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Prevalence of Temporomandibular disorder and its severity in Ahmedabad population: A Questionnaire survey

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Abstract

Abstract: Temporomandibular disorders are any disorder related to TMJ. Various screening tools are used to detect prevalence of TMDs. Fonseca's amnestic index is used as an effective tool for finding out prevalence of Temporomandibular disorders in large sample size in a shorter duration of time. No studies are available for prevalence of TMDs for Ahmedabad Population of Gujarat state. Thus, this cross sectional study was carried out to detect prevalence of Temporomandibular disorders (TMD) using Fonseca's questionnaire as a screening tool. Also correlation of TMDs with age, gender, stress, headache, Para functional habits and malocclusion was studied. Obtained results showed that prevalence rate of TMDs in Ahmedabad population is 43.7%. Prevalence rate of TMDs in male population (23%) was more than female (20.6) population. However, severity of TMD was found high in female when compared to male. Most prevalent category was mild TMD category (33.7 %). Higher prevalence of Para functional habits (24.7%), headache (42.2%) and stress (37.9%) was found in Ahmedabad population. Thus positive correlation was established between TMDs and Para functional habits, headache and stress. Thus after identification of categories of severity, dentists can prevent further

progression of disorders and treat TMDs accordingly in early stage.

Keywords: Temporomandibular disorder, TMD, Fonseca questionnaire, FAI.

Introduction

Stomatognathic system is an anatomic system where in jaw, teeth, tongue, musculature and TMJ function in complete synchronisation. Proper functioning of stomatognathic system is necessary as it helps in maintaining wellbeing of individual. Disharmony in relation to any of the involved components leads to severe disimpairement of function. For obtaining successful dental outcomes, complete and thorough diagnosis of all of these components is required. Disorder in any of it will lead to failure of the prosthesis. Any disorder related to TMJ is termed as Temporomandibular disorders (TMDs). Temporomandibular disorders term was adopted by American dental association. Thus TMDs is one of the prime factor which should be considered by dentists.[1] Proper diagnosis of TMD is required because even slightest disharmony between TMJ, anterior and posterior guidance will lead to hyperactivity and incoordination of masticatory muscle function.

Various factors can cause TMDs. These factors are Occlusal factors, Trauma (macro trauma and micro trauma), Emotional stress, Deep pain input and Parafunctional habits. Two basic things help in achieving correct diagnosis of TMDs. They are screening history and examination of masticatory system. Following valid screening questionnaire are available:

1. Helkimo's index
2. Fonseca's questionnaire
3. Questionnaire given by AAOP (American academy of orofacial pain)

No studies are available for prevalence of TMDs for Ahmedabad Population of Gujarat state. Thus, this cross sectional study was carried out to detect prevalence of Temporomandibular disorders (TMD) using fonseca's questionnaire as a screening tool and to create awareness among population of Ahmedabad regarding disorders affecting temporomandibular joints. Correlation of TMDs with age, gender, stress, headache, parafunctional habits and malocclusion was also studied. Results of this study can help us to find out prevalence of TMDs and classify population according to the severity categories of TMDs. Thus after identification of severity categories, dentists can know severity prevalence and can control and treat accordingly.

Material and Method

Place of study: This study was conducted among the subjects of age group 20 -40 years, in 6 zones (North, South, East, Central, New west and west) of Ahmedabad population. Sample size required for this study was 600. Thus from each zone of Ahmedabad 100 subjects were selected (50 females and 50 males from each zone)

Inclusion criteria

- Fully erupted permanent dentition.
- Subjects falling in age group 20- 30 and 30- 40
- Subjects according to even gender distribution from each zone (50 females and 50 males)

Exclusion criteria

- Participants below 20 and above 40 years of age
- Participants not willing to undergo survey.
- Participants who has undergone any TMJ surgery.
- Participants with gross ear pathology.
- Participants who are mentally unstable.

Methodology

- 100 Participants were selected from each zone of Ahmedabad i.e., 50 males and 50 females.

