gender on signs and symptoms of temporomandibular disorders in Brazilian patients. study results show that TMD signs and symptoms are significantly different in between male and female. Among which females were more frequently affected by TMD

**S. N. KHAWAJA, J. C. NICKEL, L. R. IWASAKI, H. C. CROW, Y. GONZALEZ et al (2015)<sup>48</sup>**

Study conducted to assess the influence of anxiety/depression on oral parafunctional habits by using a set of standardised and validated self-reporting questionnaires and diagnostic criteria for temporomandibular disorders (DC/TMD). Study conducted that patient with anxiety/depression

significantly associated with oral parafunctional habits and signs/symptoms of TMD.

**Kaberi Majumder, Shalender Sharma, Dayashankara Rao JK, Vijay Siwach, Varun Arya, Sunil Gulia et al (2015)<sup>41</sup>**

Study conducted in 1000 medical students to evaluate the influence of anxiety/depression on signs and symptoms of joint dysfunction. study showed that students who had more anxiety/depression significantly associated with significantly associated with signs and symptoms of TMD among which joint sounds more frequent TMD symptom.

**Ulku S\_ ermet Elbay, Husniye Demirturk Kocasarac, Mesut Elbay, Can Kaya, Ceren Ugurluel1and Canan Baydemir et al (2016)<sup>5</sup>**

Study conducted to compare two types of children who living with their parents and children in institutions for assessment of signs and symptoms of TMD. study results show that institutional children were more prevalent to oral parafunctions, stressful life which leads to TMD signs and symptoms.

**Victor Ricardo Manuel Muñoz, Giancarlo De la Torre Leticia Machado, Carolina Beraldo, Celia Marisa Rizzatti et al (2016)<sup>25</sup>**

Study conducted to assess the influence of hormonal replacement therapy (HRT) on TMD. This study concluded that disc displacement with or

without reduction was frequently seen in postmenopausal women and study found that no relationship between HRT and signs and symptoms of TMD.

**Minh Son Nguyen, Triin Jagomägi, Toai Nguyen, Mare Saag and Ülle Voog-Oras et al (2017)<sup>11</sup>**

Study conducted in rural residents and urban residents for assessment of prevalence and severity of signs and symptoms of TMD. This study concluded that rural residents more prone to TMD. psychological problem might be major factor of influence on the TMD symptoms. Masticatory muscle tenderness and joint sounds and headaches were the most common clinical sign of TMD.

**Arvind Muthukrishnan, Gowri Shankar Sekar et al (2017)<sup>43</sup>**

Study conducted in 4197 participants to assessed the prevalence and severity of signs and symptoms of temporomandibular disorders in Chennai city population by using house to house survey. Results show that a significant percentage of the population has signs and symptoms of TMD. 53.7% has one or more clinical signs and symptoms of TMD. Deviation of the mandible during mouth opening and closing and joint sounds were made up the highest percentage. Females above 18 years reported higher prevalence of signs and symptoms of TMD than men. And the influence of age on signs and symptoms of TMD was less pronounced, limited mouth opening, which significantly increased with age in both males and females.

## **MATERIALS AND METHODS**

This study was done in Ragas dental college and Hospital in the Department of Oral and Maxillofacial Surgery during the period of February 2016 to December 2017. The study protocol was accepted by Institutional Review Board (IRB) in 2016 February. We designed a study to assess the prevalence and severity of temporomandibular disorders (joint sounds, pain in TMJ and its associated structures, masticatory muscles and restricted mandibular movements, jaw stiffness, deviation of mandible during mouth opening and closing and limited mouth opening) by evaluating the occlusal characteristics, headache, parafunctional habits, stress and TMJ clicking by using, Fonseca's and Helkimo questionnaire and clinical examination in young adults. The study was conducted on 832 participants aged 18-50 years, using two strategies for assess the severity of TMD: a clinical examination of temporomandibular joint and its associated structures, and a set of 18 questions regarding TMD data. Informed consent was obtained from all the participants who participated the study. Out of the 832 participants that were included in the study, 617 participants satisfied the inclusion criteria. In the 617 participants who were included, at least one sign/symptom of TMD could be elicited from them.

### **INCLUSION CRITERIA:**

14. Patients with temporomandibular dysfunction.
15. Limited mouth opening
16. Pain in temporomandibular joint and its associated structures
17. Pain and tenderness over masticatory muscles
18. Deviation of mandible while mouth opening and closing
19. Restricted mandibular movements
20. Temporomandibular joint sounds / click
21. Temporomandibular joint locking
22. Chronic headache, neck pain and ear pain.
23. Patients between 18-50years of age.

### **EXCLUSION CRITERIA:**

5. Patients with systemic diseases and Dento-facial anomalies.
6. Patients undergoing current medical or psychological treatment.
7. Patients with history of surgery or trauma in the region of temporomandibular joint.
8. Patients receiving orthodontic treatment.
9. Patients who refuse to involve in the study.



The following, namely para functional habits (clenching, grinding, bruxism), malocclusion, stress/depression of the individual, missing posterior teeth and preferred side of chewing were checked meticulously if they had an influence on the TMD. Also in a similar context, head ache, neck pain, ear pain & referred pain were carefully analyzed to see if there was any relationship between them and TMD and whether the condition aggravated the underlying problem present in the TMJ

**EXAMINATION PROCEDURE:**

- ❖ The selected participants were able to answer questions about TMD symptoms from Fonseca and Helkimo questionnaire
- ❖ Participants were examined for the status of their masticatory muscles and TMJs at Department of oral and maxillofacial surgery, Ragas dental college and hospital.
- ❖ During the screening process, participants were informed the objectives of study and consented for the same, using a consent form
- ❖ Firstly, the participant was asked about any history of pain in the orofacial region, headaches, neckaches, ear pain, TMJ pain, joint clicking and locking of jaw during opening or closing movements.
- ❖ Secondly, clinical examination of temporomandibular joint and its associated structures:

- ❖ the clinical examination started with a simultaneous bilateral palpation of the temporomandibular joint. Palpation was undertaken at rest and during opening and closing movements with the patient sitting in upright position.

an examination of the clinical signs of TMD was performed as follows:

1. confirming orofacial pain and headache locations;
2. measuring incisal relations;
3. evaluating the symmetry of mouth opening pattern for deviation and deflection of mandible
4. measuring range of mandibular movement and determining the location of pain during mandibular movements;
5. identifying any clicking ( with pain or without pain )and crepitus of the TMJ during mandibular movements;
6. determining joint locking status;
7. defining muscle and TMJ pain during palpation
8. type of malocclusion
9. history of parafunctional habits
10. history of referred pain.
11. preferred chewing side
12. past dental history

Diagnostic criteria included pain-related TMD, disc displacement, and degenerative joint disease. Pain related TMD consists of myalgia and arthralgia.

Diagnosis of myalgia was based on the confirmation of pain in the masticatory muscle area, for example, pain from jaw opening or during masticatory muscle palpation.

Arthralgia was confirmed by pain of the TMJ, for example, pain from the lateral excursion, protrusion and retrusion movement of the jaw or during palpation.

Questionnaire evaluation:

Fonseca and Helkimo questionnaire were used to evaluate the degree of TMD in volunteers of this study,

Fonseca questionnaire contains an anamnestic index, and the volunteers were classified accordingly as mild TMD, moderate TMD, severe TMD or non-TMD. The questionnaire consists of 10 questions, and the possible answers are “SOMETIMES”, “YES” or “NO”, with a single answer to be marked for each question. The results were analysed using the frequency distribution of the questionnaire answers according to the anamnestic index proposed by Fonseca.

**Fonseca Questionnaire**

S.NO	QUESTONS	NO	SOMETIMES	YES
1	Is it hard for you to open your mouth?			
2	Is it hard for you to move your mandible from side to side?			
3	Do you get tired/ muscular pain while chewing?			
4	Do you have frequent headaches?			
5	Do you have pain on the nape or stiff neck?			
6	Do you have earaches or pain in craniomandibular joint or temporomandibular joint?			
7	Have you noticed any TMJ clicking while chewing or when you open your mouth?			
8	Do you clench or grind?			
9	Do you feel your teeth do not articulate well?			
10	Do you consider yourself a tense(nervous) person?			

Fonseca anamnestic index:

- Values of 0-15 : no TMD
- Values of 20-40 : mild TMD
- Values of 45-65 : moderate TMD
- Values of 70-100 : severe TMD

### Helkimo anamnestic questionnaire:

Anamnestic tests using the Helkimo anamnestic dysfunction index was performed using yes-no questionnaires. The information thus obtained allowed the patients to be classified as anamnestic dysfunctional indexes Ai: 0, I and II, Helkimo anamnestic dysfunction index (Ai)

1	Do you have a sound in the area temporomandibular joint	YES	NO
2	Do you have jaw rigidity during awakening or movement of mandible		
3	Do you have a fatigue in the jaw area		
4	Do you have difficulty when opening the mouth		
5	Do you have locked mandible during opening mouth		
6	Do you have pain in the TMJ or in the area of masticatory muscles		
7	Do you have pain during movement of the mandible		
8	Do you have luxation of the mandible		

Helkimo anamnestic index

Ai0: denotes complete absence of subjective symptoms of dysfunction of the masticatory system (i.e. symptoms mentioned under AiI and AiII).

Ail : denotes mild symptoms such as temporomandibular joint (TMJ) sounds (clicking and crepitation), feeling of stiffness **or** fatigue of the jaws.

Ail1: denotes severe symptoms of dysfunction. One or more of the following symptoms were reported in the anamnesis: difficulty in opening the mouth wide, locking, luxations, pain on movement, facial and jaw pain.

*Clinical dysfunction index, D*

DiO: denotes absence of the clinical symptoms, of which the index is built up.

DiI: denotes mild symptoms of dysfunction. **1-4** of the following symptoms were recorded: deviations of the mandible in opening and/or closing movement **>2** mm from a straight (sagittal) line, TMJ sounds (clicking or crepitation). Tenderness to palpation of the masticatory musculature in **1-3** palpation sites, tenderness to palpation laterally over the TMJ, pain in association with **1** movement of the mandible, maximal mouth opening **30-39** mm, horizontal movements 4-6 mm.

