

Original Article

Prevalence of Temporomandibular Joint Disorders Among Egyptian University Undergraduate Students: A Cross Sectional Study

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Abstract

Aim: The aim of the current study was to determine the prevalence of TMD among undergraduate students at Egyptian universities.

Subjects and methods: 1013 undergraduate students were recruited from Egyptian universities. Invitations by email were sent out to the undergraduate students registered at these universities. Data relevant to the study were collected via a questionnaire that was sent using Google Forms in the period from December 2020 to November 2023. Participants with an age range of 17 to 25 years old were considered eligible. The Google forms were revised, and any repeated responses or those from people other than undergraduate students were excluded. The incidence and severity of TMD were evaluated using the Fonseca's anamnestic index.

Results: Results show that more than half of the participants were female (58.4%); it also found that the prevalence of TMD was 70.6%. The most common degree was mild TMD in 50.1% of cases, moderate TMD in 14% of cases, and severe TMD in 6.4% of cases.

Conclusion: Within the limitations of this study, it was concluded that TMD is a prevalent condition among Egyptian undergraduate students, where females are 2.12 times more prone to TMD than males.

Keywords: Temporomandibular disorder, Temporomandibular joint, prevalence, TMD, Fonseca's questionnaire

Introduction

Temporomandibular joint disorder (TMD) is a disorder associated with functional alterations related to the joint, muscles of mastication and associated structures (Ebrahimi et al., 2011). Joint sounds, limited range of motion or deviation during mouth opening, pain, facial deformities and headache are among the symptoms of this disorder (Catanzariti et al., 2005). TMD is considered the second most common musculoskeletal condition causing pain and functional disability (Schiffman et al., 2014). Individuals with TMD rate the intensity of its pain at 4.3,

on average, using a 0–10 scale, which is comparable to the average intensity rating of 4.7 for back pain among people with that condition.

The prevalence of TMDs worldwide ranges from 30% up to 70%. (Lövgren et al., 2018; Vainionpää et al., 2019) The great variability in prevalence may be attributed to differences in the race of the population, in the sampling design or and in the methods used for collecting information. TMDs prevalence studies usually present a challenge for researchers and clinicians. This is attributed to the various assessment tools proposed in the

literature. Nevertheless, no universal diagnostic criteria have yet been established. A universally accepted TMD assessment tool, proposed by Dworkin and Leresche (1992) is RDC/TMDs (research diagnostic criteria for temporomandibular disorders), which have been since then used in several clinical and epidemiological studies. Later, Schiffman and colleagues (2014) proposed a new comprehensive version of the RDC/TMDs, known as the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD). They claim that the DC/TMD (diagnostic criteria for temporomandibular disorders) includes a valid and reliable screening questionnaire, as well as diagnostic algorithms for the most common pain-related TMDs. Despite of their advantages, the RDC/ TMD and DC/TMD are quite difficult to use on large samples. On the other hand, the Fonseca's anamnestic index (FAI) is a self-administered questionnaire that has been proposed as a low-cost, easily applied alternative for reporting the prevalence of the TMD by general practitioners or epidemiologists, thus serving as a preliminary TMD screening tool. (Fonseca et al., 1994).

Considering that TMD primarily affect young adults, and that there is a potential association with psycho-emotional factors (stress, anxiety, and depression), university students are an important study population. International studies have shown the prevalence of TMD in university student populations to generally range from 30% to 55%. (Akhter et al., 2011; Al-sanabani, 2017; De Lucena et al., 2012) However, no prevalence studies on TMD have been conducted on Egyptian university student populations. Therefore, the objectives of this study are to determine the prevalence of TMD among students at Egyptian Universities.

Subjects and Methods

Study Setting

In this study, 1013 undergraduate students were recruited from 14 Egyptian universities. Invitations by E-mail were sent out to the undergraduate students registered in these universities. Data relevant to the study were collected via a questionnaire that was sent using the Google forms in the period from December 2020 to November 2023.

Participants

Participants of this study were selected to fulfill the following eligibility criteria. Male and female undergraduate students at Egyptian universities, with an age ranging from 17 to 25 years old were considered eligible. The Google forms were revised and any repeated responses or those from persons other than undergraduate students were excluded.

Objectives

The objectives of this study were to report the prevalence of TMD among undergraduate students. TMD was diagnosed by Fonseca's questionnaire as shown in table (1). The Fonseca anamnestic index (FAI) was developed in Brazilian Portuguese to assess the severity of TMD based on the patient's signs and symptoms. It was proven to be simple and of good specificity, reliability, and accuracy (Rodrigues-Bigaton et al., 2017). The questionnaire consists of 10 ordinal questions, which are answered by "yes", "no" or "sometimes". "Yes" answer was replaced by a value of 10, "sometimes" by a value of 5 and finally "no" by a value of zero. Accordingly, the total score of each participant was calculated, where a normal participant would score 0-15, mild TMD 20-45, moderate TMD 50-65 and severe TMD 70-100 points. For reasons of applicability, the questionnaire was translated into Arabic, and the validation of the translation was performed by language experts.

