Impact of Anxiety and Depression on Temporomandibular Joint Disorders among Sample of Dental Undergraduates of Karachi

Kiran Fatima Mehboob Ali1 BDS, DCPS
Affaf Fatima2 BDS
Farnaz Ilyas3 BDS, FCPS
Muhammad Wasay Ali Khan4 BDS, MBBS
Zubair Ahmed Abbassi5 BDS

ABSTRACT:

BACKGROUND: To evaluate the impact of anxiety and depression on clinical features of TMDs among junior and senior years dental undergraduates of two private dental Institutions of Karachi.

METHODOLOGY: It was a cross sectional study conducted in two private dental colleges of Karachi from January 2016 to May 2016. Total 295/300 undergraduates completed the questionnaires from junior years and 246/300 undergraduates from senior years of dentistry through convenience sample technique. The required information was gathered through two validated questionnaires (AKUADS and DC/TMDs). Data was entered and analyzed on SPSS version 23. Descriptive analysis and Pearson Chi square test was performed.

RESULTS: This study estimated the significant impact of anxiety and depression on TMDs among junior and senior year’s dental undergraduates as 282/541 respondents had TMDs and 52.1% prevalence of TMDs was estimated. Students with TMDs (107/140) from junior and (115/142) senior were score more than 19 in AKUADS which was found to be statistically significant among both groups (p value=0.004 and < 0.001) respectively. There was not a significant difference between anxiety and depression and TMDs among male and female respondents. AKUADS was significantly associated with jaw joint noises and history of lock jaw when comparing junior and senior group (jaw joint noises, p value=0.007 and 0.001) and (history of lock jaw, p value= 0.011 and 0.001) respectively.

CONCLUSION: It is concluded from this study that there is an association between anxiety and depression and symptoms of TMDs among junior and senior dental undergraduates and they are experiencing approximately similar levels of TMDs features and depression as of the medical undergraduates mostly due to the higher studies burden, stringent criteria of clinical medical education and certainly dearth of the stress management skills. There is a need to reform the dental education system in Pakistan to reduce stress and anxiety among students.

KEYWORDS: AKUADS, dental undergraduates, Temporomandibular Joint disorders.


Received: 21 October 2016, Accepted: 27 December 2016

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 region1. Temporomandibular Joint (TMJ) is a main component of stomatognathic system which aids in diverse functioning of mandible, speech, chewing, and swallowing.2 Any disruption in the structure of TMJ leads to the development of TMDs. The clinical features involved in TMDs are pain and fatigue in muscles of mastication, pain in pre-auricular region, headache, joint noises, pain in neck and cervical spine and limited movement of TMJ3. The etiology of TMJ is multifactorial with multiple predisposing and aggravating factors4-6.

Structural and psychological factors have highlighted the
probable cause of TMDs. Globally, there are ample studies carried out on its etiology and revealed a significant impact of psycho emotional factor on TMDs. The coexistence of TMDs with other disorders have also been found in dental literature just as backaches, headaches, sleep disorders, arthritis, congenital defects, fibromyalgia, chronic fatigue syndromes, spastic colon and very known inflammatory bone SAPHO syndrome. Even after decades of research work, the precise etiology of these disorders could not be established.

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. This can be attributed to differences in race, sampling design, and diagnostic tools. Numerous studies, conducted to establish a putative association between stress and TMDs on general population including students. Stallman has reported that student population lives under more stress as compared to general population, therefore are more prone to developing TMDs. Bonjardim et al. and other researchers has formulated the hypothesis that academic stress contributes more towards the development of TMDs in the student population. 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. According to the study conducted on college and university students of Peshawar revealed that predisposing factors for TMJ pain were the advanced educational level, hostel residence and low socioeconomic status.