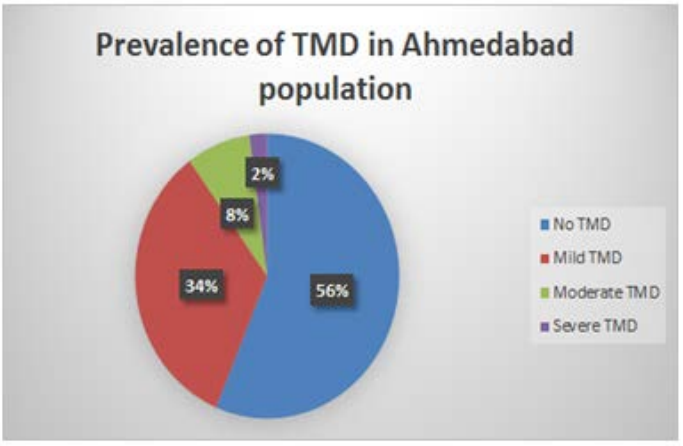
- Prior to the start of the study, the purpose was explained to the patients and Informed consent was taken from participant.
- Questions mentioned in questionnaire were asked and participant were asked to answer in Yes , No, or Sometimes and scores were given accordingly
- Each YES answer was assigned a value of 10, NO answer was assigned a value of 0, SOMETIMES answer was assigned a value of 5.
- Final score was obtained by summing up above obtained scores.
- Then, according to Fonseca's Anamnestic Index (FAI), severity of TMD was classified as :
  1. Without dysfunction (score between 0-15)
  2. Mild dysfunction (score between 20-40)
  3. Moderate dysfunction (score between 45-65)
  4. Severe dysfunction (score between 70-100)

10 questions of the FAI are:

Sn.	Question
1	Do you have difficulty on wide mouth opening?
2	Do you have difficulty on moving your jaw to the sides?
3	Do you feel pain or fatigue in muscles when you chew?
4	Do you have headache?
5	Do you have stiffness or pain in neck?
6	Do you have ear aches or pain in that area (temporomandibular joint)?
7	Have you ever noticed any noise of clicking in your Temporomandibular joint while chewing or opening your mouth?
8	Do you have any habit such as clenching or grinding your teeth
9	Do you feel that your teeth do not articulate well?
10	Do you consider yourself a tense (nervous) person?

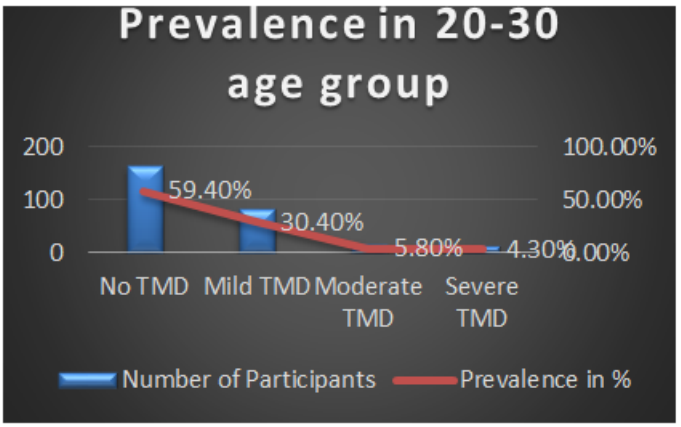
Statistical Analysis and Result

The data was formulated, computed and then was analysed in IBM SPSS 20 in windows statistical software. Statistical analysis was done using chi Square Test for categorical data. P value ($p < .05$) was considered statistically significant.