DiII: denotes at least one severe symptom combined with **0-4** mild symptoms or 5 mild symptoms only. The severe symptom may be any of the following: locking/luxation of TMJ, tenderness to palpation in **4** sites or more of the masticatory musculature, tenderness to palpation posteriorly of the TMJ,

pain in **2** or more movements of the jaw, maximal mouth opening **<30** mm, one **or** more horizontal movements **<4** mm.

DiIII: denotes **2-5** of the severe symptoms possibly combined.

### **TMJ CASE SHEET**

#### **CASE RECORD**

Date:

NAME:

IP NO:

AGE/SEX:

Occupation: duty timings and type of job

RELIGION:

ADDRESS:

TEL NO:

CHIEF COMPLAINT:

HISTORY OF PRESENT ILLNESS:

HISTORY OF TRAUMA:

**HISTORY OF PAIN:**

DURATION:

SITE OF PAIN:

FREQUENCY:

- a) Occasional:
- b) Constant :
- c) Regular time :

TYPE:

AGGREVATING FACTOR:

RELIEVING FACTOR:

RADIATING:

- a) Sharp L/R :
- b) Dull L/R :
- c) Sharp L/R + Dull L/R :

CONCOMITTANT NEUROLOGIC SIGNS:



**LIMITATION OF MOVEMENT:**

- A) Nil :
- B) Early morning:
- C) End of day only :
- D) Varies:
- E) Constant :

**HISTORY OF CLICKING:**

- a) Left :
- b) Right :
- c) Left +Right:

**RESTRICTION IN MOUTH OPENING:**

**PARAFUNCTIONAL HABITS:**

- A) TOOTH GRINDING HABIT :
- B) TOOTH CLENCH HABIT :
- C) CHEWING SIDE :

**PAST MEDICAL:**

**HABITS:**

**PAST DENTAL HISTORY:**

**PERSONAL HISTORY:**

**GENERAL EXAMINATION:**

GENERAL ASSESMENT:

MENTAL STATE:

BUILD & STATE OF NUTRITION:

COLOUR OF SKIN:

PULSE:

RESPIRATION:

TEMPERATURE:

BLOOD PRESSURE:

**LOCAL EXAMINATION:**

FACE:                      SYMMETRICAL    ASYMMETRICAL

RANGE OF MOVEMENT OF JAW:

INCISAL OPENING:

LATERAL EXCURSIONS:

DEVIATION:

TMJ TENDERNESS:

**TMJ SOUND:**

CLICK –      SINGLE              MULTIPLE

CLICK -      EARLY                  LATE

CLICK -      SOFT                      LOUD

CLICK -      PAINFUL                  NOT PAINFUL

CREPITUS –

TMJ TENDERNESS:

**TMJ LOCKING:**

OPEN / CLOSED:

TIME OF ONSET:

PATTERN:

**MUSCLE TENDERNESS:**

MASSETER:

TEMPORALIS:

LATERAL PTERYGOID:

MEDIAL PTERYGOID:

ACCESSORY:

EXAMINATION OF NECK MUSCLES:

SIGN OF BRUXISUM:

**POSTERIOR OCCUSAL ATRITION**

**SOFT TISSUE EXAMINATION: BUCCAL MUCOSA**

**LATERAL BORDER OF THE TONGUE**

**LOWER LIP EXAMINATION**

**INTRA ORAL EXAMINATION:**

**TEETH PRESENT:**


**MISSING TEETH:**

**FRACTURE TEETH:**

**CARIES TEETH:**

**FILLING TEETH:**

**WASTING DISEASES OF TEETH:**

**TEETH MOBILITY:**

**OTHER FINDINGS:**

**OCCLUSION:**

INTERCUSAL POSITION:

FREE WAY SPACE:

OVERJET:

OVERBITE:

PREMATURE CONTACT:

MAXIMUM MOUTH OPENING WITH OUT PAIN OR NOISE:

MAXIMUM MOUTH OPENING:

RELATIONSHIP OF THE ANTERIOR TEETH:

OPENING / CLOSING MOVEMENT:

EXCURSIVE GUIDANCE:

PROVISIONAL DIAGNOSIS:

**RADIOGRAPHIC EVALUATION:**

OBLIQUE MANDIBLE:

OCCLUSAL:

DENTAL:

PA JAWS:

OPG:

OCCIPITOMENTAL:

REVERSE TOWNE'S VIEW:

LATERAL SKULL:

TRANSPHARYNGEAL VIEW:

**DIFFERENTIAL DIAGNOSIS:**

**FINAL DIAGNOSIS:**

**DIAGNOSIS & TREATMENT PLAN RECORD**

DIAGNOSIS & PROBABLE ETIOLOGY:

TREATMENT PLAN:



**CONSENT FOR PARTICIPATING IN THE STUDY**

Date:

I am giving my willing consent for participating in the study and willing consent for clinical examination procedure.

I am informed about the questionnaires to be filled. I am aware of past medical history and past dental history; temporomandibular disorders are to be recorded by using questionnaire.

I am informed about the clinical examination procedure & type of questionnaire being given to me. I am informed that adequate safety precautions are taken to avoid or manage any possible complications arising.

This undertaking is given upon my own accord, I have been explained by the operating surgeon in English and in my own regional language.

NAME OF PATIENT:

SIGNATURE OF PATIENT

**CASE 1: DISC DISPLACEMENT WITH REDUCTION**



**Fig 1 a: FRONTAL VIEW**



**Fig 1 b: RESTRICTED MOUTH OPENING**



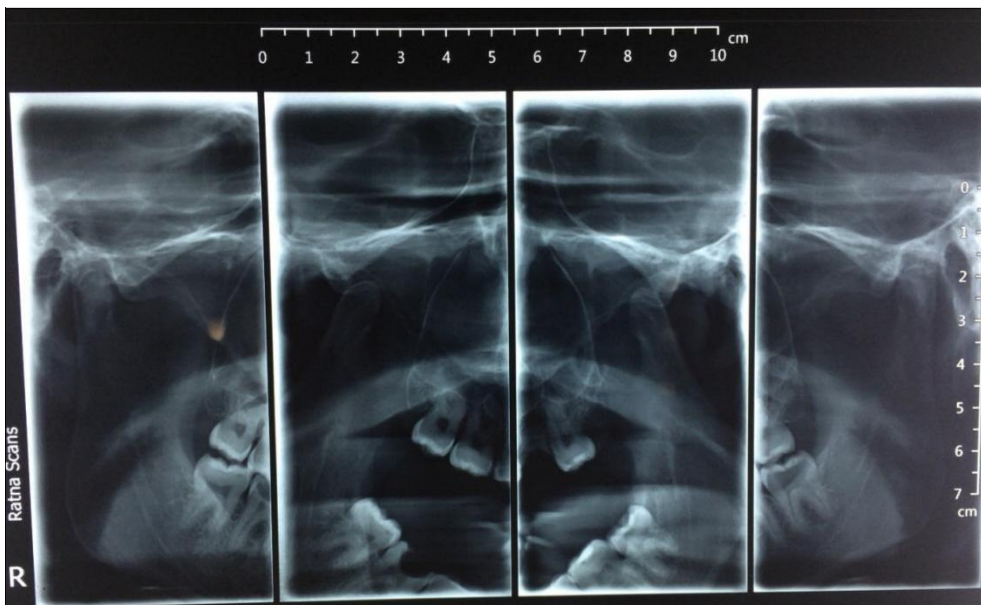
**Fig 1 c: INTRA ORAL VIEW**



**Fig 1 d: INTRA ORAL VIEW – RIGHT LATERAL**



**Fig 1e: INTRA ORAL VIEW - -LEFT LATERAL**



**Fig 1 f: TMJ TOMOGRAPHY**

**CASE 2: DISC DISPLACEMENT WITH REDUCTION**



**Fig 2 a: FRONTAL VIEW**



**Fig 2 b: RESTRICTED MOUTH OPENING**



**Fig 2 c: INTRA ORAL VIEW**



**Fig 2 d: INTRA ORAL VIEW – RIGHT LATERAL**



**Fig 2 e: INTRA ORAL VIEW – LEFT LATERAL**



**Fig 2 f: OPG**

**CASE 3: MPDS**



**Fig 3 a: FRONTAL VIEW**



**Fig 3 b: RESTRICTED MOUTH OPENING**





**Fig 3 c: INTRA ORAL VIEW**



**Fig 3 d: INTRA ORAL VIEW – RIGHT LATERAL**



**Fig 3 e: INTRA ORAL VIEW - -LEFT LATERAL**



**Fig 3 f: OPG**

**CASE 4: DISC DISPLACEMENT WITH OUT  
REDUCTION**



**Fig 4 a: FRONTAL VIEW**



**Fig 4 b: RESTRICTED MOUTH OPENING**



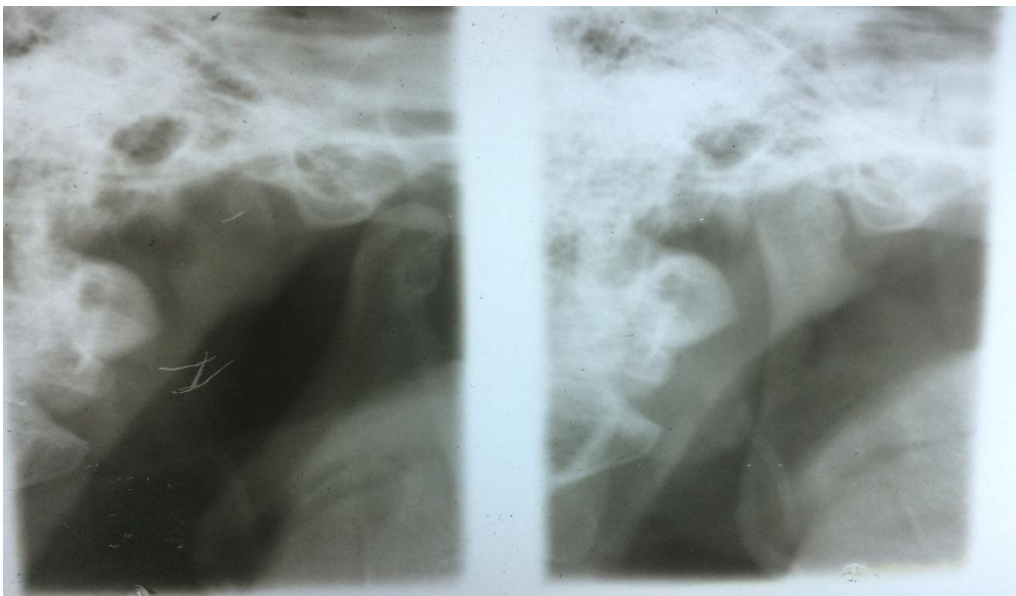
**Fig 4 c: INTRA ORAL VIEW**



**Fig 4 d: INTRA ORAL VIEW – RIGHT LATERAL**



**Fig 4 e: INTRA ORAL VIEW - -LEFT LATERAL**



**Fig 4 f: TMJ TOMOGRAPHY**

## **RESULTS**

This study was done in Ragas dental college and Hospital in the Department of Oral and Maxillofacial Surgery during the period of February 2016 to December 2017. We designed a study to assess the prevalence and severity of temporomandibular disorders (joint sounds, pain in TMJ and its associated structures, masticatory muscles and restricted mandibular movements, jaw stiffness, deviation of mandible during mouth opening and closing and limited mouth opening) by evaluating the occlusal characteristics, headache, parafunctional habits, stress and TMJ clicking by using, Fonseca's and Helkimo questionnaire and clinical examination in young adults. The study was conducted on 832 participants. The study was conducted on 832 participants in which 617 participants satisfied the inclusion criteria. In the 617 participants who are include at least one sign/ symptoms of TMD could be elicited from them.

