

ORIGINAL ARTICLE

Frequency of Temporomandibular Joint Disorders (TMDs) Among University Students from Islamabad, Pakistan

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ABSTRACT

Objective: To determine the frequency of temporomandibular disorders (TMDs) among 18- to 24-year-old university students of Islamabad.

Study Design: Descriptive cross-sectional study.

Place and Duration of Study: Sample was chosen from Quaid e Azam University, Bahria University and Riphah International University. Duration of the study was from January to March 2020.

Materials and Methods: The study comprised of 160 candidates from various universities in Islamabad including both males and females aged 18 to 24 years. Data was collected using a self-reported questionnaire and clinical examination. Age, gender, socio-economic status, and history of symptoms of TMDs were assessed. Clinical examination of the Temporomandibular Joint was carried out by the investigator to assess any clicking sounds, tenderness in the myofascial muscles and any evidence of osteoarthritis. The data was analyzed by using IBM SPSS 23. The results and frequencies were calculated using the Chi-Squared test. With a p value of <0.05, a significant relationship of TMD with gender and its clinical conditions, was determined.

Results: Out of the 160 examined, 88 were males and 72 were females. TMDs were more prevalent amongst candidates aged 22 years, with a percentage of 31.3%. Prevalence of TMDs among the participants was calculated at 61.3%. Out of those 61.3%, 58.1% had internal derangements 15% had myofascial pain and 2.5% had osteoarthritis.

Conclusion: Our study shows a high prevalence of TMDs in 18- to 24-year-old individuals. There was an overall prevalence of 61.3% among the total participants. It was found to be most prevalent among 22-year-old individuals with a percentage of 31.3%.

Key Words: *Internal Derangement, Myofascial Pain, Osteoarthritis, Temporomandibular Joint Disorders.*

Introduction

Temporomandibular disorders (TMD) are disorders of the jaw muscles, temporomandibular joint (TMJ) and the nerves associated with chronic facial pain. Anything that prevents the complex system of muscles, bones and joints from working together in harmony may result in disharmony and temporomandibular disorder (TMD).¹ Etiology and pathogenesis of TMD is poorly understood, therefore treatment of temporomandibular joint diseases is sometimes difficult but it is thought to be multifactorial.² Different etiological factors of TMD documented in the literature are psychological

factors such as personality and behavior, occlusal discrepancies, improper dental treatment, joint laxity, continuous micro trauma to joint, overloading/overusing joint structures, and parafunctional habits. Stress, behavioral, social, and emotional conditions are also considered³. Common symptoms include jaw tenderness, headaches, earaches and facial pain⁴. The symptoms vary greatly with the classification of TMDs. The classification of TMDs by Okeson P. Jeffrey, which is based on the management and diagnosis of TMJ disorders, is divided into three clinical conditions i.e., 1. Degenerative Joint disease, 2. Myofascial pain.³ Internal derangement.⁵ One or more of these conditions can prevail at the same time in an individual. The investigators of our research had a set of symptoms documented on the questionnaire with respect to each condition. The degenerative joint disease included osteoarthritis and rheumatoid arthritis in the temporomandibular joint (TMJ). Myofascial pain included pain in the fascia covering

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the muscles that control the normal functions of jaw, neck, and shoulders. Internal derangement included a dislocated jaw, disk displacement or an injured condyle.¹

TMDs are commonly found among individuals from 20 to 40 years of age but it is also reported in the younger population as well.⁶ A systematic review has investigated the prevalence of TMDs among the general population, using the diagnostic criteria 'DC/TMD', which is recognized worldwide.^{7, 8} Emerging studies regarding genetics and hormones have shown evidence of TMDs more prevalent in women than in men.⁶ TMDs are prevalent in around 31% of adults/elderly people and 11% of children/adolescents. Furthermore, most common TMD is disc displacement with reduction, accounting for roughly 26% of adults/elders and 7.5 percent of children/adolescents.^{9, 10} In recent years, a lot of youngsters are presenting with the complaint of headache and jaw pains in dental hospitals. These are mostly found to be associated with TMD which often times gets overlooked. Since TMDs are a degenerative condition that exacerbates over time, early detection and management are extremely important.^{1,2,11,12}