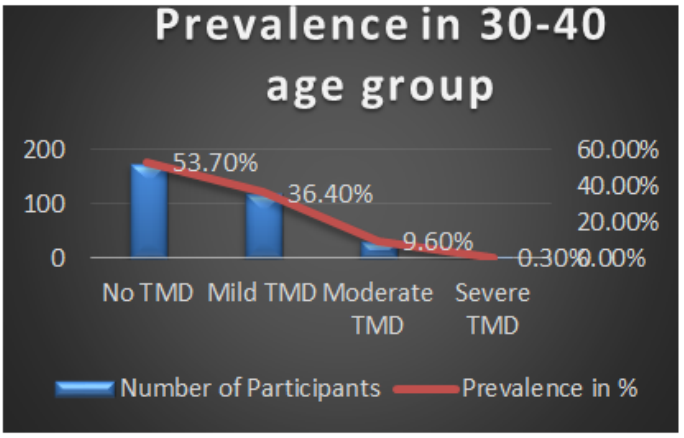


Graph 1: Prevalence of TMD in Ahmedabad Population

As shown in graph I, 43.7% subjects had some signs and symptoms of TMD.



Graph2: Prevalence of TMD in 20-30 Age group



Graph 3: Prevalence of TMD in 30-40 Age group

Total number of participants ranging in age group 20- 30 were 276 (46.0 %) and in 30- 40 age group were 342 (54

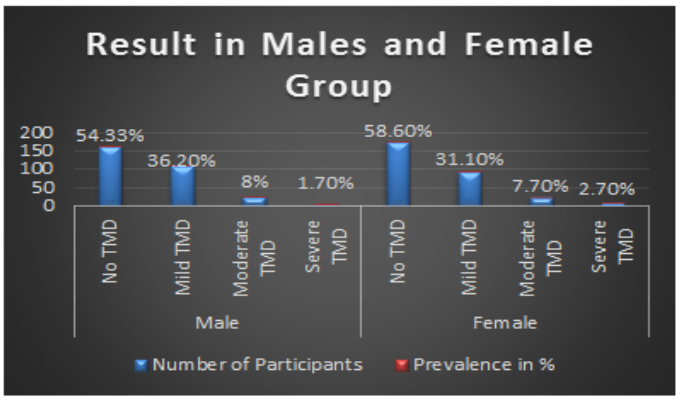
%).In age group 20- 30, as shown in graph II, number of participants having no TMD were 164 (59.4%), having mild TMD were 84 (30.4%), having moderate TMD were 16 (5.8%), and having severe TMD were 12 (4.3%). As shown in Graph III, age group 30- 40, number of participants having no TMD were 174 (53.7%), having mild TMD were 118 (36.4%), having moderate TMD were 31 (9.6 %), and having severe TMD were 1 (0.3%). Thus, from total 600 subjects, in 20- 30 age group, no TMD was found in 27.3%, mild in 14%, moderate in 2.2 % and severe in 2%. While in 30-40 age group no TMD was found in 29%, mild in 19.7%, moderate in 5.2% and severe in 0.2%. P value was obtained by chi square test was p = .001

Table 1: Statistical Analysis of 20-30 and 30-40 age group showing comparative data of percentage of participants.

Qn.	Age 20-30 years			Age 30-40 years		
	% of participants having score 10	% of participants having score 5	% of participants having score 0	% of participants having score 10	% of participants having score 5	% of participants having score 0
Q 1	11.2	5.4	83.3	15.4	7.1	77.5
Q 2	7.2	5.8	87	9	5.6	85
Q 3	10.1	15.2	74.6	10.8	14.8	74.4
Q 4	13.4	23.2	63.4	17.6	29.3	53.1
Q 5	9.4	19.9	70.7	9	19.4	71.6
Q 6	12	13	75	9.6	18.8	71.6
Q 7	14.1	14.5	71.4	12	14.8	73.1
Q 8	15.2	10.9	73.9	10.5	13	76.5
Q 9	11.2	1.8	87	5.9	1.9	92.3
Q 10	18.1	19.6	62.3	20.1	17.9	62.0

Only for question number 4, P value was found significant (p =.038).