### **DISTRIBUTION OF STUDY ACCORDING TO AGE AND GENDER:**

The distribution of study subjects based on age and gender shows that out of 617 participants the males were 303 (49.1%) and females were 314 (50.9%) in number among them, males 23.1% participants were in 18-25 years age group, 25.4% participants were in 26-33 years age group, 28.4% were in 34-41 years age group and 70(23.1%) were in 42-50 age groups. Distributions of study subjects among female 84(26.7%) participants were in 18-25 years

age group, 81 (25.7%) participants were in 26-33 years age groups, 78(24.9%) participants were in 34-41 years age group, 71(22.7%) participants were in 42-50 years age group (**table 1, chart 1**).

### **DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO PRESENCE/ABSENCE OF TMD BASED ON AGE AND GENDER:**

The distributions of study subjects according to with(or) without presence of TMD based on age and gender shows that among 617 participants in which 374 (60.6%) participants had at least one sign/symptom of TMD in which 74(48.4%) participants were in 18-25 years group, 94(59.4%) participants were in 26-33 years age group, 101(61.5%) participants in 34-41 years age group, 105(74.4%) participants were in 42-50 years age group had at least one symptoms/sign of TMD. Based on gender wise distribution 204(54.5%) females, males170(45.5%).

### **DISTRIBUTION OF STUDY ACCORDING TO SYMPTOMS OF TMD;** **(table 2,6,7, chart 2).**

#### **TMJ SOUNDS**

Temporomandibular joint sounds are more prevalent symptom and in our study. Among 617 participants 192(31.1%) participants complaining about temporomandibular joint sounds. In which 101(32.1%) participants are females and 91(30.0%) participants are males.

Among females 20(19.8%) females complaining TMJ sounds were 18-25 years age groups,26(25.7%) were in 26-33 years age groups,27 (26.7%) participants were in 34-41 years age groups, 29 (27.8%) TMJ sounds were in 42-50 years age group.

Among males 17 (18.6%) males complaining TMJ sounds were 18-25 years age groups,20(21.9%) were in 26-33 years age groups,26 (28.5%) participants were in 34-41 years age groups, 28 (30.7%) TMJ sounds were in 42-50 years age group.

### **JAW STIFFNESS**

Jaw stiffness was present in 176 (28.5%) participants consisting of 90 (28.6%) females and 86(28.3%) males.

Among females 15 (16.6%) participants were in 18-25 years of age group complaining about jaw stiffness, 18 (20.1%) were in 26-33 years age group,28 (31.1%) were in 34-41 years age group, 29(32.2%) participants were in 42-50 years age group.

Jaw stiffness was noticed in 86(28.3%) male participant in which 15 (17.4%) participants were in 18-25 years age group, 14 (16.2%) were in 26-33 years age groups, 28 (32.5%) participants were in 34-41 years age group, 29 (33.9%) were in 42-50 years age group. (statistically age, sex significant).



### **DIFFICULTY IN MOUTH OPENING**

Difficulty in mouth opening was present in 99 (16.0%) participants consisting of 60(19.1%) females and 39(12.8%) males.

among males 2 (6.7%) participants were in 18-25 years age group, 6 (20.0%) participants were in 26-33 years age group, 14(31.7%) participants were in 34-41 years age groups.17(41.6%) were in 42-50 years age group.

Among females 4 (5.1%) were in 18-25 age group, 12 (15.3%) participants were 26-33 years age group, 19 (35.9%) were in 34-41 years age group,25 (43.7%) participants were in 42-50 years age group.

### **PAIN ON CHEWING**

Pain on chewing was present in 181 (29.4%) participants consisting of 94(29.9%) females and 87 (28.7%) males.

Among females 14 (14.9%) participants were in 18-25 years age group, 24 (25.5%) subjects were in 25-33 years age group, 26(27.6%) participants were in 34-41 years age group, 30 (32.0%) subjects were in 42-50 years age group.

Pain on chewing was present in 87(28.7%) males among males 7(8.0%) participants were in 18-25 years age group,25(28.7%) subjects were in 26-33 years age group, 25 (28.7%) participants were in 33-41 years age group and 30 (34.6%) participants were in 42-50 years age group.

### **HEAD ACHE**

Head ache was present in 190(30.7%) participants consisting of 101(32.1%) females and 89(29.7%) males.

Among female's headache was present in 23 (22.8%) study subjects were in age groups 18-25 years and in 22 (21.8%) study participants in the age group of 26-33 years, 27 (26.77%) study subjects were in 34-41 years age group, 29 (28.7%) of study participants were in 42-50 age group.

Among male's headache was present in 16(17.9%) study participants were in 18-25 years age group, 20 (22.4%) were in 26-33 years age group, 24 (26.77%) study subjects were in 34-41 years age group, 29 (26.9%) subjects were in 42-50 years of age group.

### **NECK PAIN**

Neck pain was present in 175(28.3%) subjects consisting of 88 (28.0%) females and 87 (28.7%) males.

Among female's neck pain was present in 16 (18.1%) participants were in 18-25 years age group, 16 (18.1%) were in 26-33 years age group 25 (28.4%) participants were in 34-41 years of age group and 30 (35.4%) participants were in 42-50 years of age group.

Among males there were 11 (12.3%) subjects were in 18-25 years age group, 21(23.6%) participants were in 26-33 years age group, 26 (29.2%) were

in 34-41 age group, and there were 31(34.9%) participants were in 42-50 years age group.

### **PARAFUNCTIONAL HABIT**

Parafunctional habit like bruxism (teeth cleaning, grinding) was present in 181(29.3%) subjects among 92(29.2%) were females and 89(29.3%) were males.

Among females 18(19.5%) subjects were in 18-25 years age group, 22(23.9%) were in 26-33 years age group, 24(26.1%) participants were in 34-41 years age group and 28(30.5%) subjects were in 42-50 years age group.

Among males 14(15.7%) subjects were in 18-25 years age group, 22 (24.7%) were in 26-33 years age group, 26 (29.2%) participants were in 34-41 years age group and 27(30.4%) subjects were in 42-50 years age group.

### **DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO SIGN OF TMD; (table 3, chart 3).**

#### **TMJ CLICK**

On clinical examinations of temporomandibular joint most prevalence sign was TMJ clicking. In our study temporomandibular joint clicking was present in 263(42.6%) subjects consisting of 139 (44.3%) females and 124 (40.1%) males were reported temporomandibular click.

### **DEVIATION OF MANDIBLE**

In our study deviation of mandible during mandibular movements like mouth opening and closing was noticed in 176 (28.5%) participants. In which 89(28.1%) subjects were females and 87 (28.7%) were males.

### **MUSCLE TENDERNESS**

Masticatory muscle tenderness was most commonly seen in masseter muscle and temporalis muscle. In our study muscle tenderness was present in 192(31.1%) participants consisting 108(34.3%) subjects were females and 84(27.7%) subjects were in male.

### **PAIN ON CHEWING AND MANDIBULAR MOVEMENTS**

Pain on chewing (or) pain on mandibular movements were noticed in our study due to muscle and temporomandibular joint pain and it was intermittent in nature. In our study pain on chewing and mandibular movements was present in 241 (39.0%) participants in which 127(40.1%) were females and 241(39.0%) were males.

### **MANDIBLE LOCK**

Mandible locking while mouth opening and closing was noticed. In our study mandibular locking was observed in 19(3.07%) participants in which female 11(3.5%) and males were 8(2.6%).

### **TMJ TENDERNESS**

In clinical examinations of temporomandibular joint shows tenderness over the TMJ was 211(34.1%) participants in which 117(37.3%) participant were females and 94 (30.2%) subject were males.

### **ANXIETY/ DEPRESSION RELATION TO TMD:**

**(table12, 13, chart 6A, 6B).**

Anxiety / depression was present in 358 (58.0%) participants, among 185 (58.9%) were females and 173 (57.1) were males.

Subjects with stress related with no TMD were 139(41.1%) and with TMD were 199 (58.9%). Among females were 105 (52.7%) participants complaining about anxiety/depression with TMD symptoms, among which 26 (24.7%) were in 18-25 years age group, 22 (20.9%) were in 26-33 years age group, 34 (32.3%) were in 34-41 years age group, 23(21.9%) were in 42-50 years age group.

Among males were 94 (47.3%)participants complaining about anxiety/ depression with TMD symptoms, among which 26 (27.6%) were in 18-25 years age group, 17 (18.0%) were in 26-33 years age group, 30 (31.9%) were in 34-41 years age group, 21(22.3%) were in 42-50 years age group.

### **POSTERIOR TOOTH LOSS RELATED TO TMD: (table 8, 10, chart 7).**

Posterior tooth was present in 338 (54.7%) participants, among 165 (52.5%) were females and 173 (57.1) were males. Subjects with posterior tooth was not related to TMD were 110 (32.5%) and with TMD were 228 (67.5%).

