ABSTRACT

Context: Temporomandibular joint disorders (TMDs) have been recognized as one of the most common causes of nondental orofacial pain. Various studies have been reported in literature regarding the relationship between prevalence of signs and symptoms of TMDs and gender, suggestive of female predilection; however, none of the studies have yet been reported to suggest the relationship between knowledge about temporomandibular joint (TMJ) and TMDs and self-awareness of its signs and symptoms.

Aim: To find a relationship between the level of knowledge about TMJ and TMDs and self-awareness of its signs and symptoms.

Settings and Design: This study was designed as an institutional survey. The study sample comprised 491 undergraduate and postgraduate (PG) students, consisting of 90 males and 401 females with age ranging between 18 and 32 years.

Subjects and Methods: Two sets of questionnaire were distributed among the students.

Statistical Analysis Used: Statistical analysis was performed with the help of Epi Info (TM) 3.5.3, descriptive statistical analysis, test of proportion, Chi-square test, one-way analysis of variance, Tukey’s test, and knowledge index.

Results: It was observed that there was a gradual increase in the level of knowledge about TMJ and TMDs and self-awareness of its signs and symptoms from the 1st year to PG students.

Conclusions: A direct relationship exists between the level of knowledge about TMJ and TMDs and self-awareness of its signs and symptoms.

Key words: Institutional survey, self-awareness, temporomandibular disorders, temporomandibular joint, temporomandibular joint disorders

Temporomandibular disorders (TMDs) have been the subject of extensive interest since long time. Even today, temporomandibular joint (TMJ) dysfunction is an enigmatic issue because of its multifactorial etiology. Patients visiting a dental clinic with a complaint of symptoms of TMDs are very rare; the reasons could be either complete absence of symptoms and if symptoms exist, it could be either due to patient’s ignorance, confusion, excuses, or disability. Apart from disability, others could be attributed to lack of awareness, and lack of awareness can be related to lack of knowledge. Hence, we as investigators thought of finding a relationship between lack of knowledge and awareness. The best possible way for this was to do a survey of our undergraduate (UG) and postgraduate (PG) students with the objective of assessing the knowledge about TMJ and TMDs and evaluation of self-awareness of its signs and symptoms among dental UG and PG students.

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SUBJECTS AND METHODS

This study was designed as an institutional survey after discussing and receiving the permission from the Ethical Committee of the Institution. The study sample consisted of 491 students (90 males and 401 females) with their age ranging between 18 and 32 years. The sample comprised UG students: 1st year: 100; 2nd year: 82; 3rd year: 92; 4th year: 90; and interns: 80 and PG students: 48. Two sets of questionnaire were distributed among the students, which were prepared by consulting the staff of all the departments to validate it [Figures 1 and 2].

Statistical analysis was performed with the help of Epi Info (TM) 3.5.3. Epi Info is a trademark of the Centers for Disease Control and Prevention. Descriptive statistical analysis was performed to calculate the means with corresponding standard deviations (SDs). Test of proportion was used to find the standard normal deviation (Z) to compare the difference proportions, and Chi-square test was performed to find the associations. Furthermore, one-way analysis of variance (ANOVA) followed by Tukey’s test was performed with the help of critical difference (CD) or least significant difference at 5% and 1% level of significance to compare the mean values. P ≤ 0.05 was taken to be statistically significant. In addition, knowledge index was used, which was developed as the model developed by Ray and Mandal.[1]

RESULTS

The mean age of the respondents from the 1st year (mean ± SD) was 18.60 ± 0.78 years with range of 18–21 years and the median age was 18.0 years. The mean age of the respondents from the 2nd year (mean ± SD) was 19.53 ± 0.77 years with range of 18–22 years and the median age was 19.0 years. The mean age of the respondents from the 3rd year (mean ± SD) was 20.10 ± 0.98 years with range of 19–23 years and the median age was 20.0 years. The mean age of the respondents from final year (mean ± SD) was 21.43 ± 0.97 years with range of 19–23 years and the median age was 26.0 years. The mean age of the respondents from interns (mean ± SD) was 22.75 ± 1.21 years with range of 21–28 years and the median age was 23.0 years. The mean age of the respondents from PG (mean ± SD) was 26.50 ± 1.70 years with range of 23–32 years and the median age was 26.0 years [Table 1, Figures 3 and 4].

Significant improvement of knowledge was found for the students of the 4th year and onward (P < 0.01) [Table 2 and Figure 5].

ANOVA showed that there was significant difference in knowledge index of different years (\( F_{5,486} = 12.14; P < 0.01 \)). As per the CD, the mean knowledge index was significantly increased from the students of the 1st year to the students of PG (P < 0.01) [Table 3 and Figure 6].

