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Original Research Article

Determination of prevalence of Temporomandibular disorders among dental students in Ernakulam district – A cross sectional study

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ABSTRACT

Context: Early diagnosis of temporomandibular disorders (TMD) is important for prevention of further damage to the parts of the oro-facial system as early symptoms can be used as predictors of TMD.

Aim: To assess the frequency of symptoms of temporomandibular disorders among dental students in Ernakulam district, Kerala, using Fonseca questionnaire.

Settings and Design: A cross sectional study was conducted among dental students of various dental colleges in Ernakulam district. A convenience sampling method was used.

Materials and Methods: The participants were provided with questionnaire of Fonseca, which included ten questions, which could be answered with yes, no and sometimes.

Statistical analysis used: The collected data was analyzed statistically using SPSS version 24. Descriptive statistics and chi square tests were used for the analysis.

Results: Among the 793 students who took part in the study (112 males and 681 females) 59.3% of the students had TMD according to the Fonseca index and among them almost 36% had mild TMD, 17.7% moderate TMD and only 5.8 % had severe TMD. The results also revealed that the sex of the individual did not significantly influence the severity of TMD (p value>0.05) whereas the influence of the age was found to be significant.

Conclusions: The prevalence of TMD was found to be higher in dental students. Further research involving large diverse populations may throw light on the prevalence and severity of TMD, which may pave ways for developing specific preventive and therapeutic protocols in managing TMD at an early stage.

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1. Introduction

Temporomandibular Disorders (TMD) are a group of signs and symptoms related to an orofacial region that typically involves the Temporomandibular Joints (TMJ), occlusion and masticatory muscles.^{1,2}

TMD not only involves the disorders of the temporomandibular joint but also the surrounding musculature that ultimately results in pain and dysfunction. The mandibular movements require maximum coordination to maintain function and minimize the damage to the surrounding oro-facial structures and any factor, chronic

or acute, which deviates this coordination can result in the dysfunction of the Temporomandibular Joint.³

Over the years many factors have been identified, that causes the disruption of the above mentioned balance, among them stress, occlusal disturbances, tooth loss, oral habits like bruxism, deviation, masticatory muscle dysfunction, changes in the TMJ structure have been most frequently reported.⁴

Temporomandibular disorders manifests a wide range of signs and symptoms based on the severity of the joint dysfunction, which ranges from joint sounds like clicking, crepitus, popping to restricted or deviating range of motion, and cranial and/or muscular pain, known as orofacial pain.⁵

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The literature shows a variable prevalence rate of the Temporomandibular disorders ranging from 20-50%, this variability can be attributed to the difference in the population, races and also to the different methods used to assess the TMD.⁶⁻⁹

There was a need for a simple and standardized questionnaire which will help in obtaining the data and to compare it with other clinical studies. In the year 1992, Fonseca¹⁰ modified the previously used anamnestic and clinical indexes proposed by Helkimo (1974) and proposed his anamnestic questionnaire which can be used to assess the severity of the TMD in a short time and classify the same into mild, moderate and severe. The most striking feature of Fonseca’s questionnaire is its simplicity and its lesser degree of variability in the answers. It can be self administered, and is easier for the participants to understand.

Studies have also shown that only a small fraction of the affected individuals seek treatment in case of TMD. The importance of early diagnosis and its influence of preventing greater damage on the orofacial structures remain unknown to these populations. Only limited data is available regarding the prevalence of temporomandibular disorders among dental students in India.

This study was done to evaluate the prevalence and severity of temperomandibular disorders among the dental students in Ernakulam district, Kerala, India using the Fonseca’s questionnaire

2. Materials and Methods

This cross sectional study was conducted among the dental students of five different dental schools in Ernakulam district, Kerala, India. The institutions where the study was conducted are as follows:

1. Annoor Dental College and Hospital, Muvattupuzha
2. Amrita School of dentistry, Kochi
3. Mar Baselios Dental College, Kothamangalam
4. St Gregoreos Dental College, Chelad
5. Indira Gandhi Institute of Dental Sciences, Nellikuzhi

A convenience sampling technique was employed to recruit the students who were interested in taking part in the study. Study population included 793 students of age group 18 to 28years among whom 681 were females and 112 were males.

After collecting the data regarding age and gender of each participant, the questionnaire of Fonseca was used to analyse the TMD and its severity. The questionnaire was distributed to students at the respective institutions and those who were unavailable to take the questionnaire, were given an alternative in the form of taking an online survey using the survey monkey application. Care was taken to avoid duplicate entries from students in the form of distributed questionnaires and online survey.