### **CHEWING SIDE PREFERENCE RELATED TO TMD: (table 9,11, chart 8).**

Unilateral chewing side preference was present in 381 (61.7%) participants, among 195 (64.3%) were females and 186 (59.2) were males.

bilateral chewing side preference was present in 236 (38.3%) participants, among 128 (40.8%) were females and 108 (35.7%) were males.

Subjects with unilateral chewing side preference with not related to TMD were 161(42.2%) and with TMD were 220 (57.8%).

Subjects with bilateral chewing side preference with not related to TMD were 180 (76.3%) and with TMD were 56 (23.7%).

### **HELKIMO ANAMNESTIC DYSFUNCTION INDEX (Ai): (table 4, chart 4).**

In our study helkimo anamnestic dysfunction index(Ai) shows among 617 participants, no TMD symptoms(Ai0) were present in 278(45.0%) participants consisting of 126 (40.2%) females and 152(50.1%) males.

Mild TMD symptoms(AiI) were present in 284(48.02%) participants consisting of 155(49.3%) females and 129(42.5%) males.

Severe TMD symptoms(AiII) were present in 55(8.91%) participants consisting of 33(10.5%) females and 22(7.4%) males.

### **HELKIMO CLINICAL DYSFUNCTION INDEX (Ai): (table 5, chart 5).**

Helkimo clinical dysfunction index(Di) shows among 617 participants, no TMD signs (Di0) were present in 158(25.6%) participants consisting of 74 (23.0%) females and 82 (27.0%) males.

Mild TMD signs (DiI) were present in 300(48.6%) participants consisting of 146(46.4%) females and 154(50.8%) males.

Moderate TMD signs (DiII) were present in 142 (22.73%) participants consisting of 82(26.0%) females and 60(19.8%) males.

Severe TMD signs (DiIII) were present in 19(3.07%) participants consisting of 12 (3.8%) females and 7(2.3%) males

**TABLE 1: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO AGE AND GENDER**

Distribution of study subject according to age and gender						
Age	Male		Female		Total	
	n	%	N	%	n	%
18 – 25	70	23.1	84	26.7	154	25.0
26 – 33	77	25.4	81	25.7	158	25.5
34 – 41	86	28.4	78	24.9	164	26.6
42- 50	70	23.1	71	22.7	141	22.9
	303	100.0	314	100.0	617	100.0



**TABLE 2: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SYMPTOMS BASED ON GENDER**

Symptom		Gender				total	P VALUE
		Female %		Male %			
TMJ sound	No	213	67.9	212	70.0	425 (68.9)	0.022
	yes	101	32.1	91	30.0	192 (31.1)	0.022
Feeling of jaw stiffness	No	224	71.4	217	59.9	441 (71.5)	0.84
	Yes	90	28.6	86	28.3	176 (28.5)	0.84
Difficulty in mouth opening	No	254	80.9	264	87.2	518 (84.0)	0.044
	Yes	60	19.1	39	12.8	99 (16.0)	0.044
Pain on chewing	No	220	70.1	216	71.3	436 (70.6)	0.047
	Yes	94	29.9	87	28.7	181 (29.4)	0.047
Head ache	No	213	67.9	214	70.3	427 (69.2)	0.517
	Yes	101	32.1	89	29.7	190 (30.7)	0.517
Neck pain	No	226	72.0	216	71.3	442 (71.6)	0.793
	Yes	88	28.0	87	28.7	175 (28.3)	0.793
Clenching/grinding	No	222	70.8	214	70.7	436 (70.6)	0.033
	Yes	92	29.2	89	29.3	181 (29.3)	0.033
Anxiety/depression	No	129	41.1	130	42.9	259 (45.2)	0.001
	Yes	185	58.9	173	57.1	358 (54.8)	0.001

**TABLE 3: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SIGNS BASED ON GENDER**

Signs		Gender				Total	P VALUE
		Female %		Male %			
TMJ click	No	175	55.7	179	59.9	354	0.457
	yes	139	44.3	124	40.1	263	0.457
Deviation	No	225	71.9	216	71.3	441	0.267
	Yes	89	28.1	87	28.7	176	0.267
Pain or tenderness	No	206	65.7	219	72.3	425	0.129
	Yes	108	34.3	84	27.7	192	0.129
Pain on chewing or pain on movement	No	187	59.9	189	62.9	376	0.047
	Yes	127	40.1	114	37.1	241	0.047
Mandible lock	No	303	94.3	295	97.4	598	0.252
	Yes	11	3.5	8	2.6	19	0.252
TMJ tenderness	No	197	62.7	209	69.8	406	0.043
	Yes	117	37.3	94	30.2	211	0.043
One or more sign	No	110	35.4	133	43.7	243	0.047
	Yes	204	64.6	170	56.4	374	0.047

**TABLE 4 : DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE HELKIMO ANAMNESTIC DYSFUNCTION (Ai) BASED ON GENDER**

Symptom code Ai						
	Ai0		AiI	AiII	TOTAL	P VALUE
Gender	No	126	155	33	314	0.896
Female	%	40.2	49.3	10.5	100	0.896
Male	No	152	129	22	303	0.896
	%	50.1	42.5	7.4	100	0.896
Total	No	278	284	55	617	0.896
	%	45%	46.02%	8.91%	100	0.896

**TABLE 5: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE HELKIMO CLINICAL DYSFUNCTION (Di) BASED ON GENDER**

Sign (Di)							
Gender	Dio		DiI	DiII	DiIII	TOTAL	P VALUE
Female	No	74	146	82	12	314	0.896
	%	23	46.4	26	3.8	100	0.896
Male	No	82	154	60	7	303	0.896
	%	27	50.8	19.8	2.3	100	0.896
Total	No	158	300	142	19	617	0.896
	%	25.6	48.6	22.73	3.07	100	0.896

**TABLE 6: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SYMPTOMS BASED ON AGE AND GENDER**

Factors	GENDER										P VALUE
	MALE					FEMALE					
	18-25	26-33	34-41	42-50	TOTAL	18-25	26-33	34-41	42-50	TOTAL	
TMJ SOUNDS	17	20	26	28	91	20	26	27	29	101	0.02
JAW STIFFNESS	15	14	28	29	86	15	18	28	29	90	0.44
DIFFICULTY MOUTH OPENING	2	6	14	17	39	4	12	19	25	60	0.57
PAIN ON CHEWING	7	25	25	30	87	14	24	26	30	94	0.012
HEAD ACHE	16	20	24	29	89	23	22	27	29	101	0.26
NECK PAIN	11	21	26	31	89	16	16	25	30	88	0.39
CLENCHING / GRINDING	14	22	26	27	89	18	22	24	28	92	0.03
ANXIETY/DEPRESSION	26	17	30	21	94	26	22	34	23	105	0.011

**TABLE 7: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SYMPTOMS BASED ON AGE AND GENDER**

Factors	GENDER										P VALUE
	FEMALE %					MALE %					
	18-25	26-33	34-41	42-50	TOTAL	18-25	26-33	34-41	42-50	TOTAL	
TMJ SOUNDS	19.8	25.7	26.7	27.8	100	18.6	21.9	28.5	30.7	100	0.02
JAW STIFFNESS	16.6	20.1	31.1	32.2	100	17.4	16.2	32.5	33.9	100	0.44
DIFFICULTY MOUTH OPENING	6.7	20.0	31.7	41.6	100	5.1	15.3	35.9	43.7	100	0.57
PAIN ON CHEWING	14.9	25.5	27.6	32.0	100	8.0	28.7	28.7	34.6	100	0.012
HEAD ACHE	22.8	21.8	26.7	28.7	100	17.9	22.4	26.9	32.8	100	0.26
NECK PAIN	18.1	18.1	28.4	35.4	100	12.3	23.6	29.2	34.9	100	0.39
CLENCHING / GRINDING	19.5	23.9	26.1	30.5	100	15.7	24.7	29.2	30.4	100	0.03
ANXIETY/DEPRESSION	25.7	20.9	32.5	21.9	100	27.6	18.0	31.9	22.5	100	0.011

**TABLE 8: ASSOCIATION OF STUDY SUBJECTS WITH POSTERIOR TEETH LOSS**

		Female %		Male %		Total
Posterior teeth loss	yes	165	52.5	173	57.1	338(54.7)
	No	149	47.5	130	42.9	279(45.2)

**TABLE 9: ASSOCIATION OF STUDY SUBJECTS WITH CHEWING SIDE PREFERENCE**

		Female %		Male %		Total
Chewing preference	Unilateral	186	59.2	195	64.3	381(61.7)
	Bilateral	128	40.8	108	35.7	236(38.3)

**TABLE 10: ASSOCIATION BETWEEN POSTERIOR TEETH LOSS AND TMD**

		No TMD %		TMD %		Total
Posterior teeth loss	yes	110	32.5	228	67.5	338(54.7)
	No	182	65.3	97	34.7	279(45.2)

**TABLE 11: ASSOCIATION BETWEEN CHEWING SIDE PREFERENCE WITH TMD**

		No TMD %		TMD %		Total
Chewing preference	Unilateral	161	42.2	220	57.8	381(61.7)
	Bilateral	180	76.3	56	23.7	236(38.3)

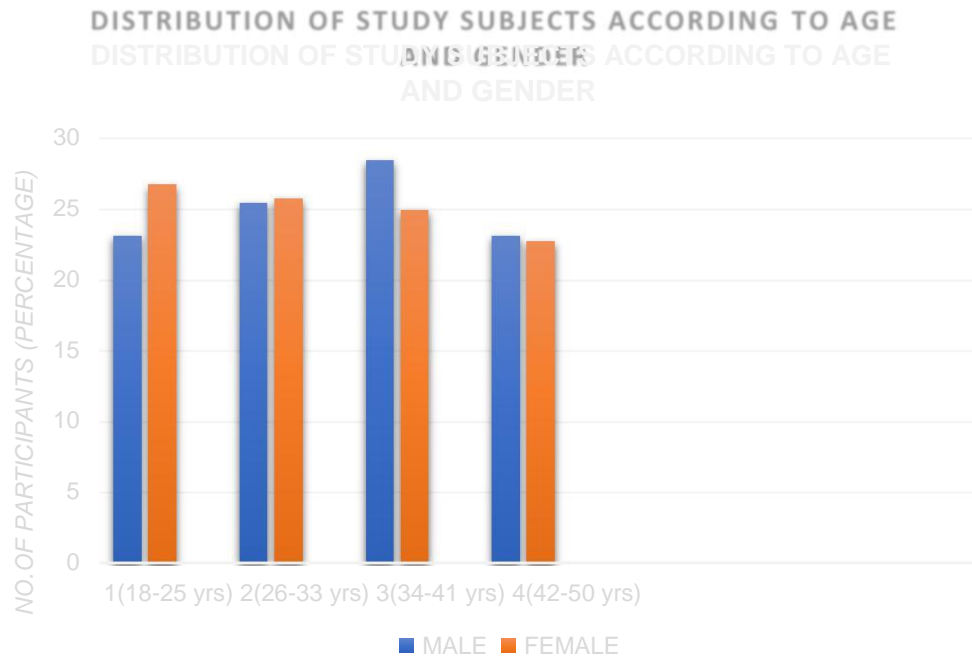
**TABLE 12: ASSOCIATION OF STUDY SUBJECTS WITH ANXIETY/DEPRESSION**

		Female %		Male %		Total
Presence of anxiety / depression	yes	185	58.9	173	57.1	358(58.7)
	no	129	41.08	130	42.9	259 (41.3)