Screening for TMDs has been a challenge for clinicians and epidemiologists. Many diagnostic tools have been designed for TMDs. RDC/TMDs (Research Diagnostic Criteria/Temporomandibular joint Disorder) has been used in various epidemiological studies. The most recent modified version of RDC/TMDs is DC/TMD (Diagnostic Criteria/Temporomandibular joint Disorders). AKUADS (Aga Khan University Anxiety and Depression Scale) is a screening instrument formulated indigenously in the primary health care and psychiatric setting of Pakistan. It integrates basic somatic metaphors of depressive disorder which are culturally apposite in the setting of our society.

There is a general perception that dental studies are much easier and less stressful then the medical studies and there have been no study that reported the impact of anxiety and depression on TMDs among dental undergraduates in Pakistan and therefore this is the rationale of the study. Though there were multiple studies conducted on medical college and university students and keeping in mind the burden of dental studies, it is imperative that research should be done to evaluate the impact of anxiety and depression on TMDs among dental undergraduates. In Pakistan, the dentistry is comprised of four years in which first two years are junior and last two years are senior years in which students apply their knowledge and develop procedural skills in the clinical setting.

The aim of this study was to assess the prevalence of anxiety and depression and its association with TMDs among dental undergraduates of two private institutions of Karachi. We hypothesized that the anxiety and depression contributes an association with TMDs among dental undergraduates’ students.

**METHODOLOGY**

**Study Design**

It was a cross sectional study conducted in two private dental institutions of Karachi. The study population comprised of dental undergraduates in the age bracket of 18-24 years. The study duration was 5 months from January 2016 to May 2016. The intended sample size was 537 calculated by using the standard formula for calculating sample size on the basis of 35% prevalence.

\[
N = \frac{(Z)^2 \times P \times (1-P)}{d^2}
\]

The calculated sample size was 537 which later augmented to 600. Self-administered questionnaires were distributed among 300 dental undergraduates at each institute who were presented on the day of data collection and this was the inclusion criteria of the study. An exclusion criterion was all those dental students who were not present in the college premises on the day of data collection. Medical undergraduates were also excluded. The sampling technique was convenience, non-probability. The informed consent was taken from all the participants.

**Ethical Consideration**

The study was approved by the Ethical Review Board of Bahria University Medical and Dental College, BUMDC numbered 03/2016.

**QUESTIONNAIRES**

Two types of questionnaires were used. One was to assess TMDs and the other for anxiety and depression.
For TMDs

Our study utilized the ‘Symptom Questionnaire’ available on International RDC-TMD Consortium. DC/TMDs is the modified version and constitutes of 14 standard questions divided into 5 categories of symptoms including pain, headache, open and closed locking of the jaw and jaw joint noises.

For Anxiety/Depression

The unique aspect of AKUAD scale is; its development is based entirely on the complaints of patients in Urdu. Most of the existing scales and screening instruments for anxiety/depression are contrived by the health care professionals after assessing the clinical features e.g. Hospital Anxiety and Depression Scale (HADS) and Self Reporting Questionnaire (SRQ). AKUAD consists of 25 items and are scored according to the occurrence of particular feature concerning anxiety, appetite, breathing difficulties, concentration, gastrointestinal symptoms, hopelessness, loneliness, interests, mood, sleep, suicidal ideation, etc. The score > 19 indicates anxiety and depression.

Statistical Analysis

Data was analyzed on SPSS version 23 after sorting out the questionnaires for junior and senior students from two teaching institutions. Frequencies and percentages were calculated for categorical variables. Chi square test was used to find the association between different variables included genders, do you have pain in TMJ, do you ever have headache, jaw joint noises, history of lock jaw and anxiety and depression score. P-value less than 0.05 were taken statistically significant.