In this study, out of 600 total participants, 300 participants were male and 300 participants were female. Amongst 300 male participants, 163 (54.33 %) had no TMD, 109 (36 %) had mild TMD, 24 (8%) had moderate TMD, and 5 (1.7 %) had severe TMD. Amongst 300 female participants, 176 (58.6 %) had no TMD, 93 (31%) had mild TMD, 23 (7.7%) had moderate TMD, and 8 (2.7%) had severe TMD. Thus from among 600 subjects, prevalence of TMD was found among 23% male (i.e., mild: 18.2%, moderate: 4%, and severe: 0.8%) and among 20.6% females (mild: 15.5%, moderate: 3.8%, severe: 1.3%). P value obtained by chi square test was insignificant (p=.494) for sex category. For sex category, P value was found to be significant for question 1 (p=.006), question 4 (p=.030), question 5 (p=.031), question 8 (p=.022).



Graph 4: Prevalence of TMD in Male and Female group

Table 2: Statistical Analysis of 20-30 and 30-40 age group showing comparative data of percentage of participants.

Qn.	Male			Female		
	% of participants having score 10	% of participants having score 5	% of participants having score 0	% of participants having score 10	% of participants having score 5	% of participants having score 0
Q 1	17.9	6	76.1	9	6.7	84.3
Q 2	10	5.3	84.7	6.4	6	87.6
Q 3	11.6	14.6	73.8	9.4	15.4	75.313.3
Q 4	13.3	23.6	63.1	18.1	29.4	52.5
Q 5	8.6	23.9	67.4	9.7	15.4	74.9
Q 6	12.3	14.3	73.4	9	18.1	72.9
Q 7	15.9	14.6	69.4	10	14.7	75.3
Q 8	11.6	15.6	72.8	13.7	8.4	77.9
Q 9	8	2	90	8.7	1.7	89.6
Q 10	19.9	20.3	59.8	18.4	17.1	64.5

Study was carried out in 6 zones of Ahmedabad.

In zone 1, 53 (53 %) participants had no TMD, 36 (36%) had mild TMD, 10 (10%) had moderate TMD, and 1 (1%) had severe TMD.

In zone 2, 58 (58%) participants had no TMD, 28 (28%) had mild TMD, 7 (7%) had moderate TMD, and 7(7%) had severe TMD.

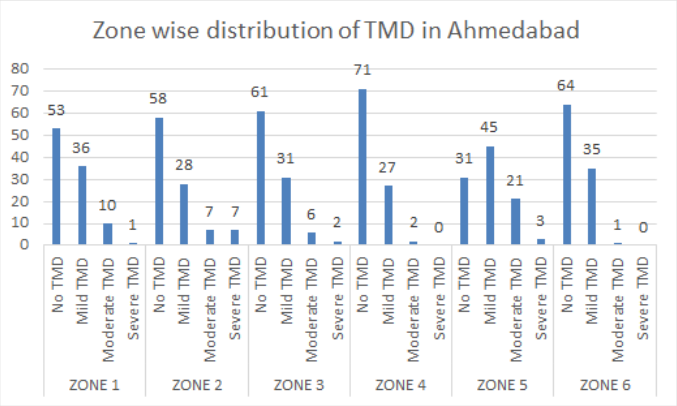
In zone 3, 61 (61%) participants had no TMD, 31 (31%) had mild TMD, 6 (6%) had moderate TMD, and 2 (2%) had severe TMD.

In zone 4, 71 (71%) participants had no TMD, 27 (27%) had mild TMD, 2 (2%) had moderate TMD, and 0(0%) for severe TMD.

In zone 5, 31 (31%) participants had no TMD, 45 (45%) had mild TMD, 21 (21%) had moderate TMD, and 3 (3%) had severe TMD.

In zone 6, 64 (64%) participants had no TMD, 35 (35%) had mild TMD, 1 (1%) had moderate TMD, and 0 (0%) for severe TMD.

