

## Temporomandibular Joint Disorders And Gender Differences Among Habitants Of Karachi

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### ABSTRACT:

**Background:** This study aimed to determine the prevalence of TMDs among the sample of Karachi and to observe the most frequent TMJ sound in this population.

**Methodology:** It was a cross sectional study conducted from Sep 2017 to Nov 2017. Three hundred patients were selected through cluster sample technique from the public/private dental institutes and private dental clinics of Karachi. The data was collected with the help of questionnaire and intraoral examination was performed by the researchers. All those patients with complain of TMDs and between 20-75 years were included in this study. The frequency and association between gender and TMDs were assessed through the application of Chi square.

**Results:** There were more males (n=162, 54%) and (n=138, 46%) females in this study. Majority of participants fall under the age group of 20-30 years of age. Most common TMDs symptom among male was pain during mastication (n=104, 64%) and most common symptoms among female was pain on neck/cervical area which was (n=92, 66%). Headache and earache was the least common symptom among both genders and p-value was 0.003 and 0.024 respectively. Clicking was the most common TMJ sound found among both genders, in male it was (n=58, 35.8%) and in female it was (n=48, 34.7%) followed by crepitation. Regarding parafunctional habits; majority of females (n=95, 68.8%) were in habit of clenching than male (n=60, 37%) and p-value was 0.0001 followed by tooth grinding which was also found mostly in female (n=64, 46.3%) then male (n=10, 6.1%) and p-value was 0.0001. Regarding the risk factors of TMDs; while examination majority of females were found with disturbed articulation, (n= 37, 26.8%) and in male it was (n=10, 6.1%), significance difference was found between both genders and p-value was 0.0001. Stress was found to be most common risk factor and aggravating factor of TMDs among both genders. Missing teeth were found in both gender; (n=100, 61.7%) male and (n=71, 51.4%) female and calculated p-value was 0.047.

**Conclusion:** It was inferred from this study that greater prevalence of TMDs was mostly found in female gender. The statistically significant difference was found among stress as an aggravating factor of TMDs and gender. Clicking was the most prevalent TMJ sound and clenching was the most frequently observed parafunctional habit among both gender, followed by tooth grinding and statistically significant difference found among both gender.

**KEYWORDS:** Temporomandibular Joint, Temporomandibular Joint Disorders

### INTRODUCTION:

Temporomandibular joint disorders (TMDs) have been an enigma in the world of dental literature. It accounts for the second most common pain in intraoral and circum-oral region<sup>1</sup>. Temporomandibular Joint (TMJ) is a main component of stomatognathic system which aids in diverse functioning of mandible, speech, chewing, and swallowing<sup>2</sup>. Any disruption in the structure of TMJ leads to the develop-

ment of TMDs. The typical features involved in TMDs are pain and fatigue in muscles of mastication, pain in preauricular region, headache, jaw joint noises, pain in neck and cervical spine, disability in mastication, mandibular deviation, limited movement of TMJ<sup>3</sup>. The etiology of TMJ is multi factorial with multiple predisposing and aggravating factors<sup>1,4</sup>.

Patient strives for dental treatment in case of pain in TMJ. Majority of patients experienced pain during jaw movements, mastication; palpation and tenderness in muscles of mastication and pain at rest<sup>5</sup>. This pain is mainly due to alteration in muscle's activity and its further damage is prevented by limiting jaw movements which promotes healing of stomatognathic system<sup>6</sup>. TMDs can be an upshot of discomfort in non-dental part of the orofacial region, and there is a positive correlation present between prevalence of headaches and TMDs<sup>6</sup>.

Crepitation and clicking are the most occurring TMJ noises followed by headache<sup>7</sup>. TMJ noises are not the consistent problem or disorder but are relatively a risk factor<sup>7</sup>. TMJ clicking without pain or significant dysfunction usually occurs due to alteration in disc displacement, variation in condyle morphology and mechanical disk derangements<sup>8</sup>.

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There is sufficient literature available worldwide which exhibited the association between stress and anxiety and TMDs and multiple studies indicated that depression, stress and anxiety are the predisposing factors and risk factors for TMDs and may aggravates the symptoms of TMDs<sup>1, 9</sup>. In 2008, according to the study conducted in Japan revealed the greater prevalence of TMDs was observed in working people and was around 17-18% and among general population the prevalence of TMDs was 5%-12%. It was inferred from the study that this huge difference was caused by the stress due to working climate, work load and interpersonal relationships which acted as an aggravating psychological factors<sup>10</sup>. Moreover psychological status have been correlated to the TMDs in multiple studies<sup>1</sup>. One comparative study of TMD sufferers and without TMDs reported augmented levels of somatization due to anxiety and depression<sup>1</sup>.