RESULTS

From 600 distributed questionnaires, 541 questionnaires were returned (response rate=90.1%). Of 541 completed questionnaires, 295 were from junior students whereas 246 subjects belonged to senior students. Total of 282/541 respondents had TMJ pain and the prevalence of TMDs was estimated 52.1%; around 140 individuals from the junior group and 142 from senior group complained of TMJ pain. Females were 433/541 (80.03%) while 108/541 (19.96%) respondents were males. Females composed a significantly larger proportion of respondents with prevalent TMDs 230/433 (53.11%). In junior group 107/140 and in senior group (115/142) students scored more than 19 in AKUAD scale which was found to be statistically significant among both groups (p value=0.004 and < 0.001) respectively. However, 29/59 (49.1%) males from junior group and 23/49 (46.93%) males from senior group of students responded with an affirmative response when questioned about having TMJ pain. While asking the same questions of TMDs from females of junior group 111/236 (47.03%) and 119/197 (60.40%) from senior group responded positively. This revealed that there was no significant difference between gender and TMDs in both group. When respondents were questioned about anxiety and depression; 45/59 (76.27%) males and 156/236 (66.10%) females from junior group and 29/49 (59.1%) male and 149/197 (75.63%) females from seniors were scored higher in AKUAD scale and association of gender with anxiety and depression was found to be statistically insignificant. There was no significant association found in prevalence of headache and anxiety and depression in both groups of junior and senior (p value= 0.382 and <0.001) respectively but association was significant between groups. Two more variables the jaw joint noises and history of lock jaw were significantly associated with anxiety/depression when comparing junior and senior group (jaw joint noises, p value=0.007 and 0.001) and (history of lock jaw, p value= 0.011 and 0.001) respectively (Table 1).

When considering the history of TMJ pain there were four scores; 1=no pain, 2=less than 1 year, 3= more than 1 year and 4= more than 3 years. This study revealed that among junior students, the history of TMJ pain was found to be high in less than a year period and the anxiety/depression score was more than 19 in 94/201 (p value= 0.783) students and among senior group the history of TMJ pain was found to be high with the history of more than three years and anxiety and depression score was also higher in this group 78/178 (p value= < 0.001). From 379/541 subjects scored more than 19 on AKUAD scale (201 from junior group and 178 from senior group) Table 2. When asking regarding any history of headaches, 481/541(88.9%) individuals from the total sample responded with affirmation to this question which estimated 289 from junior and 192 from the senior dental students. From 289 juniors, 126 students had history of headache for more than a year and 89/192 from the senior group had history of headache for more than 3 years. This result depicted that within one year of commencing undergraduate studies students encountered with headaches and this symptom become chronic in senior years of studies. Explicit analysis of this study revealed failure to accept the null hypothesis.

DISCUSSION

The subject of TMDs has been under scrutiny in dental literature since the exact cause is still unknown. Hence, the psycho-emotional component and its relation with TMDs is
Table 1. Gender Prevalence and Impact of Clinical Features of TMD on Anxiety and Depression among Pre Clinical and Post clinical dental undergraduates of two private Teaching Institutes of Karachi.