**TABLE 13: ASSOCIATION BETWEEN ANXIETY/DEPRESSION AND TMD**

		No TMD %		TMD %		Total
Presence of anxiety / depression	Yes	139	41.1	199	58.9	338(54.7)
	No	18	63.3	95	36.7	259 (41.9)

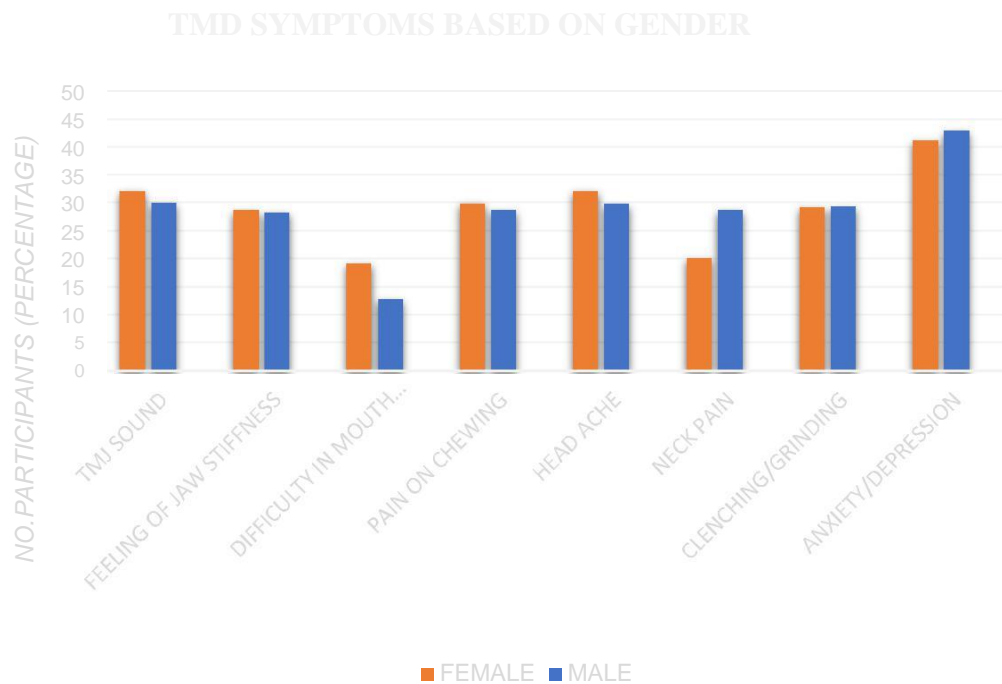
**GRAPH 1: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO AGE AND GENDER**



INFERENCE: The distribution of study subjects based on age and gender shows that out of 617 participants the males were 303 (49.1%) and females were 314 (50.9%).

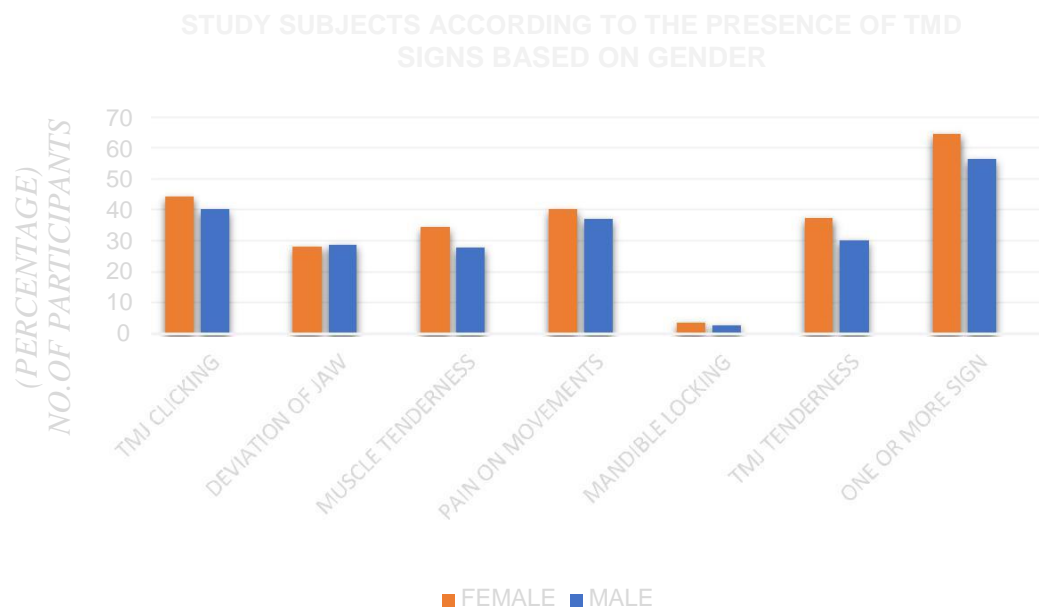


**GRAPH 2: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SYMPTOMS BASED ON GENDER**



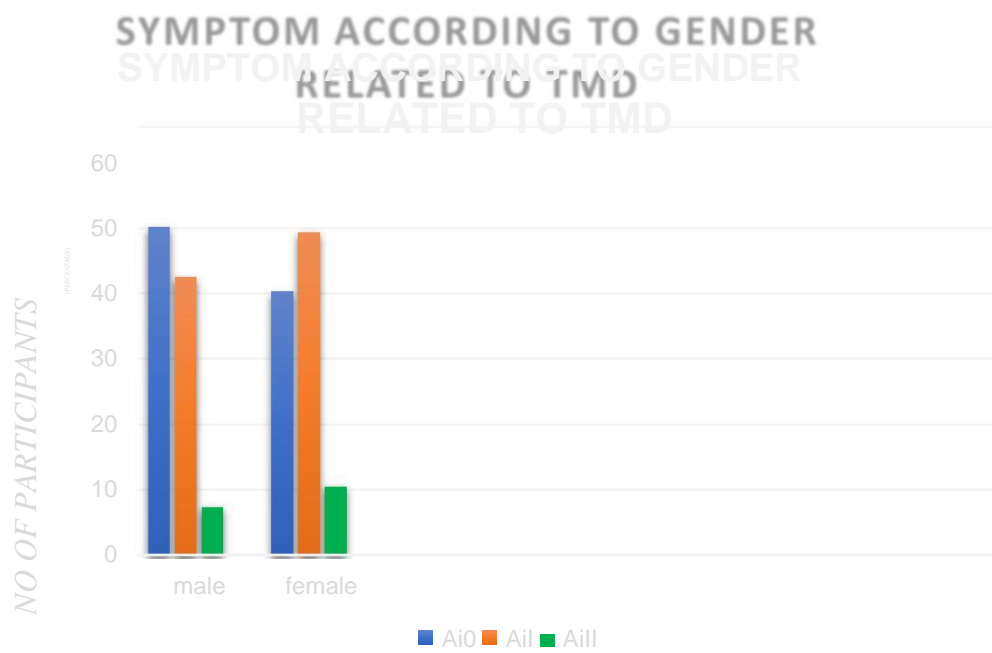
INFERENCE: Temporomandibular joint sounds are more prevalent symptom and in our study. Among 617 participants 192(31.1%) participants complaining about temporomandibular joint sounds. In which 101(32.1%) participants are females and 91(30.0%) participants are males.

**GRAPH 3: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE PRESENCE OF TMD SIGNS BASED ON GENDER**



INFERENCE: On clinical examinations of temporomandibular joint most prevalence sign was TMJ clicking. In our study temporomandibular joint clicking was present in 263(42.6%) subjects consisting of 139 (44.3%) females and 124 (40.1%) males were reported temporomandibular click.