There are ample epidemiological studies conducted worldwide which revealed the high prevalence of TMJ sounds among the age group of 15 and 25 years old<sup>1</sup>. The range reported for the prevalence of TMDs in various investigations has been 1%-75% of general population exhibiting at least 1 objective TMD sign, and 5%-33% reporting subjective symptoms<sup>1</sup>. One of the studies conducted in New Zealand in 2015 revealed 12% incidence of TMJ clicking as a self reported symptom and primary clinical finding<sup>11</sup>. This can be attributed to differences in race, sampling design, and diagnostic tools<sup>1</sup>.

There are multiple medical and dental factors related to TMDs were highlighted in literature for example age, gender, emotional stress, psychosocial and genetic factors, disc anatomy and pathophysiology of muscles, occlusion, dental treatments (restorative, prosthetics, orthodontic), parafunctional and oral habits, posture and trauma<sup>1,4</sup>.

Abundant literature revealed dental factors such as interference in normal occlusion like open bite, cross bite, crowding, missing teeth, midline discrepancies excessive overbite and overjet as perpetuating, triggering or predisposing factors for TMDs<sup>11</sup>. Parafunctional activities are usually harmless, until the forces exerted exceed the structural tolerance<sup>1</sup>. TMJ space reduction, followed by disc compression results in pain in muscles of mastication and discomfort and these symptoms are reported among the patients with chronic habit of clenching and bruxism<sup>8</sup>.

According to Goran Agerberg et al; TMJ clicking was found to be most frequent clinical finding<sup>12</sup> while, Virginia Tuerling et al reported muscle tenderness was the most frequent complain among 80.9% of patients<sup>13</sup>. In 2002 according to Johansson et al discomfort in mastication was found in 61% of patients, pain during mouth opening among 19.4% patients, jaw joint noises in 28.5% of patients in a cross sectional study of (n= 8,888) subjects<sup>14</sup>. According to Michelotti et al jaw joint noises were the most occurring symptoms of TMDs followed by pain<sup>11</sup>.

Fariha Shah in 2014 conducted a study in Shadman Lahore Pakistan which revealed pain while yawning and eating was most frequent complains followed by TMJ sounds of clicking and crepitus<sup>15</sup>. Another study conducted in Mardan, Pakistan evidenced clicking as a commonest symptom of TMDs among college students<sup>16</sup>.

It was hypothesized that TMDs were more prevalent among female gender and TMJ clicking is the most frequently occurring sound. There is ample literature available worldwide and more work should be done nationwide to develop a strong Pakistani reference material to compare it with other studies and indeed it was the rational of the study. The objective was to determine the prevalence of TMDs among the sample of Karachi and to observe the most frequent TMJ sound in this population.

**Methodology:** This was a cross sectional study to determine the prevalence of TMDs among the sample from Karachi. The sample size was calculated as 289 based on the prevalence of 25% which then augmented to 300 by using sample size calculation formula  $N = (Z)^2 \times P(1-P) / d^2$ <sup>1</sup>. Three hundred participants were inducted through cluster sampling technique from Karachi. Karachi is the metropolitan city and has the federation of eighteen autonomous towns and every town was sampled as cluster<sup>17</sup>. Approximately 17 participants were selected from every town and though this sample was the true representative of Karachi population. The data was collected from Sep to Nov 2017 in the oral medicines OPD of all the clusters. The data was collected by the help of self administered questionnaire and intraoral examination was conducted by researchers and was formulated with the help of Research Diagnostic Criteria for TMD (RDC/TMD)<sup>1,18</sup>. The questionnaire was validated after conduction of pilot study on 30 participants. The rational of the study was explained to every participant before the informed consent. The study protocol was approved by the Ethical Review Committee of BUMDC numbered 37/17. All those patients who were reported to Dental OPD between 20-75 years gave consent and had complain of any TMJ symptoms were included in the study. The subjects with atypical odontalgia, burning mouth syndrome, atypical facial pain, cervical and neuropathic pain, fibromyalgia, migraine, trigeminal neuralgia and with the history of treatment of TMDs were excluded from the study. The demographic variables were age, gender, dental history (filled/missing teeth, removable/fixed prosthesis), symptoms of TMDs were assessed by asking questions regarding pain during mastication and mouth opening, pain on neck/cervical area, MPDs tenderness, headache, earache. TMJ sounds clicking/crepitation, parafunctional habits i.e: clenching, tooth grinding. Risk factors of TMDs for example TMJ pain aggravates under stress, nervousness, history of head and neck trauma were asked.