In a survey of university students, temporomandibular joint disorders were shown to be widespread among university going students.¹³ These students usually fall under the age range of 18 to 24 years old in most undergraduate universities. During the course of their undergraduate studies, students face all sorts of academic stresses and social pressures that lead to the development of certain parafunctional habits like bruxism, clenching etc. resulting in one of the three clinical conditions of TMDs.⁸ In this cross-sectional study, the authors investigated the prevalence of TMDs among university going individuals aged 18 to 24. Prevalence of the most common condition of TMD was also assessed among those individuals. Incidence of the most common signs and symptoms was also assessed based on respective conditions of TMDs.

Most health care professionals receive minimal or no training in diagnosis of TMDs and have difficulty in distinguishing the pain associated with TMD and pain originating from surrounding structures, due to which it goes undetected in most individuals. Several

researches have reported the misdiagnosis of severe pain due to TMDs with migraines, neck-ache, musculoskeletal pain due to other reasons¹⁴. The aim of this study was to take TMDs into account as a public health issue since it was an under-reported condition among students. Our objective was to highlight Orofacial pain disorder as a disease for its early detection and management as it effects the quality of an individual's life.

Materials and Methods

A descriptive cross-sectional study was conducted in three institutions of Islamabad, namely 'Quaid e Azam University', 'Bahria University' and 'Riphah International University'. Students from these three institutions were sampled for our study. Duration of the study was from January to March 2020.

A total of 160 participants were examined and given self-reported questionnaires to fill out. The sample size was calculated using the WHO calculator, confidence level=95%, confidence interval 5%, population=infinite and population proportion=10%. This generated a sample size of 130.¹⁵ The data collection was carried out from 1st January 2020 to 14th March 2020. During the survey, the students were explained the terminologies and an informed consent was taken with the assurance that the privacy of their information would be maintained. The study was permitted by the institution's ethical review committee (Ref. No. IIDC/IRC/2 0211007 1008).

Inclusion criteria for our study was university students from age 18 to 24 years. Their age was verified through university identity cards. Our study included university students aged 18 to 24. Data was collected using a self-reported questionnaires and physical examination of the temporomandibular joints was carried out. The physical examination by the investigators comprised of palpation of the TMJ on mouth closing and opening, to assess the presence of any crepitation or clicking. Furthermore, the muscles of mastication were palpated to assess any tenderness that might be present due to undiagnosed TMDs. The participants were then interviewed and asked about their symptoms relating to temporomandibular disorders.

Our self-reported questionnaire was adapted from the 'DC/TMD' criteria^{7,8} It consisted of five parts. The first part comprised history of the participant

including demographic details and socio-economic status. The second part consisted of causative factors such as depression, anxiety, arthritis, stress plus symptoms such as headaches and earaches. Any significant previous dental treatment linked to the TMJ, was also recorded for example prior orthodontic treatment or third molar extractions. Presence of osteoarthritis was assessed in the third part of the questionnaire. Symptoms like pain in the jaw, pre-auricular area, jaw lock, limited mouth opening and headaches in the temple areas were evaluated. For those presenting with any of the above symptoms, were to identify the aggravating factors such as chewing hard food and parafunctional habits such as clenching and grinding of teeth. In the fourth part, internal derangements within the TMJ, which presents as opening and closing jaw clicking in both TMJs and crepitation, was mentioned. This was assessed through palpation and auscultation of the joints by the investigator. The fifth and final part of the form was to evaluate myofascial pain through palpation of the muscles of mastication and muscles of the neck.

SPSS 23 software was used to analyze the data. For each variable, the frequency and percentages were determined. Chi-square test was used to compare factors such as TMD signs and symptoms among age groups, genders, and clinical situations. *P* value less than 0.05 was taken statistically significant.