P value obtained by chi square test for zonal distribution was highly significant for all the 10 questions (i.e., p < .001). P value for Q1 was p = .017, for Q2 was p =.009, for Q3, 4, 5, 6, 8 and 10 P value was p <.001, for Q7 was p =.002, and for Q9 was p =.017.



Graph 5: Zone wise distribution of TMDs in Ahmedabad

Table 3: Over all Statistical data Analysis of all zones

Qn.	Zone 1			Zone 2			Zone 3			Zone 4			Zone 5			Zone 6		
	% of participants having score:																	
	10	5	0	10	5	0	10	5	0	10	5	0	10	5	0	10	5	0
Q 1	10	7	83	21	5	74	13	9	78	5	5	90	18	10	72	14	2	84
Q 2	12	7	81	6	3	91	9	4	87	3	4	93	16	8	76	3	8	89
Q 3	18	18	64	10	7	83	9	10	81	4	7	89	16	37	47	6	11	83
Q 4	15	27	58	17	19	64	19	24	57	6	23	71	22	49	29	15	17	68
Q 5	8	15	77	9	18	73	7	16	77	8	13	79	12	44	44	11	12	77
Q 6	8	24	68	16	7	77	10	17	73	8	6	86	13	28	59	9	15	76
Q 7	11	22	67	24	7	69	11	8	71	7	9	84	15	15	70	10	17	73
Q 8	7	10	83	24	8	68	11	10	79	8	11	81	19	24	57	7	9	84
Q 9	5	4	91	14	0	86	8	0	92	5	5	90	12	1	87	6	1	93
Q 10	14	31	55	29	6	65	23	20	57	15	19	76	30	32	38	4	14	82

Discussion

The aim of this cross sectional study was to evaluate the prevalence of signs and symptoms of TMD in Ahmedabad population through frequency distribution of data obtained using a questionnaire. The Fonseca's Amnestic index was used in this study because it allows collection of a large quantity of information from larger sample size in a relatively short period of time.

In the dental literature, studies have shown that percentage of people in general population with one or more signs and symptoms of TMD ranges from 40-60 %[2]. In this present study 43.7% subjects had some signs and symptoms of TMD. As per Fonseca's amnestic index (FAI), mild TMD was present in 33.7%, 7.8% had moderate TMD and 2.2% had severe TMD. The results obtained in this present study were near to studies done by Shiau YY [3] (1992) 42.9%, Conti PC [4] (1996) 41.3%, Nomura K [5](2007) 53.2%, Pesqueira AA [6] (2010) 40%, Modi P [7] (2012) 45.16%, Minghelli B [8] (2014) 42.4 %, Habib SR [9] (2015) 46.8%, Santhosh MP [10] (2018) 42%, and Zareef U [11](2018) 42.6% in Karachi. However prevalence rate of this study was lower when compared to prevalence rate of studies done by Pedroni CR [12](2003) 68%, Oliveria LK [13](2015) 74.5%, Chandak RM [14](2017) 70%, and Wahid [15](2019) 92.2 %. The prevalence rate of this study was higher than studies done by Ebrahimi M [16](2011) 34.7%, Rani S [17] (2016) 15%, and Rokaya D [18](2018) 30.6%. The differences in the prevalence rate could be due to racial, ethical and social background of the sample size.

In this study, the prevalence of TMD in age group 30-40 was more i.e., 25.1%, when compared to 20-30 age group which had 18.7% prevalence. This was in accordance with the study done by Jain S [19]and Zareef U [11] that as the age increases the presence of TMDs and signs and symptoms of TMDs also increases. Also it was reported

by Nomura [5] (2007) that clinical signs and symptoms of TMD can occur more in young population and this information is of great importance for the early diagnosis of the dysfunction