**Oral examination:** The clinical examination of TMJ was conducted via the help of questionnaire i.e; inspection,

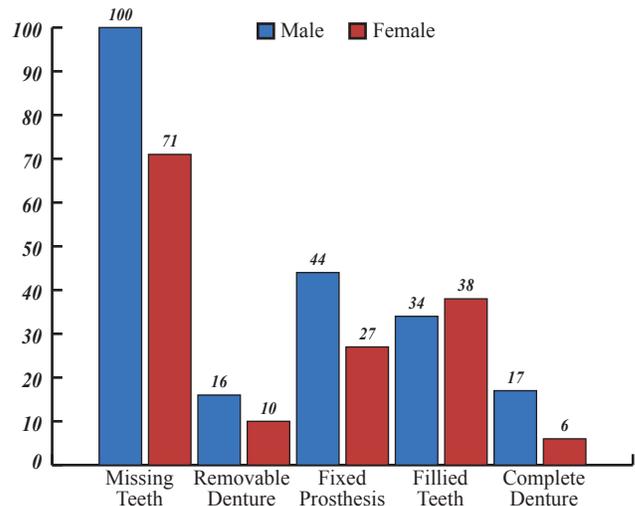
palpation, and an intraoral examination. The localized tense and painful area was examined. The suprahyoid, subhyoid head and neck muscles and muscles of mastication were examined. The origin and insertion of masseter muscle was palpated at zygomatic arch and angle of the mandible. Mouth opening was measured with the help of ruler between the central incisor and TMJ sounds were assessed as clicking, crepitation or no sound with the help of stethoscope. To assess the articulation, mandible deviation and dental status of patient about missing teeth, filled teeth, presence of removable or fixed prosthesis or presence of complete denture intraoral examination was performed.

### Statistical Analysis:

The data was entered manually on SPSS version 23 for data analysis. To compare prevalence of clicking with gender descriptive analysis and chi square ( $\chi^2$ ) was applied. Confidence interval was set at 95% and P value less than 0.05 was taken as statistically significant.

**Results:** Our study focused on 300 participants who fulfilled the inclusion criteria and were recruited through cluster sampling technique. There were (n=162, 54%) males and (n=138, 46%) females in this study. Majority of participants fall under the age group of 20-30 years of age. During assessing the association between gender and TMDs symptoms; pain during mastication (n=104, 64%), was the most common symptom in male followed by pain on neck/cervical area which was (n=93, 57%) and MPDS tenderness was (n=73, 45%) and most common symptoms in female was pain on neck/cervical area which was (n=92, 66%) followed by pain during mastication and MPDS tenderness which was (n=78, 56%). Pain during mouth opening was slightly greater (n=36, 22%) in male and then female (n=29, 21%) and p-value was 0.063. Headache and earache was the least common symptom among both genders. Headache was (n=10, 6.1%) in male and (n=23, 16.6%) in female and p-value was 0.003. Earache was (n=12, 7.4%) in males and (n=21, 15.2%) in females and p-value was 0.024. Table-1. For assessing the association between gender and TMJ sounds; clicking was the most common sound found among both genders, in male it was (n=58, 35.8%) and in female it was (n=48, 34.7%) and p-value was 0.475 followed by crepitation which was (n=8, 4.9%) in male and (n=12, 8.6%) in female and calculated p-value was 0.143. Regarding parafunctional habits majority of females (n=95, 68.8%) were in habit of clenching than male (n=60, 37%) and p-value was 0.0001 followed by tooth grinding which was also found in majority of female (n=64, 46.3%) then male (n=10, 6.1%) and p-value was 0.0001 Table-2. Stress was found to be most common risk factor and aggravating factor of TMDs among both genders. From the total (n=73, 45%) male and (n=78, 56.5%) female responded affirmatively that TMJ pain aggravates during stress and statistically significant difference found between both genders and p-value was 0.0001 on the other hand (n=12, 7.4%) male and