**GRAPH 4: DISTRIBUTIONS OF STUDY SUBJECTS ACCORDING TO HELKIMO ANAMNESTIC DYSFUNCTION (AI) BASED ON GENDER**

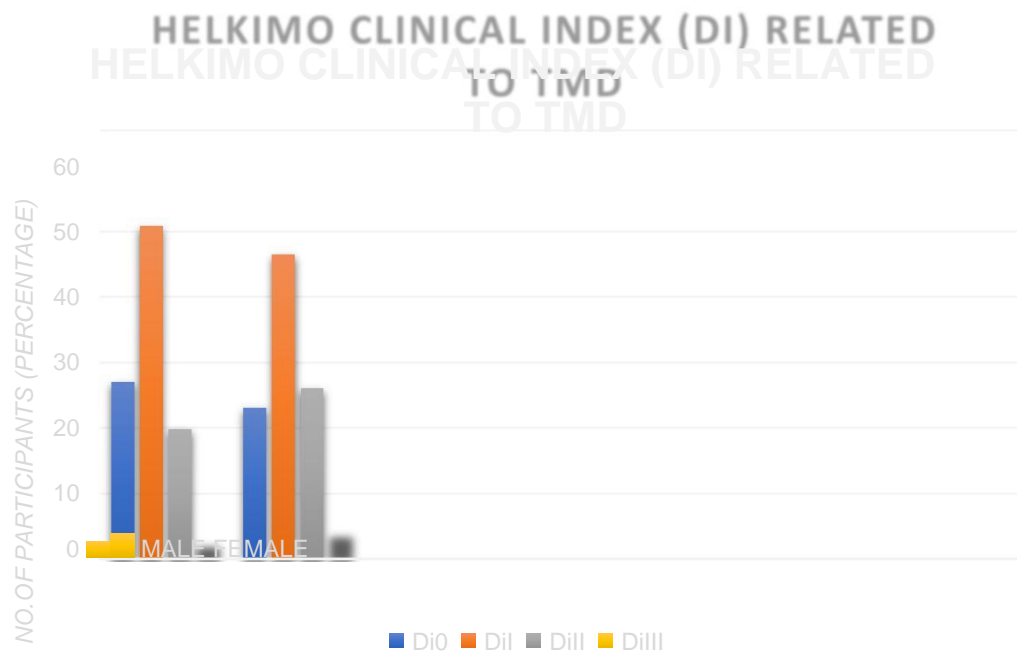


**Ai0**: NO TMD

**AiI**: MILD TMD

**AiII**: SEVERE TMD

**GRAPH 5: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO THE HELKIMO CLINICAL DYSFUNCTION (DI) BASED ON GENDER**



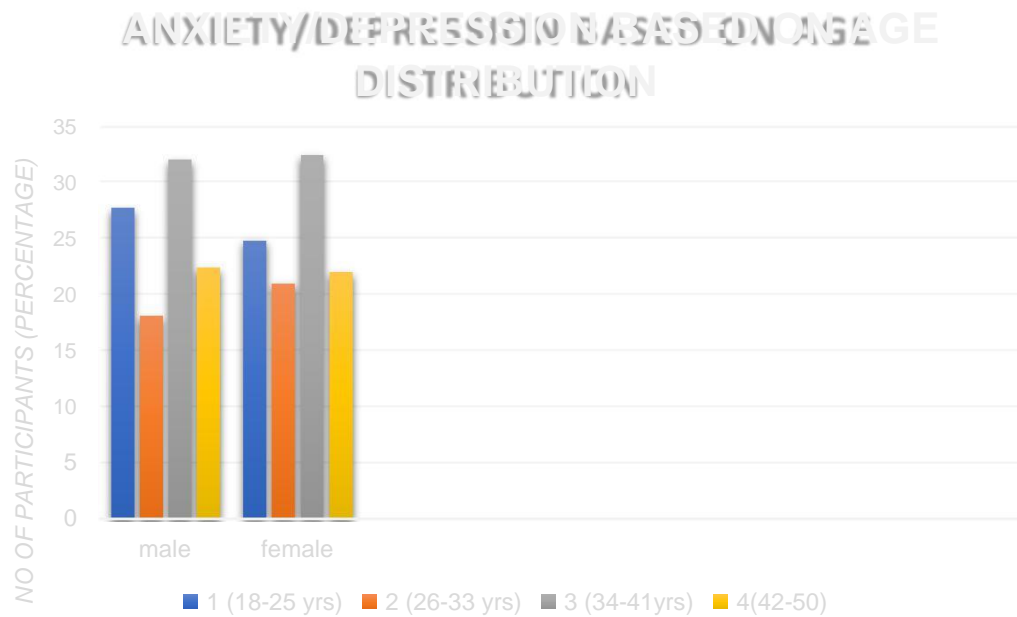
**Di0** : NO TMD

**DiI** : MILD TMD

**DiII** : MODERATE TMD

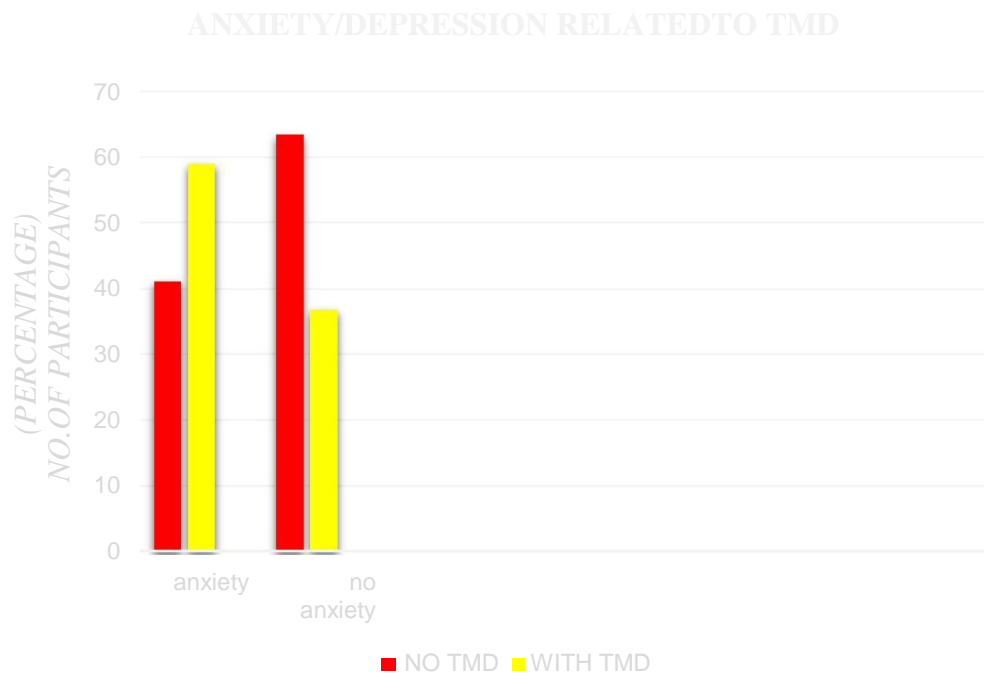
**DiIII** : SEVERE TMD

**CHART 6A: DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO PRESENCE OF ANXIETY/DEPRESSION BASED ON AGE AND GENDER**



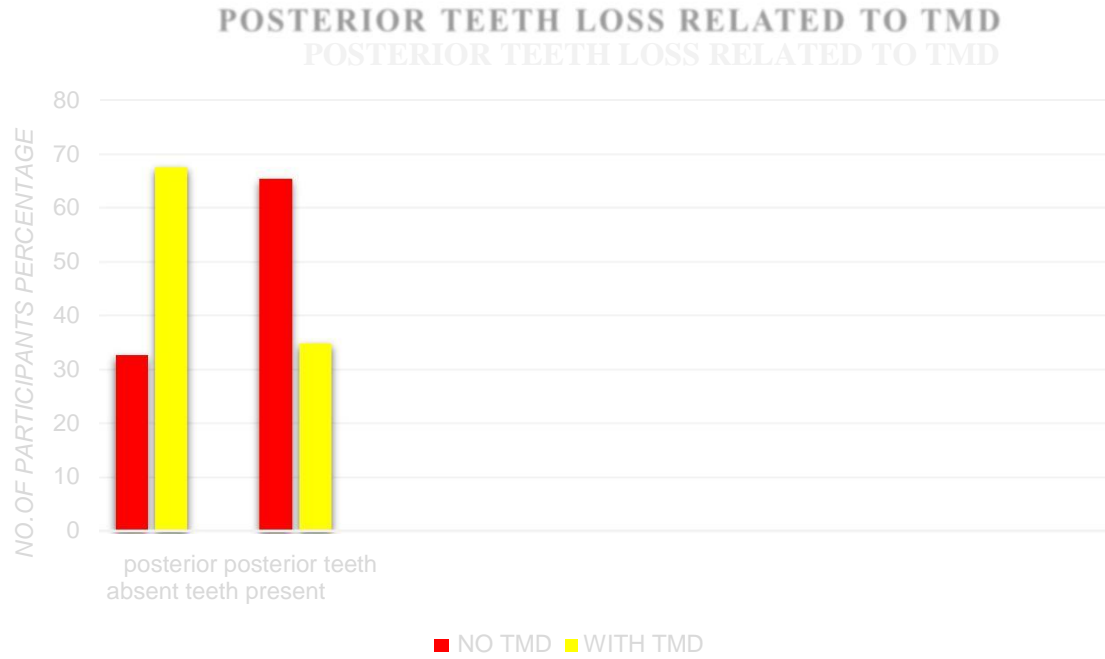
INTERENCE: Anxiety / depression was present in 358 (58.0%) participants, among 185 (58.9%) were females and 173 (57.1) were males. In both gender 34-41 years age group had more anxiety/depression were present.

**CHART 6B: ASSOCIATION BETWEEN ANXIETY/DEPRESSION  
RELATED TO TMD**



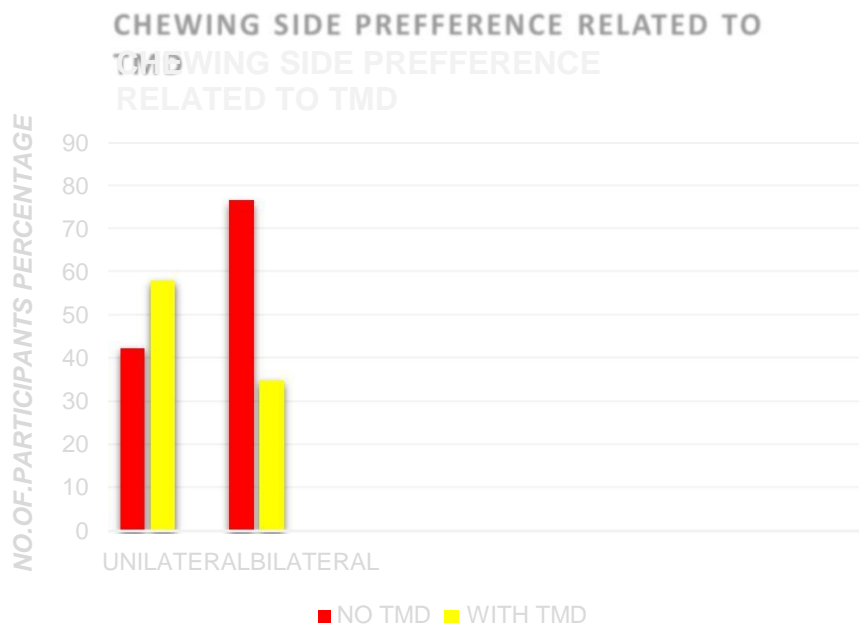
INFERENCE: Subjects with stress related with no TMD were 139(41.1%) and with TMD were 199 (58.9%). Subjects with anxiety/depression are more prevalent to TMD

**CHART 7: ASSOCIATION BETWEEN POSTERIOR TOOTH LOSS  
RELATED TO TMD**



INFERENCE: Subjects with posterior tooth was not related to TMD were 110 (32.5%) and with TMD were 228 (67.5%). Participants with posterior teeth loss were more prevalent to TMD