Results

A total of 160 participants were included in the study who filled questionnaires. They were interviewed and examined. These 160 participants were between the age ranges of 18 to 24. Individuals younger than 18 and older than 24 were not included in the study. All the participants were healthy, and their socioeconomic status was assessed based on the level of income as chosen by participants in the questionnaire. Individuals were informed that the questionnaires would be kept confidential, to avoid any bias in their selection of income level.

Out of 160 participants, 88(55%) were males and 72(45%) were females. 98 participants out of 160 were found to be positive for having one of the TMDs. Among the TMD positive 98 participants, 45(46%) were males and 53(54%) were females. Thus, an overall 61.3% prevalence rate was found.

We found a statistically significant relationship

Table I: Prevalence of TMDs Amongst Different Genders

Gender	Yes	No	Total
Females	53	19	72
Males	45	43	88
Total	98	62	160

between gender and the presence of TMDs with a *p*-value of 0.005.

A generalized prevalence of TMDs was assessed in a manner of present or absent status in the participants.

Our participants were also assessed for the type of TMDs present via manual examination by the researchers and the signs and symptoms marked by the participants in the questionnaires.

Table II: Prevalence of The Various Types of TMDs Amongst Participants

TMJ Disorder	Frequency	Percentage
Internal Derangement	70	71.4%
TMPDS	5	5.1%
Osteoarthritis	0	0 %
ID and OA	3	3%
ID and TMPDS	19	19%
All	1	1.02 %

Table II shows that out of the three clinical conditions of TMDs, 70(71.4%) individuals had internal derangement only, 5(5.1%) had TMPDS only and 3(3.06%) individuals had both internal derangement and osteoarthritis. 19(19.3%) individuals had both internal derangement and TMPDS and only 1(1.02%) individual had all three conditions.

Furthermore, about 48.9% of people who had TMD were found to have a click on mouth opening after examination. 78.5% of TMD positive subjects showed a click on closing. And 25% of these subjects manifested crepitation.

Assessment of other variables was also conducted via questionnaire like depression, arthritis, periodontal disease, headaches, migraines, neck ache, earache, stressful work environment, marital problems, trouble sleeping and shoulder pain etc. Despite depression being the most frequent variable found in our study population and marital problems being the closest (0.6) to statistically significant value (0.005), the results did not show a statistically significant relationship with any of these variables. Other variables related to oral and maxillofacial aspect included orthodontic treatment, jaw trauma, parafunctional habits, wisdom tooth extraction,

previous treatment for TMPDS and dental treatment. Dental treatment was found to be the most frequent variable among the oral and maxillofacial factors, giving a percentage of 30% among TMD positive individuals, yet not statistically significant.

Examination and history of TMPDS included pain in (jaw, temple, in the ear, in front of ear), limitation in function (jaw closing, ability to eat), jaw lock, jaw stiffness, clicking sounds, headache in temple areas, pain on chewing hard or tough food, side to side pain, pain on opening of mouth, on parafunctional jaw habits (clenching, grinding, pen chewing, chewing gum) and pain on yawning or while talking. None of these had a statistically significant relationship with TMPDS either.

Lastly, investigators examined the muscles of mastication and neck manually. Among all the muscles examined (masseter, temporalis, medial pterygoid, lateral pterygoid, anterior neck, posterior neck, and sternocleidomastoid), temporalis was the most common muscle found tender on palpation i.e. 14.4%.

Since our research focused on a specific range of age of individuals, a prevalence of TMDs was also found with respect to age. Table III shows that the mean age of the participants was 21 years in the age group of 18- to 24-year-olds. TMD was found to be most prevalent in 22-year-olds followed by 21-year-olds and then 20 year old.