Result of this study showed that prevalence rate of TMD was more in male population (i.e., 23%) as compared to female population (i.e., 20.6%). Although, severity of TMDs was more in female population than male population. This prevalence rate found in result was contradictory to various studies done by Pedroni [16] (2003), oliveria AS [20](2006), Nomura K [5](2007), Ebrahim M [16] (2011), Bagis B [21] (2012), Rani S [17] (2016), Karthik R [22] (2017), Jain S [19] (2018), Zareef U [11] (2018). All these studies showed that there is greater prevalence rate of TMD in female than in male. This higher prevalence rate in literature could be due to higher emotional stress in females. Although in all the above studies sample size was biased. Number of female participants was much higher compared to males. This factor can lead to biased result. In contrast, Bevilaqua GD [23] (2006) and Celic R (2004) [24] showed equal distribution of TMD among male and female. Also study by Modi P [20] showed that no significant relationship was found between gender and TMD severity.

In this study, prevalence rate of TMDs was highest in the Zone 5 i.e., new west zone (69%), and was lowest in Zone 4 i.e., central zone (29%). Prevalence rate in Zone 1 was 47%, in Zone 2 was 42%, in Zone 3 was 39%, and in Zone 6 was 36%. Population in the new west zone is belonging to higher class and well educated. While most of peoples living in central zone are socially backward. Thus possible factor for higher prevalence of TMD in new west zone could be due to higher presence of stress factor.

Most prevalent category in our study result was mild symptoms category (33.7 %) as classified according to FAI.

Most common symptoms elicited by the participants in this study included difficulty on wide mouth opening (13.7% for yes category and 6.3% for sometimes category), clicking in TMJ region on opening mouth and on chewing (13% for yes category and 14.7% for sometimes category), clenching and bruxism (12.7% for yes category and 12% for sometimes category). Austin DG [25] and Bezarra BP [26] have reported that the parafunctional habits are one of the most important factors in the etiology of TMDs. Also high prevalence of headache was found (15.7 for yes category and 26.5 % for sometimes category). There was also increased prevalence of symptoms in people who described themselves as being tense (19.2 % for yes category and 18.7 % for sometimes category). This is of clinical significance as emotional stress is considered to be one of the predisposing and initiating factors for TMD. Positive association between TMD and anxiety, stress and depression is already proven by Pesquiera AA [27] (2010), Minghelli B [8] (2014), Ryalat S (2009) [28]. This finding is in accordance with the previous investigations as emotional stress influencing changes of the muscular activity and occlusion [13, 29]. Least frequently mentioned problems included difficulty on side jaw movements (8.2 % for yes category and 5.7 % for sometimes category) and difficulty related to improper articulation of teeth (8.3 % for yes category and 1.8 for sometimes category) [30, 31].

Conclusion

Fonseca's amnestic index can be used as an effective tool for finding out prevalence of Temporomandibular disorders in large sample size in a shorter duration of time.

This present study concluded that:

- Prevalence rate of TMDs in Ahmedabad population is 43.7%.
- Prevalence rate of TMDs in male population (23%) was more than female (20.6) population. However, severity of TMD was found in female when compared to male.
- Most prevalent category was mild TMD category (33.7 %).
- Prevalence rate of TMDs was highest in the Zone 5 (69%), and was lowest in Zone 4 (29%). Population in the new west zone is belonging to higher class and well educated. While most of people living in central zone were socially backward. Thus possible factor for higher prevalence of TMD in new west zone could be due to higher presence of stress factor.
- Higher prevalence of parafunctional habits (24.7%), headache (42.2%) and stress (37.9%) was found in Ahmedabad population. This helps in establishing positive correlation between TMDs and parafunctional habits, headache and stress.

Limitation of the study

Dentists can only use FAI as a screening tool for finding presence of TMD. Confirmed diagnosis, to guide for further treatment requires clinical examination and radiographic Investigations.

Future scopes of the study

Larger sample size and long term clinical studies can further help us to highlight prevalence and severity of TMD and more genuine results can be obtained. Various studies should be conducted in different races, gender and age groups to further enlighten about factors affecting prevalence of temporomandibular disorders.

Abbreviation's used: FAI: Fonseca's Amnestic Index, TMDs: Temporomandibular disorders

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