(n=21, 15.2%) female were found to be nervous, p-value was 0.0001. Upon examination, majority of females were found with disturbed articulation, (n= 37, 26.8%) and in male it was (n=10, 6.1%), and calculated p-value was 0.0001. Deviated mandible was found slightly more in males (n=14, 8.6%) and in female it was (n=13, 9.4%) and p-value was 0.485. From the total females (n=11, 7.9%) had the history of head and neck trauma than male which was (n=8, 4.9%), (n=8, 5.7%) female and (n=7, 4.3%) male encountered TMJ locking during their life-(Table-3). Regarding dental status; missing teeth were found in both gender; (n=100, 61.7%) male and (n=71, 51.4%) female and calculated p-value was 0.047. In male (n=44, 27%) had fixed prosthesis, (n=34, 20.9%) had filled teeth, (n=17, 10.4%) were wearing complete denture and (n=16, 9.8%) had removable partial denture. In female (n=38, 27.5%) had filled teeth, (n=27, 19.5%) had fixed prosthesis, (n=10, 7.2%) had removable partial denture and (n=6, 4.3%) were wearing complete denture. When comparing the gender, male was having more number of missing teeth, removable denture, fixed prosthesis and complete denture then female and greater number of filled teeth was seen in female gender then male. Graph-1. Explicit analyses of this study accept the research hypothesis.



Graph: 1 Dental Status and Gender

**Discussion:** Multiple clinical symptoms related to the TMDs were assessed in several studies for example parafunctional habits, TMJ clicking, jaw locking, history of trauma to head and neck and dental status like missing teeth<sup>19</sup>. However, it is difficult to classify TMDs according to greater number of symptoms and the variations found in a single patient. There were ample retrospective clinical studies examined the association between TMDs and risk factors. Age, gender, psychological factors were associated with TMDs according to the systemic review based on clinical studies. The effect of oral parafunctional habits on TMDs were studied by Michelotti *et al* and revealed that

TMDs Symptoms	Gender		P-value
	Male(n=162)	Female(n=138)	
Pain during mastication	104	78	0.108
	64%	56.5%	
Pain during mouth opening	36	29	0.456
	22%	21%	
Pain on neck/cervical area	93	92	0.063
	57%	66%	
MPDs Tenderness	73	78	0.031*
	45%	56.5%	
Headache	10	23	0.003*
	6.1%	16.6%	
Earache	12	21	0.024*
	7.4%	15.2%	

Table-1: Association between Gender and TMDs Symptoms

TMJ Sounds	Gender		P-value
	Male(n=162)	Female(n=138)	
Clicking	58	48	0.475
	35.8%	34.7%	
Crepitation	8	12	0.143
	4.9%	8.6%	
Clenching	60	95	0.0001*
	37%	68.8%	
Tooth Grinding	10	64	0.0001*
	6.1%	46.3%	

Table-2: Association between Gender and TMJ sounds and Parafunctional habits

TMDs Symptoms	Gender		P-value
	Male(n=162)	Female(n=138)	
TMJ pain aggravates under stress	73	78	0.0001*
	45%	56.5%	
Nervousness	12	21	0.0001*
	7.4%	15.2%	
Disturbed articulation	10	37	0.0001*
	6.1%	26.8%	
Deviated mandible	14	13	0.485
	8.6%	9.4%	
H/O head and neck trauma	8	11	0.201
	4.9%	7.9%	
TMJ locking	7	8	0.373*
	4.3%	5.7%	

Table-3: Impact of Risk factors of TMDs on Gender

diurnal parafunctional activities, especially daytime tooth clenching/grinding, were risk factors for subgroups of TMDs and myofascial pain<sup>20</sup>. According to Lee et al; jaw disability was the risk factor among 87 psychological distress patients<sup>21</sup>. Hagag et al discovered that prosthodontic treatment and occlusion has an impact on TMDs<sup>22</sup> while Mohlin et al examined that orthodontic treatment and malocclusion has no association with TMDs<sup>23</sup>.