Data Sources/Measurement

Invitations by E-mail were sent out to the undergraduate students registered in the aforementioned Egyptian universities. The e-mail contained a summary about the aim of the study and an assurance of the confidentiality of the respondents. A link to the survey website at Google Forms was provided with the e-mail. The responses were received in the form of a spreadsheet, where all data relevant to the outcome were seen. Revising the data for duplicate emails, eligibility and any irrelevant data or responses was essential to ensure complete info outcome of the included participants. The frequency distribution of the participants among the studied variables was then calculated and sent for statistical analysis.

Potential Sources of Bias

Selection bias: Despite of being susceptible to response rate bias, the authors of the study preferred sending emails for data collection

because of health restrictions related to the COVID-19 pandemic and the implementation of social distancing and online learning.

Quantitative Variables

The only quantitative variable that was investigated in this study was age. Undergraduate university students frequently fall within the age group that has the highest frequency of TMD symptoms. According to literature, the greatest incidence of TMD development occurs between the ages of 20 and 40 (Yadav et al., 2020).

Statistical Methods

Qualitative data were presented as frequencies and percentages. For univariate analysis, Chi-square test or Fisher's Exact test was used for comparisons regarding qualitative variables. Student's t-test was used to compare between mean age values of participants with TMD and normal subjects. The significance level was set at $P \leq 0.05$. Statistical analysis was performed with IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp. The given quantitative data was extracted using the Shapiro-Wilk test and Kolmogorov-Smirnov test for normality, indicating that data originated from a normal distribution (parametric data) resembling normal Bell curve in both groups.

Results

The present study was conducted on 1013 undergraduate students: 416 males (41.1%) and 597 females (58.9%). The mean and standard deviation (SD) values for age were 22.4 (2.5) years old with a minimum of 17 and a maximum of 25 years old table (2).

Prevalence of TMD was 70.6%. Severity of TMD is presented in Figure (1). The most common degree was mild TMD in 50.1% of

cases, moderate TMD in 14% of the cases and severe TMD in 6.4% of the cases Figure (2).

There was a statistically significant association between gender and prevalence of TMD (P-value <0.001 , Effect size = 2.12). Females are 2.12 folds prone to TMD than males.

Discussion

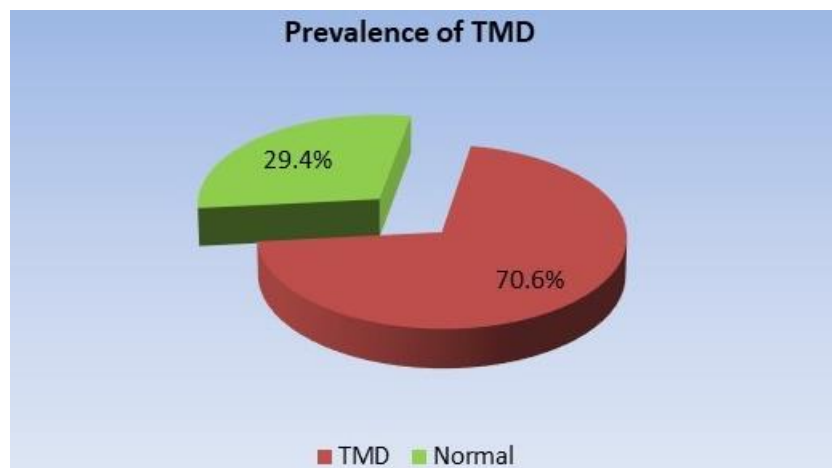
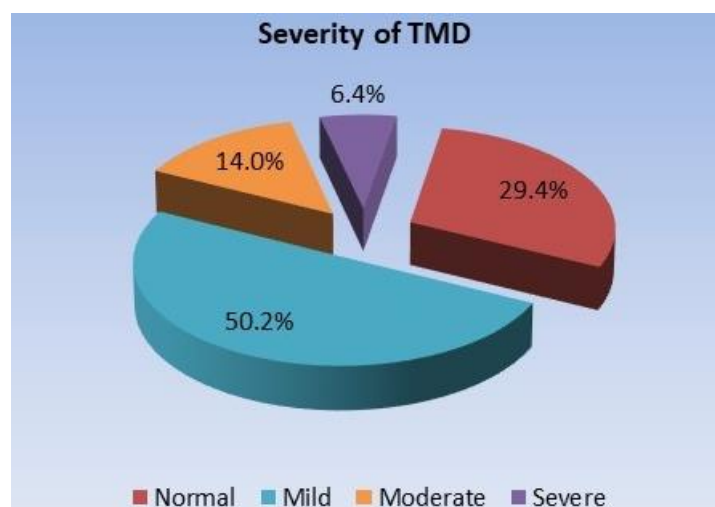
Tempromandibular joint disease is a broad term that encompasses several musculoskeletal and neuromuscular problems affecting the tempromandibular joint. Tempromandibular disorders frequently manifest as discomfort in the jaw, cheek, and neck, either accompanied by or without a reduction in the ability to move these areas. The illness can be highly incapacitating and can have a significant impact on one's quality of life. Given that tempromandibular disorders predominantly impact young adults and may be linked to psycho-emotional factors such as stress, anxiety, and depression. University students represent a significant group for research. As a result, it appeared important to find out how common this illness was among undergraduate students (Jha et al., 2022). There have been one conducted prevalence study on tempromandibular disorder among university students in Egypt (Rashed & Elsharkawy, 2018), in which the results are expected to increase due to the recent economic challenges and the recent devaluation of the local currency. Research conducted on a global scale has indicated that the occurrence of tempromandibular disorders among university students often falls between the range of 30% and 55%.