**GRAPH 8: ASSOCIATION BETWEEN CHEWING SIDE PREFERENCE RELATED TO TMD**



**INFERENCE:** Participants with unilateral chewing side preference with not related to TMD were 161(42.2%) and with TMD were 220 (57.8%). Subjects with bilateral chewing side preference with not related to TMD were 180 (76.3%) and with TMD were 56 (23.7%). Participants with unilateral chewing habits were more prevalent to TMD



## DISCUSSION

Temporomandibular disorders (TMDs) is one of the most common causes of pain in the orofacial region, followed by odontogenic pain and also has a potential to produce a chronic type of pain. Temporomandibular (TMJ) disorder is an array of condition characterized by pain in mouth opening, pain in orofacial region, temporomandibular joint sounds with or without pain. limited mouth opening, restricted mandibular movements, pain and tenderness of temporomandibular joint or associated structures, orofacial muscles and masticatory muscles and deviation/deflection of mandible during movements of joint.<sup>12</sup> Chronic TMDs can be associated with other chronic pain conditions including stress induced tension type of headache, cervical spinal pain, shoulder pain, radiating and referred type of pain in forehead and occipital, temporal region of head, restricted mandibular movements, masticatory fibromyalgia. TMDs are recognised psychological impact on quality of life. The aetiology of TMD are more complex and multifactorial with initiating factors, predisposing and perpetuating factors. TMD causes may be related to stress, anxiety/depression, tension type of headache, preferred chewing side, abnormal occlusion, parafunctional habits (bruxism, grinding, clenching, nail biting), posterior teeth loss, posterior crossbite, anterior deep bite, anterior open bite, adverse oral habits and masticatory muscle pain<sup>16</sup>

Studies significantly showed that TMD tend to be begin during teenage and signs / symptoms of TMD gradually increased as age advances. Prevalence and severity of TMD have been observed to be more common among female than males because hormonal influences play a most important role in pathogenesis of TMD and MPDS. Pain sensitivity, pain threshold and its tolerance vary in women because of hormonal imbalance <sup>(33)</sup>. the information about sign and symptoms of TMD has been collected by clinical examination and questionnaires, house to house survey, locality and regional survey of people, telephone survey in some studies and by personal interviews in others <sup>(43,62)</sup>. The purpose of this study is to assess the prevalence and severity of temporomandibular disorders by evaluating the occlusal characteristics, headache, para functional habits (clenching, grinding, bruxism), malocclusion, stress, anxiety/depression of the individual, missing posterior teeth and preferred side of chewing were checked meticulously if they had an influence on the TMD in young adults.

Among 617 participants in which 374 (60.6%) participants had at least one sign/symptom of TMD in which 74(48.4%) participants were in 18-25 years group 94(59.4%) participants were in 26-33 age groups, 101(61.5%) participants in 34-41 years age group had at least one symptoms/sign of TMD. Based on gender wise distribution 204(54.5%) females, males170(45.5%).

TMJ sounds or clicking are associated with pathology or may be simply reflect as normal physiological variations. TMJ sounds are most

commonly seen in TMD, where they may be associated with or without pain and restricted functional mandibular movements. Joint sounds or clicking are often seen in the normal general populations without any symptoms of TMD. Objective methods and subjective methods are used to detect TMJ sounds or click.

Objective and subjective methods are helpful for detection of TMD. Objective methods like stethoscope, palpations, electronic recording and subjective methods such as clinical examination and self-reporting by patient.

Morphological and psychological factors are causes for TMD.

Anatomical and morphological factors such as change in shape and positions of condylar head with related to the articular disc and glenoid fossa are associated with improper adaptation in temporomandibular joint leading to incidence of joint sounds/clicks.

Psychological factors such as stress, anxiety/depression related parafunctional habits like clenching and grinding also cause strain on TMJ which leads to TMJ disorders and joint sounds. Psychological factors indirectly effects on joint sounds <sup>23</sup>.

Other causes of TMJ sounds are pre-mature contacts of teeth, attrition, chewing cycle, jaw play, vertical movements, parafunctional habits, malocclusion (class II), deep bite more than 6mm anterior open bite, posterior cross bite, morphological characteristic of TMJ shape and position of condyle,

balancing side interferences causes more strain on the joint which can lead to maladaptive process in the joint which cause sound/click. 57% nonpatient populations had a joint sound/click without any TMJ symptoms/signs <sup>23</sup>

In our study TMJ disorders, mainly because of patients presented with psychological stress, anxiety/depression, bruxism, posterior teeth loss, preferred chewing habit , oral adverse habits , class II malocclusion , anterior open bite, stressful life style, long time working hours, travelling long distance, stress related profession , sleep disturbances, improper fitting dentures, abnormal dental restorations with improper vertical dimensions changes in dental occlusion may leads altered work load on TMJ.

TMJ sounds/clicks were the most prevalent symptom/sign of TMD. In our study, joint sounds were present in 31.1% of the study sample. Females had significantly more joint sounds (32.1%) when compared to males (30.0%). high prevalence was found (41.61%) in 42-50 years age group ( $p < 0.02$ ). Our study results significantly associated with studies conducted by Minson Nquyen et al<sup>11</sup> reported prevalence of TMD sounds 28.0% and Kaberi Majumber et al<sup>41</sup> study reported 26.0% prevalence of sound were observed. Canadian study conducted by Locker D.Slade <sup>(58)</sup> et al reported (25.4%).

Our results were relatively low compared with study conducted by Clauda Lucia pimento Ferreria <sup>(33)</sup> reported prevalence of sounds (67%).Our study results relatively high compared to studies conducted by M.Dekanter <sup>(7)</sup>

and Arvind Muthukrishen et al <sup>(43)</sup> studies showed that prevalence of TMJ sounds were 14.8 and 8.2% respectively.

In our study, joint clicking was present in 42.6% of the study sample. Females had significantly more joint sounds (44.3%) when compared to males (40.1%). high prevalence was found (42.6%) in 34-41 years and 42-50 years both age group ( $p < 0.02$ ). Our study results significantly associated with studies conducted by Minson Nquyen et al <sup>(11)</sup> reported prevalence of TMD clicking 48.1% and Arvind Muthukrishen et al <sup>(43)</sup> studies showed that prevalence of TMJ clicking sounds were 38.6%.

Our results were relatively low compared with study conducted by Jose Gustavo Dala Dea Camacho <sup>(13)</sup> reported prevalence of sounds (71%). Our study results relatively high compared to Kaberi Majumber et al <sup>(41)</sup> study reported 22.4% prevalence of clicking were observed.

Masticatory muscle pain/tenderness mainly due to Psychological factors such as stress, fear, tension, anxiety/depression, family environments, life style changes, adverse habits have been contributing to overall balancing of masticatory system. These situations primarily effecting the facial muscles and mandibular muscles. Once this balance is disturbed it alters the individual physiological tolerance of the masticatory system, the system itself start to respond with certain changes like pain in masticatory muscle and tenderness over masticatory and facial muscles leading to limited mouth opening, joint

sounds, pain on mouth opening, altered chewing pattern, internal derangement, deviation of mandible, muscle pain/tenderness, muscle fatigue are commonly seen. All etiological factors cause macro and micro trauma to musculoskeletal system leads to changes in hyper tonicity of muscle which cause muscle fatigue and accumulation of chemical pain mediators which lowers pain threshold to mechanical and chemical stimuli which causes MPDS.

It is characterized by unilateral sharp pain, with localized trigger points in orofacial muscle region. it is intermittent in nature, sudden in onset, and aggravates on mandibular function. Multiple factors are cause for MPDS such as oral parafunctions habits, sleep and awake bruxism, nail biting, gum chewing are the factors that initiate and perpetuate muscle pain.

In our study severity of muscle pain in patients presented with psychological stress, sleep disturbances, anxiety/depression, bruxism, posterior teeth loss, preferred chewing habit, oral adverse habits, improper fitting dentures, abnormal dental restorations, changes in vertical dimensions of dental occlusion may leads to increased work load on TMJ and masticatory muscle which causes muscle tenderness and pain.

Masticatory muscle tenderness was found in 31.1% of the study sample and it was more among women (34.3%) when compared to men (27.7) ( $p < 0.1$ ). high prevalence was found (30.0%) in 42-50 years age group.

Claudia Lucia Pimenta Ferreria et al <sup>(33)</sup> study shows that masticatory muscle tenderness was found in (52.6%) of the subjects. The prevalence rates reported in Brazilian study by Victor Villaca Cardoso Mello et al <sup>(10)</sup> shows that muscle tenderness was reported in (14%) of the subjects. The Dutch adult population study by R.J.A.Mde Kantekar et al <sup>(7)</sup> reported that prevalence of masticatory tenderness was found in (5.6%). The Swedish study by Agerbers et al <sup>(12)</sup> reported frequency of muscle tenderness was 19-36%. Sign and symptoms were significantly more frequent among women than men in German study by Gesch D et al <sup>(20)</sup> reported prevalence of muscle tenderness was found in 12% and significant age difference existed in this study significantly higher prevalence value were documented by Lucia Pimento Ferreria <sup>(33)</sup> and Janeere group study <sup>(16)</sup> for the 20-39 years old subject. In our study women tended to report symptoms more frequently ( $p < 0.10$ ) than men and had more severe symptoms 65.7% of the female and 72.3% of men were symptoms free in accordance with other findings. Contradictory studies suggest that lower prevalence of muscle of masticatory tenderness and symptoms of TMD occur equally often in men and women.

Joint tenderness may lead to restricted mouth opening, functional limitation of mandibular movements, pain in TMJ and orofacial muscular region.

Jaw pain was slow growing, dull type of pain, sudden in onset, intermittent in nature, pain mostly aggravated by during mastication and mandibular movements.

In our study Parafunctional habits, stress, anxiety/ depression is the cause for TMJ pain. Bruxism like sleep and awake bruxism causes for TMJ pain, limited mouth opening, pain with tenderness involved joint.