The questionnaire consists of ten questions all pertaining to various symptoms of TMD that could be experienced by the patient as well as the emotional status of the individual, parafunctional habits, occlusion and other factors that could possibly have a role in aggravating the disorder. Each question can be answered with one among the three options that include yes, sometimes and no. Each answer is assigned a score ie: score ten for yes, score five for sometimes and score zero for no. Scores for all ten questions were added up to get the total score of individual which will be classified based on the Fonseca’s Clinical Index¹⁰ and severity of the TMD can be determined. Figure 1 shows the questions of Fonseca questionnaire and the Fonseca’s index is given in Figure 2 .

1. Do you have difficulty in opening mouth wide?	Yes <input type="checkbox"/>	sometimes <input type="checkbox"/>	No <input type="checkbox"/>
2. Do you have difficulty moving your jaw to side?	Yes <input type="checkbox"/>	sometimes <input type="checkbox"/>	No <input type="checkbox"/>
3. Do you feel fatigue or muscle pain when you chew?	Yes <input type="checkbox"/>	sometimes <input type="checkbox"/>	No <input type="checkbox"/>
4. Do you have headaches?	Yes <input type="checkbox"/>	sometimes <input type="checkbox"/>	No <input type="checkbox"/>
5. Do you have neck pain or stiff neck?	Yes <input type="checkbox"/>	sometimes <input type="checkbox"/>	No <input type="checkbox"/>
6. Do you have ear aches or pain in that area (TMJ)?	Yes <input type="checkbox"/>	sometimes <input type="checkbox"/>	No <input type="checkbox"/>
7. Have you noticed any noise in your temperomandibular joint while chewing or opening your mouth?	Yes <input type="checkbox"/>	sometimes <input type="checkbox"/>	No <input type="checkbox"/>
8. Do you have any habits such as clenching or grinding your teeth?	Yes <input type="checkbox"/>	sometimes <input type="checkbox"/>	No <input type="checkbox"/>
9. Do you feel that your teeth do not come together well?	Yes <input type="checkbox"/>	sometimes <input type="checkbox"/>	No <input type="checkbox"/>
10. Do you consider yourself a tense or nervous person?	Yes <input type="checkbox"/>	sometimes <input type="checkbox"/>	No <input type="checkbox"/>

Fig. 1: Questions of Fonseca questionnaire

0-15 points, no TMD
 20-40 points, mild TMD
 45-65 points, moderate TMD
 70-100 points, severe TMD.

Fig. 2: Fonseca’s clinical index

The collected data was analyzed statistically using SPSS version 24 software. Descriptive statistics and chi square tests were used for analysis.

The study was presented before the institutional review board and approved by the Ethical Committee. Appropriate

permissions are taken from the heads of the institution for conducting study in their respective institutions and an informed written consent is obtained from each participant. E-consent was obtained from the participants who took part in the study via online survey application.

3. Results

Among the 793 students who took part in the study (112 males and 681 females) 70% were among the age group 20-25years. 59.3% of the students had TMD according to the Fonseca index and among them almost 36% have mild TMD, 17.7% moderate TMD and only 5.8 % have severe TMD. The frequency and percentage distribution is shown in Table 1.

Table 1: Frequency and percentage distribution of TMD

Fonseca-Clinical Index Class	Frequency	Percent
No TMD	323	40.7
Mild TMD	284	35.8
Moderate TMD	140	17.7
Severe TMD	46	5.8
Total	793	100

Chi square test was used to evaluate the influence of gender on TMD and the results revealed that the sex of the individual did not significantly influence the severity of TMD (p value>0.05). Table 2 shows the results of the chi square test.

The results of chi square test to evaluate influence of age on TMD shows significant association (p value<0.05). Table 3 depicts the same.

In the clinical scenario one of the most common features involved in TMD include clicking while opening on closing. When we evaluate the answers of the participants to that particular question, it can be seen that among the study population only 16.6% experienced it on a regular basis.

Another important parameter in a clinical setting is reduction in the mouth opening which addressed by question one to which 67.7% answered that they didn't have any difficulty in opening their mouth wide whereas 11.2% experienced difficulty in doing the same.

Q1. Do you have difficulty in opening mouth wide?

The symptoms noticed by the majority of the students included clicking, parafunctional habits, occlusal disharmony, stress and headaches.

4. Discussion

This study is aimed at assessing the prevalence of temporomandibular disorders among dental students in Ernakulam district by analyzing the data collected by using the questionnaire of Fonseca. Selection of this questionnaire for the study was mainly due to its simplicity and thereby allows collecting more data in shorter duration.

The results revealed that more than half of the students that is 59.3% experienced TMD among which 5.8% had severe TMD, 17.7% had moderate and 35.8% had mild TMD. These results are almost similar to the results obtained Nomura et al 2007 in a study conducted among 218 Brazilian dental students.¹¹

A similar study conducted in 2017 among 166 dental students in Prishtina, Albania shows 46.4% of the students, had no symptoms of TMD, 44.6 % had mild TMD, 7.8% moderate TMD and only 1.2% had severe TMD.¹² There seems to be more percentages of severe and moderate cases which can be attributed to the differences in the population and race.