Table (1): Questions of the Fonseca's questionnaire

No.	Question
1	Do you have difficulty opening your mouth wide?
2	Do you have difficulty moving your jaw from side to side?
3	Do you feel fatigue or muscle pain when chewing?
4	Do you have frequent headaches?
5	Do you have neck pain or a stiff neck?
6	Do you have earaches or pain in that area (TMJ)?
7	Have you noticed any clicking in your TMJs while chewing or opening your mouth?
8	Have you noticed if you have a habit of clenching or grinding your teeth?
9	Do you feel that your teeth do not come together well?
10	Do you consider yourself a tense or nervous person?

Table (2): Descriptive statistics and results of Chi-square test, Fisher's Exact test and Student's t-test for the association between demographic data and prevalence of TMD

Demographic data		Normal (n = 298)		TMD (n = 715)		P-value	Effect size			
		n	%	n	%					
Gender	Male	161	54	255	35.7	<0.001*	OR = 2.12			
	Female	137	46	460	64.3					
Age	Mean	21.7	SD	1.9	Mean	22.7	SD	2.7	<0.001*	d = 0.419

**Figure 1:** Pie chart representing prevalence of TMD among study participants**Figure 2:** Pie chart representing severity of TMD

The chosen study design to address the subject of TMD prevalence is a cross-sectional study. The latter possesses the benefits of being relatively rapid, uncomplicated, effortless, cost-effective, and is the most appropriate research strategy for addressing concerns regarding prevalence. Additionally, it has the capability to analyse relationships between numerous exposures and outcomes.

This study utilized Fonseca's anamnestic index to assess the frequency and intensity of TMD (Fonseca et al.,1994). Despite its lower diagnostic accuracy in comparison to other tools such as the RDC/TMD that incorporate clinical examination, the FAI offers several advantages, including simplicity, quick application, and affordability. It will allow us to do large screening with less effort and high speed; on the other hand, RDC/TMD is used for

smaller groups. Consequently, it proves valuable in epidemiological studies, patient screening, and the initial diagnosis of TMD. In addition, the tool relies on self-reporting from participants, eliminating the necessity for evaluator training. It has been extensively employed in clinical screening as well as in several studies on the prevalence of TMD, which have significant implications for public health practice and policy development. This measure is both reliable and valid for assessing stress, parafunctional behaviors, pain frequency, and restrictions in jaw function. The accuracy of the test was demonstrated to be high, with a specificity of 91.90% and a sensitivity of 86.30% (Rodrigues-Bigaton et al., 2017).

In our study, we found that the prevalence of TMD was 70.6%. The most common degree was mild TMD in 50.1% of cases, moderate TMD in 14% of cases, and severe TMD in 6.4% of cases. The prevalence is higher than that reported by the study by (Rashed & Elsharkawy, 2018) (41.4%), which investigated a single Egyptian private university. The difference in the reported prevalence may be attributed to factors such as sample size, methodology, different financial backgrounds of the population, different colleges, recent economic challenges, and the time in which the research is conducted (the Corona pandemic), which may have increased stress, which is a main factor in TMD. But the results are comparable to other studies conducted in other countries, as (Nazir et al., 2023) in Pakistan (66.9%) may be due to the same financial and educational stressors experienced by university students.

The current study shows a high prevalence of TMD among females, 2.12-fold higher than males. The result is comparable to other studies and systematic reviews (Bueno et al., 2018) (Yap et al., 2023). The higher incidence in females may be due to hormonal changes and a lower pain threshold (Klasser & Reyes, 2023).

Conclusion

Within the limitations of this study, it was concluded that TMD is a prevalent condition among Egyptian undergraduate students, where females are 2.12 times more prone to TMD than males.

Conflict of Interest:

The authors declare no conflict of interest.

Funding:

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors

Ethics:

This study protocol was approved by the ethical committee of the Faculty of Dentistry - Cairo university on: 26 January 2021, approval number: 10-1-21.

Data Availability:

Data will be available upon request.

Credit statement:

Author 1: Data curation, Writing - review & editing, Writing-original draft, Methodology, Conceptualization, Resources

Author 2: Data curation, Conceptualization, Project administration, Supervision, Methodology, Writing - review & editing, Writing - original draft

Author 3: Methodology, Writing - original draft, Writing - review & editing, Investigation, Formal analysis, Supervision, Data curation.

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