Test of proportion showed that proportion of respondents with answer “Yes” for Q2, Q3, Q4, and Q8 regarding the presence of signs and symptoms of TMDs was significantly higher among interns and PG (Z = 8.59; P < 0.01) [Table 4 and Figure 7].

Chi-square test showed that there was a significant association between prevalence of symptoms of noises within TMJ, pain in or around ears, and orthodontic treatment (P = 0.00001). Test of proportion supported that

![Figure 1: Questionnaire regarding signs and symptoms of temporomandibular joint disorders](image1)

![Figure 2: Questionnaire for knowledge based assessment](image2)
An institutional survey of dental undergraduate and postgraduate students Choudhary, et al.

The proportion of symptoms as well as orthodontic treatment increased with the age of the respondents (i.e., from among the 1st year students to PG students) [Table 5 and Figure 8].

It was observed that there was gradual increase in the level of knowledge about TMJ and TMDs and self-awareness of its signs and symptoms from the 1st year to PG students. Most prevalent symptom found among the 1st and 2nd year students was pain in and around ears, whereas among the 3rd year to PG students, it was joint sounds more than pain. Correlation between orthodontic treatment and presence of signs and symptoms of TMDs was also observed. On detailed analysis of knowledge-based assessment, it was observed that maximum number of wrong answers given was related to questions regarding soft tissue anatomy of TMJ and diagnostic investigations. Hence, more emphasis should be given on this.

DISCUSSION

The term “TMDs” involves changes in masticatory muscles, TMJ, and its associated structures. These changes affect a large portion of the population which can be related to the presence of signs and symptoms such as masticatory...
muscle pain, TMJ pain, joint noises, restricted mouth opening, inadequate occlusion, auditory disorders, and headache. TMD can affect patients of any age or gender.

| Question | 1st year (n=100) n (%) | 2nd year (n=82) n (%) | 3rd year (n=92) n (%) | Final year (n=90) n (%) | Interns (n=80) n (%) | Postgraduate (n=48) n (%) |
|----------|------------------------|------------------------|-----------------------|-------------------------|----------------------|--------------------------|
| 1        | 0 (0.0)                | 0 (0.0)                | 4 (4.3)               | 1 (1.1)                 | 0 (0.0)              | 1 (2.1)                  |
| 2        | 5 (5.0)                | 4 (4.9)                | 27 (29.3)             | 19 (21.1)               | 26 (32.5)            | 19 (39.6)                |
| 3        | 9 (9.0)                | 14 (17.1)              | 18 (19.6)             | 19 (21.1)               | 22 (27.5)            | 19 (39.6)                |
| 4        | 0 (0.0)                | 4 (4.9)                | 2 (2.2)               | 5 (5.6)                 | 0 (0.0)              | 5 (10.4)                 |
| 5        | 0 (0.0)                | 2 (2.4)                | 3 (3.3)               | 8 (8.9)                 | 4 (5.0)              | 4 (8.3)                  |
| 6        | 0 (0.0)                | 2 (2.4)                | 4 (4.3)               | 3 (3.3)                 | 0 (0.0)              | 8 (16.7)                 |
| 7        | 0 (0.0)                | 2 (2.4)                | 7 (7.6)               | 3 (3.3)                 | 0 (0.0)              | 3 (6.3)                  |
| 8        | 5 (5.0)                | 6 (7.3)                | 19 (20.7)             | 19 (21.1)               | 16 (20.0)            | 19 (39.6)                |
| 9        | 0 (0.0)                | 0 (0.0)                | 4 (4.3)               | 0 (0.0)                 | 0 (0.0)              | 0 (0.0)                  |
| 10       | 0 (0.0)                | 0 (0.0)                | 0 (0.0)               | 1 (1.1)                 | 0 (0.0)              | 1 (2.1)                  |

Table 5: Association between answer regarding prevalence of symptoms of noises within temporomandibular joint, pain in or around ears, and orthodontic treatment

| Question | 1st year (n=100) n (%) | 2nd year (n=82) n (%) | 3rd year (n=92) n (%) | Final year (n=90) n (%) | Interns (n=80) n (%) | Postgraduate (n=48) n (%) |
|----------|------------------------|------------------------|-----------------------|-------------------------|----------------------|--------------------------|
| 2        | 5 (5.0)                | 4 (4.9)                | 27 (29.3)             | 19 (21.1)               | 26 (32.5)            | 19 (39.6)                |
| 3        | 9 (9.0)                | 14 (17.1)              | 18 (19.6)             | 19 (21.1)               | 22 (27.5)            | 19 (39.6)                |
| 8        | 5 (5.0)                | 6 (7.3)                | 19 (20.7)             | 19 (21.1)               | 16 (20.0)            | 19 (39.6)                |