<table>
<thead>
<tr>
<th>Association of Gender and Clinical Features of TMD on Anxiety and Depression Among junior BDS Students</th>
<th>Association of Gender and Clinical Features of TMD on Anxiety and Depression Among seniors BDS Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>Variables</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender-</td>
<td>Gender-</td>
</tr>
<tr>
<td>Male</td>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td>A/D &gt; 19 Score</td>
</tr>
<tr>
<td>14</td>
<td>A/D &lt; 19 Score</td>
</tr>
<tr>
<td>80</td>
<td>n= 295</td>
</tr>
<tr>
<td></td>
<td>*P-Value</td>
</tr>
<tr>
<td>0.137</td>
<td></td>
</tr>
<tr>
<td>A/D &gt; 19 Score A/D &lt; 19 Score n= 295 *P-Value</td>
<td>A/D &gt; 19 Score A/D &lt; 19 Score n= 246 *P-Value</td>
</tr>
<tr>
<td>Do You have Pain in TMJ? -Yes</td>
<td>Do You have Pain in TMJ? -Yes</td>
</tr>
<tr>
<td>33</td>
<td>Do You have Pain in TMJ? -No</td>
</tr>
<tr>
<td>107</td>
<td>140</td>
</tr>
<tr>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>Do You have Pain in TMJ? -No</td>
<td>Do You ever have Headache? -Yes</td>
</tr>
<tr>
<td>61</td>
<td></td>
</tr>
<tr>
<td>94</td>
<td>155</td>
</tr>
<tr>
<td>0.382</td>
<td></td>
</tr>
<tr>
<td>Jaw joint Noises-Yes</td>
<td>Jaw joint Noises-Yes</td>
</tr>
<tr>
<td>15</td>
<td>Jaw joint Noises-No</td>
</tr>
<tr>
<td>62</td>
<td>77</td>
</tr>
<tr>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Jaw joint Noises-No</td>
<td>History of Lock Jaw-Yes</td>
</tr>
<tr>
<td>79</td>
<td></td>
</tr>
<tr>
<td>139</td>
<td>218</td>
</tr>
<tr>
<td>History of Lock Jaw-Yes</td>
<td>History of Lock Jaw-No</td>
</tr>
<tr>
<td>8</td>
<td>49</td>
</tr>
<tr>
<td>41</td>
<td>49</td>
</tr>
<tr>
<td>0.011</td>
<td></td>
</tr>
<tr>
<td>History of Lock Jaw-No</td>
<td></td>
</tr>
<tr>
<td>86</td>
<td>67</td>
</tr>
<tr>
<td>160</td>
<td>146</td>
</tr>
<tr>
<td>246</td>
<td>213</td>
</tr>
</tbody>
</table>

*Chi square.

Table 2. Association of Anxiety & Depression Score and history of TMJ Pain among Junior & Senior dental undergraduates.

<table>
<thead>
<tr>
<th>AKUADS</th>
<th>History of TMJ Pain Among Juniors</th>
<th>History of TMJ Pain Among Seniors</th>
<th>Total</th>
<th>P-Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Pain</td>
<td>less than 1 year</td>
<td>More than 1 year</td>
<td>More than 3 years</td>
</tr>
<tr>
<td></td>
<td>Less than 19</td>
<td>3</td>
<td>43</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>More Than 19</td>
<td>3</td>
<td>94</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6</td>
<td>137</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>No Pain</td>
<td>-----------------------------------</td>
<td>--------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td></td>
<td>Less than 19</td>
<td>29</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>More Than 19</td>
<td>27</td>
<td>43</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>56</td>
<td>53</td>
<td>38</td>
</tr>
</tbody>
</table>

*Chi square.
a matter of debate in dental literature. In the present study, the response rate was 90.1% comparatively higher than the earlier study conducted on university students of Saudi Arabia.\textsuperscript{31} The prevalence rate of TMDs was high in this study similar to a study conducted on university students of North Saudi (49.7%) \textsuperscript{32} and also matched with the study conducted on Brazilian college students\textsuperscript{33}. On the other hand 42.9% prevalence was reported by Shiau and Chang\textsuperscript{34} and Pesqueira \textit{et al.} stated 40.7% on Brazilian undergraduate students\textsuperscript{35}. While Conti \textit{et al.} in 2003, reported high prevalence rate of 68%. \textsuperscript{36} Majority of these studies used FAI (Fonseca Anamnestic Index) as diagnostic tool. The studies which have used RDC/TMD as a diagnostic tool reported high prevalence rates as the present study included Polish students pointed 54% of prevalence rate\textsuperscript{37} and a study by Calixtre \textit{et al.} reported 70.6% \textsuperscript{38}. In multiple studies female gender has more inclination towards the establishment of TMDs. A study involving 17 countries with a sample size of 85052 has clearly mentioned that 62% of women endured TMDs. \textsuperscript{39} The present study also quoted the high prevalence of TMDs among females.