Joint tenderness was present in (34.1%) of population and maximum in the age group 42-50 years. Female showed a higher prevalence female (37.3%) when compared to males (30.2%) with a statistically gender significant ( $p < 0.043$ ). High prevalence was found in 34-50 years age group. TMJ tenderness upon was reported (44.4%) in Jose Gustavo Dala Dea Camacho<sup>(13)</sup> study and also showed a higher prevalence in females compared to male. In Turkish population study by A. Nekura-Azak et al<sup>(62)</sup> found that 30.1% the proportion of 35.6% versus 26.2% in 35-50 years old subjects. This study was significantly associated with gender and one of the studies reported significant age difference. Contradictory studies suggest prevalence of joint tenderness was found in Kaberi Majumber<sup>(41)</sup> study shows that (10.1%) in which females were effected 10.3% and males were effected 9.0%. Another study in Dutch population showed that prevalence of joint tenderness was males (1.7%) females (2.9%).



Pain on mouth opening was evident and showed (39.0%) in our study population. Females experienced more pain on mouth opening (40.1%) when compared to men (37.1%) and it was statistically significant ( $p < 0.04$ ) high prevalence was found (32.0) in 42-50 years age group.

Minh Son Nquyed <sup>11</sup> et al study reported pain up on mouth opening in 25.2% of subjects and this symptom was more frequent among women (60.0%) than men (40.0%). Kaberi majumber <sup>(41)</sup> et al study reported pain upon mouth opening in (41.9%) subjects and this symptom was more frequent in female (42.28%) compared to the male (41.5%). Brazllian study conducted by Victor Villaca Cardosode Mello et al <sup>(10)</sup> showed that prevalence of pain on mouth opening females were frequently involved (22.9) compared to men (11.8%). All these studies stated that no significant age and gender based difference.

Dental abnormalities such as change in occlusal position, posterior crossbite premature contact, chewing side preference leads to excessive pressure on balancing side or nonworking side joint and bilamellar zone of articular disk region shows degenerative changes in joint and articular disc, this leads to improper anatomical relations between condylar head to articular disc which leads to deviations of mandible during mouth opening and closing. Deviation of mandible on mouth opening was reported (28.5%) of individuals in the present study, males showed a slightly higher prevalence of deviation (28.7%) when compared to females (28.1%) ( $p < 0.2$ ) our study contrasting

Minhson Nguyen<sup>11</sup> et al study showed that 37.6% study subject had deviation of mandible in this study subject's females were more commonly involved (54.1%) compared to male. This study results were relatively high compared to Kaberi Majumber<sup>(41)</sup> study R.J.A.M.De Kanter<sup>(7)</sup> et al which reported irregular jaw movements such as deviations and deflection in 26.9% and 26.4% respectively.

Limited mouth opening of <35mm was present in (16.0%) of the subjects in our study. Female reported higher prevalence of limited mouth opening (19.1%) when compared to men (12.8%). Very high prevalence was found (41.61%) in 42-50 years age group( $p < 0.5$ ) No statistical significant found in between age and gender of population. Arvind Muthukrishnan<sup>43</sup> study reported that rate of limited mouth opening to be 11.4% and study show that female reported higher prevalence of limited mouth opening (13.9%) compared to men (10.1). In these study gender and age statistically significant.

Study results were relatively high compared to Minhsoninguyan<sup>11</sup> and showed that rates of limited moth opening (9.7%) of subject in which very high prevalence was found in females (60.0%) compared to men.

Study results were relatively low compared to Kaberi Majumber et al<sup>41</sup> and reported that prevalence of limited mouth opening to be (18.0%) and showed that female reported higher prevalence (24.9%) then the male (9.5).

All studies including our study described a significant increase in prevalence with age and higher prevalence was reported in women than men.

Parafunctional habit is an unusual or abnormal behaviour or functioning of the oral structures and its associated muscles of the face. Parafunctional habits such as sleep bruxism, awake bruxism, clenching, lip biting, nail biting, thumb sucking, tongue thrusting, gum chewing, these are mainly due to psychological stress.

These adverse habits may cause Sleep disturbances, headache, masticatory muscle spasm and orofacial pain, joint pain/tenderness, mild to severe attrition of teeth structure, mainly in posterior teeth attrition, Periodontal problems, increased load on TMJ which lead to TMJ sound, deviation of mandible during mandible opening and closing, Disc displacement with reduction and without reduction, degenerative joint diseases.

Thumb sucking, tongue thrusting causes more excessive pressure on teeth which leads to anterior open bite and posterior cross bite. Parafunctional habits such as Bruxism (sleep bruxism, awake bruxism), clenching/grinding are associated with TMD<sup>(62,45,24)</sup>. The prevalence of bruxism was present in 29.3% of study sample. Very high prevalence 30.5% was found in (42-50) years age group. Both male and female showed a same prevalence of bruxism (29.2% and 29.3% respectively) and no significant difference was found.

Three studies <sup>(6,24,45)</sup> found a significant association between bruxism and TMD, which reported that subjects with any degree of bruxism had a higher rate of TMD than those who showed no degree of bruxism (clenching/grinding).

According to Jaun Fernon Docasanova Rasado et al<sup>40</sup> Posterior teeth loss associated with TMD. In our study patients with posterior teeth loss was present in (67.5%) were associated with TMD. Our study found an association between incidence of TMD in posterior teeth loss (67.5%) and same results also found by Helkimo <sup>(8)</sup> and K Ikeae<sup>4</sup> et al showed that there was a significantly increase in prevalence of missing mandibular posterior teeth in subjects with disc displacement. Because loss of posterior occlusal support and an increase in joint loading that produces changes such as disc displacement and degenerative joint diseases.

Unilateral chewing side was an independent predictor of TMD and our study found that the subjects with higher rates of this variable have higher rates of TMD than those who chew bilaterally. In our study Subjects with unilateral chewing side preference with not related to TMD were 161(42.2%) and with TMD were 220 (57.8%). Subjects with bilateral chewing side preference with not related to TMD were 180 (76.3%) and with TMD were 56 (23.7%).

57.8% have TMD study subjects were complaint about TMD with the habit of unilateral chewing habits. Jaun Fernon Docasanova Rasado et al <sup>40</sup> suggest that the subjects with severe TMDS tent to divert chewing to the side of the lesion. These pattern of characteristics movements seem to adaptive responses that allow for the work of chewing to be handled with the least amount of pain and damage. Although the alteration observed in the chewing pattern of patients with TMD are probably direct consequences of TMD and/or muscular disorders. This does not eliminate the possibility that chronic unilateral chewing during development stages and while growing up could predispose an individual to certain articular intra capsular dysfunction as well as internal degeneration. Because of this unilateral chewing may be factor that is highly associated with TMD and may even be a cause problem.

Psychological factors provided some very interesting data in our study of the two questionnaires that we administrated, fonseca's questioner (anxiety/depression/stress) provided significant results in relations to TMD. Anxiety was significant in our finding (59.9%)that the most anxious subjects had a 1.32 greater likelihood than those with less anxiety. Anxiety / depression was present in 358 (58.0%) participants, among 185 (58.9%) were females and 173 (57.1) were males.

Subjects with stress related with no TMD were 139(41.1%) and with TMD were 199 (58.9%). High prevalence was found in 34-41 years age group.

These results agree with Jaunfernando Casanova-Rosado et al<sup>40</sup>, Kariny Alomura et al<sup>30</sup> and Kaberi Majumber et al<sup>(41)</sup> showed that 49% had significant association with TMD and anxiety and also females (57.6%) more frequently involved compared to males (45%).

## SUMMARY AND CONCLUSION

Subclinical signs of TMD were observed in 64.6% of general population who showed at least one positive sign. Females were more commonly affected than males in the ratio of 1.6:1. The middle age people more commonly affected.

Relevant subjective personal history, medical and dental history are useful for identifying the patients with clinical temporomandibular dysfunction

In our study the more frequent symptoms of TMD are discomfort stiffness of the mandibular jaw while waking-up in the morning, pain in TMJ or its associated orofacial region during mandibular movements. Most frequent signs of TMD are temporomandibular joint clicking/sounds and mandibular deviation/deflect during mouth opening and closing, tenderness over temporomandibular joint and masticatory muscle region.

Our study results showed significant association between the reporting sign/symptoms of TMD and hypothesised risk factors such as psychological stress, anxiety/depression, sleep disturbances tension type of headache, occlusal characteristics like malocclusion, posterior cross bite, anterior open bite, deep bite, posterior cross bite, parafunctional habits, adverse habits, missing posterior teeth, preferred chewing side have a significant role in establishing progressive temporomandibular disorders

Early diagnosis of TMD is helpful for prevention of future complication from temporomandibular disorders.

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**ANNEXURE I**



**RAGAS DENTAL COLLEGE & HOSPITAL**

(Unit of Ragas Educational Society)

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Affiliated to The Tamilnadu Dr. M.G.R. Medical University, Chennai

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TO WHOMSOEVER IT MAY CONCERN

Date: 19.01.2018  
Place: Chennai

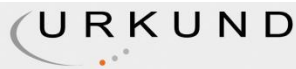
From,  
The Institutional Review Board,  
Ragas Dental College and Hospital,  
Uthandi,  
Chennai – 600 119.

The dissertation topic titled “ASSESSMENT OF THE PREVALENCE AND SEVERITY OF THE TEMPOROMANDIBULAR DYSFUNCTIONS IN YOUNG ADULTS” submitted by **Dr. SARNU SIVAIAH.**, has been approved by the Institutional Review Board of Ragas Dental College and Hospital.

**Dr. N.S. Azhagarasan M.D.S,**  
Member secretary,  
Institution Ethics Board,  
Ragas Dental College & Hospital  
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Chennai – 600 119.



## ANNEXURE II



### Urkund Analysis Result

Analysed Document: sarnu sivaiah.docx (D34354050)  
Submitted: 1/4/2018 5:02:00 PM  
Submitted By: sree4418@gmail.com  
Significance: 5 %

#### Sources included in the report:

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#### Instances where selected sources appear:

50

**ANNEXURE III**

**CONSENT FORM**

Date:

I am giving my willing consent for participating in the study and willing consent for clinical examination procedure.

I am informed about the questionnaires to be filled. I am aware of past medical history and past dental history; temporomandibular disorders are to be recorded by using questionnaire.

I am informed about the clinical examination procedure & type of questionnaire being given to me. I am informed that adequate safety precautions are taken to avoid or manage any possible complications arising.

This undertaking is given upon my own accord, I have been explained by the operating surgeon in English and in my own regional language.

NAME OF PATIENT:

SIGNATURE OF PATIENT