The prevalence of the TMD seems to be higher in dental students than that of students of similar age group according to the results of a similar study conducted by Karthik et al¹³ in 2017 among 402 university students of age 18-25 years in Tamil Nadu, India using the foseca questionnaire where 77% of the students did not show any signs of TMD, 19.4% showed mild, 2.7% moderate and 0.5% severe TMD. It may be due to the fact that, as dental students, are dealing with TMJ problems as a part of their curriculum, they are more aware of the signs and symptoms and hence are able to recognize the same better than non dentist population.

According to the results obtained from the current study there is no significant influence of gender on the TMD, which is in accordance with the results of study conducted by Bicaj et al¹² and Karthik et al¹³ but conflicts with the results obtained by Gonçalves et al¹⁴ Bevilaqua-Grossi et al,¹⁵ Magnuson et al,¹⁶ Celic at al.¹⁷ and Nomura et al¹¹ where it was seen that women had more prevalence of TMD when compared to male counterparts.

When the parameter age was analyzed it was established that a significant association existed between age and TMD, as age increased the proportion of individual experiencing TMD also increased. Etiological factors influencing the TMD seem to accumulate over time hence may explain the findings. The opposite was true in electromyographical study conducted by Mazzetto et al,¹⁸ where it was seen that no significant correlation existed between age and the severity of TMD and also the young adults have more tendency towards severe TMD, especially those between the age group of 25-50 years.

Most common symptoms expressed by the study participants includes stress, clicking while opening or chewing, occlusal disharmony, headaches and parafunctional habits like bruxism and clenching. In the study population, 37% expressed themselves as tensed individuals, another 38% answered sometimes to that question. This may point towards the significant work load experienced by the dental students and thereby may explain the increased prevalence of TMD in this category compared to other university students.

Table 2: The influence of gender on TMD

	Male	Female	Respondents	Chi-Square Value	P value
No TMD	49	274	323	6.265	0.099
Mild TMD	46	238	284		
Moderate TMD	15	125	140		
Severe TMD	2	44	46		
Total	112	681	793		

Table 3: Influence of age on TMD

Age	Index Class				Total	Chi-Square	P value
	No TMD	Mild TMD	Moderate TMD	Severe TMD			
15 - 20	77	60	49	22	208	24.774	0.000
21 - 25	236	208	88	22	554		
26 - 30	10	16	3	2	31		
Total	323	284	140	46	793		

Table 4: Response to question number seven (have you noticed any noise from TMJ while opening mouth or chewing?)

	Frequency	%
No	452	57.0
Sometimes	209	26.4
Yes	132	16.6
Total	793	100

Table 5: Response to question number one

	Frequency	%
No	537	67.7
Sometimes	167	21.1
Yes	89	11.2
Total	793	100

According to Farrar et al, 70% of the temporomandibular disorders arise due to the pathologies associated with the articular disc of the temporomandibular joint, and such disorders are termed 'internal derangement'.¹⁹ The management of the TMD depends on the severity of this derangement, where a non invasive or minimally invasive treatment option is available for early stage of derangement, severe internal derangement requires fully invasive, joint replacement therapy. The need for regular follow up and repeated surgical procedures when indicated with less predictability regarding the long term success of the treatment makes this even more cumbersome.²⁰ These facts stresses the importance of early diagnosis of TMD, where more complicated and invasive procedures can be avoided and also the importance of educating the general population where these symptoms goes unnoticed. The questionnaire of Fonseca, can be a boon in all these instances where screening can be done in a simpler manner and making the patient aware that he or she suffers from a problem that requires them to consult a medical facility.

Only those factors which are included in the questionnaire of Fonseca are included in this study. Certain factors like orthodontic treatment, history of trauma

or previous history of treatment of temporomandibular disorders were not included in the study. The cross sectional study design hinders us from understanding the course of the disease as well as the etiology. Even though simple, the participants perception of the question influence his or her response, which can be clarified for those who undertook the study in person, but for the online participants clarification of the doubts were not possible.

More multicentric longitudinal studies including different age groups are required to better understand clinical scenario of temporomandibular disorders and efforts must be made to increase the awareness of general population regarding the disease to improve the prognosis, promoting earlier diagnosis and management.

5. Conclusion

The study highlights the importance of Fonseca questionnaire which could be invaluable in diagnosing and classifying TMD based on severity in a simple, cost effective manner especially in large scale screening procedures. The prevalence of TMD seems to be higher in Dental students. More research involving large diverse populations may throw light on the prevalence and severity

of TMD, which may pave ways for developing specific preventive and therapeutic protocols in managing TMD at an early stage.

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7. Conflict of Interest

The authors declare they have no conflict of interest.

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