As mentioned, this was the first kind of the study conducted on dental undergraduates in Pakistan and further comparing two groups (junior and senior) to assess the prevalence of anxiety and depression and its impact of TMDs. The prevalence among both groups was found to be incomparable. However, the senior population of students suffered from TMJ pain for more than 3 years which indicates its chronic nature as compared to the duration of less than a year among junior population of students mainly due to the burden of clinical based studies. From the total population 481/541(88.9%) participants had complained of history of headache from less than a year to more than three years. This can be explained by the fact that headaches are related to muscular activity encountered in the region of head and neck involve muscles of mastication and facial muscles and this predisposes to headaches. In an epidemiological study by Gonclaves \textit{et al.}, 56.5% of the individuals with one symptom of TMDs reported headaches\textsuperscript{39} and matched with our study results as majority of senior undergraduates had a history of headache for more than 3 years while most junior undergraduates had the history of headaches for the past one year and the female gender is predominates and this trend has also been observed in the case of history of TMJ pain. Among total population, 70.05% have scored more than 19 on AKUAD scale which indicates that the individuals had 19 out of 25 symptoms of anxiety and depression. A study in Pakistan by Jadoon \textit{et al.} showed the prevalence of anxiety/depression to be 43.9% by using HAD instrument for assessment\textsuperscript{40}. The association between anxiety/depression with TMJ pain was found to be statistically significant in this study. This was in line with a study in India by Moffiat \textit{et al.}, 2004, which reported 73% students encountered anxiety and depression in their student life and frequently consulted their physicians for TMJ symptoms. \textsuperscript{21} According to the study conducted at Aga Khan University Karachi, 90% of the students stumble upon myofacial pain due to the academic stress once in their academic period\textsuperscript{41} numerous worldwide literatures also accord with this association\textsuperscript{41-43}. The jaw joint noises and history of lock jaw were significantly associated with anxiety/depression in this study which is in line with the study conducted in Brazil\textsuperscript{44}.

The limitation of this study was the size of the sample. The larger sample would give the true representation of the association. Secondly, the examination component of RDC/TMD should be incorporated to assess the TMDs and its signs/ symptoms. Anxiety/ Depression are subjective variables which are difficult to be associated with certainty with any other disease. Other factors like socioeconomical status, pain aggravating factors, burden of studies and work load should have been assessed. This gives an incentive for future research. Thirdly, there were more female participants in this study as it was difficult to get equal distribution of gender in dental institutions so the results were more preponderance to female gender. The strength of this study was the utilization of validated questionnaires. The results of this study cannot be generalized to the entire student population of the city as the sample was recruited from two dental institutions of Karachi, Pakistan.

**CONCLUSION AND RECOMMENDATION**

It is concluded from this study that there is an association between anxiety and depression and symptoms of TMDs among junior and senior dental undergraduates and they are experiencing approximately similar levels of TMDs features and depression as of the medical undergraduates mostly due to the higher studies burden, stringent criteria of clinical medical education and certainly dearth of the stress management skills.

There is a need to reform the dental education system in Pakistan to reduce stress and anxiety among students.

**ACKNOWLEDGEMENT**

The authors expressed the gratitude to all the participants of this study. The authors are grateful for the support received from the vice principle Dr Kulsoom Fatima RizviBahria University of Medical and Dental College (BUMDC) and the research department of (BUMDC).
Impact of Anxiety and Depression on Temporomandibular Disorder

CONFLICT OF INTEREST
None declared

AUTHORS’ CONTRIBUTIONS
KFMA: Conceived the idea, data collection, Interpretation of Data on SPSS, conclusion, proof reading and final formatting of manuscript
AF: Writing of introduction and discussion
FI: Introduction
MWAK: Data collection
ZAA: Proof reading

REFERENCES:
14. Ali KFM/ Fatima A/ Khan MWA/ Abbassi ZA