Table III: Prevalence of TMDs Amongst 18- To 24-Year-Old Participants

Age	TMD		Total
	Yes	No	
18	5	2	7
19	8	4	12
20	14	7	21
21	23	17	40
22	37	13	50
23	7	12	19
24	4	7	11
Total	98	62	160

Discussion

Our study revealed that more than half of the total participants had TMD symptoms. This is in line with findings from the College of Medicine and Medical Sciences at Holy Spirit University of Kaslik (USEK) in Jounieh, Lebanon, which revealed that a similar number of patients in a clinic sample had TMDs⁸.

In order of prevalence, headache, temporal pain, and clicking were observed to be the most common symptoms. A previous study conducted at Abdul Wali Khan University in Mardan observed headache to be the most common symptom as these findings were found to be in line with our study¹⁵. However, a study by Okeson et al. revealed clicking to be the most common symptom^{5,15}. It is likely that students mix up ear issues and TMD symptoms since it is easier to say "earache" compared to "joint discomfort." This is further supported by the fact that otolaryngologists examined 50% of TMD patients from the Lebanese and Italian subpopulations¹⁶, which is the reason why our study also aimed at its awareness so that its findings can guide in the diagnosis, prevention, and treatment of TMDs by respective specialists. Our study further revealed that the female subgroup showed a higher prevalence of TMPDS than their male counterparts. This is supported by similar results observed in a study at Qassim University¹⁷. The findings of the present study also showed similar results in the presence of TMD symptoms between the two genders. Furthermore, the subgroup of students who had previous dental treatments showed the highest prevalence of TMPDS. The most common sign on examination was the clicking sound on the closing of the jaw followed by a clicking sound on opening and crepitation. Almost half of the people who had TMD were found to have a click upon mouth opening during the examination. More than half of TMD-positive subjects revealed clicking upon mouth closing, and a quarter of these subjects experienced crepitation. Our study observed that out of seven muscles that we examined, the temporalis muscle was the most affected muscle in TMDs patients, with the masseter being the second most common. According to research, TMD affects the jaw elevator muscles, such as the temporalis and masseter muscles.¹⁸ Another correlation derived from our study was depression and stress as aggravating and risk factors for TMDs. Out of the 46 individuals who claimed to be subject to stress and depression, more than half of them exhibited signs and symptoms of TMDs. This result was in line with a study conducted at the Mayo Hospital, Pakistan, that investigated the correlation between depression and TMDs.¹⁹ Finally, a study conducted in China investigated the frequency of TMDs amongst medical students and

the psychological risk factors associated with it. Their study found a high frequency of TMDs (31.7%) amongst the participants, this result is in line with our findings as our study also demonstrated a high prevalence of TMDs with psychological influences as possible risk factors.²⁰

Despite positive findings there were some limitations to our study. Firstly, our study only included 18- to 24-year-old individuals, hence leaving out a big portion of the younger generation. Secondly, we could not examine the subjects in a clinical setting with radiographic aids, which would have proved to be far more accurate and reliable. To accurately assess the correlation between stress and depression with TMDs, subjects diagnosed with stress and depression could be added to the study. Furthermore, our study does not reveal the future implications of TMDs since the study was cross-sectional. Future longitudinal studies should be conducted to include a wider range of youth, to reveal the true impact of undiagnosed TMDs. Moreover, if ignored at an early age, TMDs aggravate and can consequently affect the quality of life of an individual. Our study hopes to aid and encourage further research on this topic, to diagnose, prevent, and treat these disorders timely and to spread awareness regarding these conditions. Moreover, future studies should be conducted with a proportionate number of male and female participants to maximize the accuracy of the results. In conclusion, among all the variables assessed i.e type of TMD, gender, age, environmental and dental factors, the only statistically significant relationship found between a variable and its effect on presence or absence of TMDs, was gender. It is accepted that TMD symptoms are more common in females.^{21,22}

Conclusion

Our study shows a high prevalence of TMDs in 18 to 24 year old individuals. There was an overall prevalence of 61.3% among the total participants. It was found to be most prevalent among 22-year-old individuals with a percentage of 31.3%.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.

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