The primary aim of this study was to study the prevalence of TMDs symptoms associated with gender among the population of Karachi. Multiple epidemiological studies reported severity and high frequency of TMDs were found in females as compare to males<sup>20</sup>. These differences were well explained due to hormonal, psychosocial, behavioral and constitutional factors without any significant result according to multiple studies<sup>1,23</sup>. In our study, females were found to have a higher prevalence of TMDs symptoms than males and these results were parallel with observations of Manfredini *et al.* on 433 patients<sup>24</sup>. Pain in temporomandibular joint is the only reason to visit the dentists by the sufferers of TMDs. According to our study tool; questions related to pain during mastication, pain during mouth opening, pain on neck/cervical area, pain in MPDs, frequent earaches and headaches were asked. In our study, pain during mastication, pain in neck/cervical area and in MPDs were observed mostly among females and similar trends were observed in another study<sup>5</sup> and these results were in harmony with the study of Begis which revealed that pain in resting position at TMJ area and in masseter muscle was significantly higher in female gender<sup>19</sup>. According to Velly *et al* females were three times more at the risk of MPDs in 83 patients<sup>25</sup>. In our study, majority of females were the sufferers of headache and earache and significance difference was found between both genders and these results were compatible with the study of Bora.<sup>19</sup> and Cooper et al who investigated TMDs among 4528 patients and discovered that around 96.1% subjects reported pain in temporal region which followed by headache in 87% of participants.<sup>26</sup>

Symptoms of TMDs include jaw joint noises for example TMJ clicking, crepitation.<sup>7</sup> In our study the prevalence of clicking was 35% and mostly reported by males and crepitation was 6% which was mostly reported by females and no statistical significance were noticed among both gender and these results were almost in agreement with the study of Bora in which 39% patients reported with clicking and 6% with crepitation with significantly different results among both gender which found nearly four times more frequent among females than males<sup>19</sup>. and Troeltzsch *et al.* reported the opposite results than our study, in 1031 patients; they observed more clicking among female patients<sup>27</sup>. Another study reported 40% clicking and 15% crepitation<sup>28</sup>. Important etiological factors of TMDs include bruxism, clenching and grinding as a parafunctional habits<sup>25</sup>. During bruxism, the habit of grinding and pressing the teeth alters

the biomechanical mechanism of TMJ by overloading the articular surfaces<sup>29</sup>. In our study, most frequent parafunctional habits were clenching and grinding which were frequently observed in female patients and these results were compatible with the study of Bora Begis<sup>19</sup>. Among the risk factors disturbed articulation, deviated mandible, TMJ locking, history of head and neck were the infrequent findings and mostly found in females in our study.

Multiple studies conducted worldwide which exhibited the strong association between TMDs and anxiety and depression. The patients with TMDs demonstrated greater frequency of stress, anxiety, somatization and depression<sup>1,30</sup>. Our study demonstrated nervousness and stress as an aggravating factor in temporomandibular pain and mostly found in females and significant difference was found among both genders and these results were comparable with the study of Ali KFM<sup>1</sup> Furthermore, the female gender has been ascertained a predisposing factor in the establishment of TMDs due to the higher hormonal fluctuations, estrogen levels, biological differences, social status and low threshold of pain perception<sup>1,12-14</sup>.

Ample literature evidenced the dental status for example malocclusion and missing teeth as predisposing factors to TMDs<sup>31,32</sup> however the role of occlusion related factors is controversial as they are weakly associated with TMDs<sup>21</sup>. In our study missing teeth was more frequently observed in both gender but impact of missing teeth on TMDs should be verified on a larger sample size.

#### **Strengths and limitations of the study:**

Non standardized examination procedure was one of the limitations of the study. The second limitation was the smaller sample size. The third limitation was another variable like ethnicity and age related variable should be included in the study tool. The cluster sampling technique and the study tool which was formulated with the help of validated questionnaire based on the Research Diagnostic Criteria for TMD (RDC/TMD)<sup>36</sup> were the strengths of our study.

#### **Conclusion:**

It was inferred from this study that greater prevalence of TMDs was mostly found in female gender. The statistically significant difference was found among stress as an aggravating factor of TMDs and gender. Pain during mastication, pain on neck/cervical area and MPDs tenderness were the most common symptoms among both gender. Statistically significance difference was found among both gender while assessing headache and earache. Clicking was the most prevalent TMJ sound and clenching was the most frequently observed parafunctional habit among both gender, followed by tooth grinding and statistically significant difference found among both gender. Stress was found as an aggravating factor, nervousness and disturbed articulation were the significant risk factors among both genders.

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