Figure 5: Answers for knowledge based assessment by the students

Figure 6: Knowledge index regarding knowledge based assessment of the students

Figure 7: Prevalence of symptoms among the students

Figure 8: Association between answer regarding prevalence of symptoms of noises within temporomandibular joint, pain in or around ears and orthodontic treatment

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with the presence of various signs and symptoms. However, the diagnosis of this clinical entity may be difficult due to
the variation in the presence of symptoms among different
patients and in the same patient at different times.\[5\] The etiology of TMD is multifactorial which may be related to
various medical and dental conditions such as emotional
tension, occlusal interferences, teeth loss, postural deviation,
masticatory muscular dysfunction, internal and external
changes in TMJ structure, and various associations of these
factors.\[4\]

The identification of possible signs and symptoms of TMDs
is a key to early diagnosis of this dysfunction and adequate
treatment. A number of studies have been reported in
literature on the prevalence of signs and symptoms of
TMDs among populations from different parts of the world.
The signs and symptoms of TMDs tend to occur more
frequently in female after puberty and peak during the
reproductive years, whereas they are smaller in number
among children and adolescents and the elderly.\[6\] The
most prevalent subjective symptoms present in a study by
Bonjardim et al. were TMJ sounds (26.72%), headache
(21.65%), tooth grinding (17.98%), and pain in the face or
jaw regions (12.9%).\[6\] Conti et al. in 2003 also found TMJ
sounds followed by headache to be the most commonly
reported symptoms.\[7\] In the present study, the most
common symptom found was TMJ pain followed by joint
sounds. Melis and Abou‑Atme\[8\] and Conti et al.\[7\] observed
a prevalence rate of 27.2% and 20.5%, respectively, for
tooth grinding.

Studies have also been reported regarding the relationship
between prevalence of signs and symptoms of TMDs and
gender, suggestive of female predilection. Bagis et al.\[9\]
in their study concluded that signs and symptoms of
TMD are present more frequently in females than males.
However, the present study cannot comment on female
preponderance due to unequal male to female ratio. The
most common symptom was pain in both the genders.
Various studies have been reported in literature suggesting
the relationship between stress and TMDs, but none of the
studies have yet been reported in literature to suggest the
relationship between knowledge about TMJ and TMDs
and self‑awareness of its signs and symptoms. The present
study was first to be conducted with the aim of finding a
relationship between the level of knowledge about TMJ
and TMDs and self‑awareness of its signs and symptoms,
which was designed as an institutional survey.

In the present study, the knowledge of the students was
assessed using questionnaire. Out of 491 students, 92.55%
were found to be free from the signs and symptoms of
TMDs and the rest 7.45% were suffered from the signs and
symptoms of TMDs. The most prevalent symptom in our
study was found to be pain in and around ears among the
1st and 2nd year students, whereas among the 3rd year to PG
students, it was joint sounds more than pain in and around
ears. The reason for this could be lack of awareness about
signs and symptoms of TMDs among the 1st and 2nd year
students. The overall most common symptoms found were
pain in and around ears (20.57%) followed by joint sounds
(20.36%). Inger Egermark et al.\[10\] in their study concluded
that patients with history of orthodontic treatment in
childhood do not have an increased risk of developing
signs or symptoms of TMDs later in life, and correlations
between signs and symptoms of TMDs and different types of
malocclusion are generally nonexistent or weak; however,
in the present study, the correlation was found between
history of orthodontic treatment done and presence of joint
sounds in 84% of the cases as well as pain in and around ears
in 83.16% of the cases.

Mottaghi et al.\[11\] and Kanehira et al.\[12\] in their study
suggested the probable role of psychological factors such
as stress in causation of TMDs. In the present study, as the
academic educational level increased, there was gradual
increase in the signs and symptoms of TMDs. However,
this increase may be as a consequence of increased level of
psychological stress with the increase in academic education
level. Thus, further studies should be conducted with larger
sample size, equal male to female ratio, and with more
parameters to definitely conclude about the relationship
between the level of knowledge about TMJ and TMDs and
self‑awareness about its signs and symptoms.

CONCLUSION

The parallel increase in the level of knowledge about TMJ
and TMDs and self‑awareness about its signs and symptoms
may suggest that a direct relationship exist between the two.
However, further studies should be conducted to explore
more about this entity. Further, various measures should be
integrated and motivated in our dental practice to increase
the awareness about importance of TMJ and TMDs among
patients as well as our fellow dentists, especially the general
practitioners.

Acknowledgment

We acknowledge cooperation of all the individuals who
participated in the study and Dr. S. S. Mandal for his help
in statistics.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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