*Original Research Article*

# Oral health related quality of life of undergraduate students in an Indian University

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## Abstract

**Introduction:** Undergraduate students of a university are a crucial transitional age group to examine the effects of poor oral health on a population's quality of life (OHRQoL). **Objective:** Therefore, the purpose of this study was to evaluate how OHRQoL-related factors affected undergraduate students at a University in Delhi, India. **Material and methods:** 451 undergraduate students from Jamia Millia Islamia University in New Delhi, India responded to a cross-sectional hybrid mode questionnaire survey. Using the Oral Health Impact in Adolescents scale (OHIA), the OHRQoL of research participants was evaluated. The Mann-Whitney U test was used to compare OHIA scores for individuals in various age groups and according to their gender. **Results:** Mean OHIA score was 4.87 (SD 1.1). When compared to younger age groups and men, older individuals and women felt that oral health-related issues reduced their quality of life. Oral health's physical and psychological components were the main cause of the study participants' worse OHRQoL. **Conclusion:** The average OHIA score illustrates the minimal influence of oral health on university students' quality of life. To better understand how dental health affects this age group's QoL, more studies on groups that are similar to this one are needed.

## Introduction

There is evidence that oral disorders have a detrimental effect on people's quality of life (QoL). Research over the previous two decades has demonstrated that a straightforward oral examination is insufficient to evaluate numerous aspects of oral health. A QoL scale that may measure needs and perceptions of an individual regarding their dental health must be included with the clinical assessment. Numerous oral health-related quality of life (OHRQoL) assessments has been created as a result of this phenomenon [7, 10, 11].

Oral health perception is a dynamic process. Oral health will be viewed differently by children and adolescents than by older adults. Additionally, oral health and its impact on QoL have different meanings and perceptions for the various populations in the various countries. For instance, for a person living in a low- or lower-middle-income country, pain and the financial cost of dental treatment may be the most common factors affecting OHRQOL, whereas for a person living in a high-income country, aesthetic or social embarrassment due to poor oral health may be the most important factor. Therefore, more studies focused on various populations in other nations are required to paint a complete picture of this phenomenon [2, 8].

As a generation in transition from adolescence to young adulthood, university students represent a distinct age group. For the first time in their lives, the majority of them had left the comfort of their home. Studying under stress, dealing with peer pressure, and making independent decisions can result in psychosocial difficulties as well as changes in lifestyle and health behavior [2, 3]. These elements can have a negative impact on a person's oral health. Furthermore, a person's dental and overall health may be affected for a long time by the knowledge and abilities they gain early in life [12].

Few research has been done on assessing OHRQoL of dental students [1, 13] but none of these studies have used university students or using the Oral Health Impact for Adolescents (OHIA) scale. There is a dearth of literature on OHRQoL studies done on the population of university students in India. In order to determine how oral health affects undergraduate students' quality of life at Jamia Millia Islamia University, we planned to conduct this study. The study also had the following additional goals: 1) to evaluate the effect of oral health on undergraduate university students' QOL using the OHIA scale; 2) to ascertain the impact of each OHIA domain on the study participants' overall OHRQOL; and 3) to provide baseline data for future research on this subject on students enrolled in other Indian universities.

## Material and methods

A representative sample of Jamia Millia Islamia University, New Delhi, undergraduate students participated in this cross-sectional questionnaire study. Any university undergraduate student who possesses sufficient English language proficiency and is willing to voluntarily engage in the study was eligible.

The ICMR Guidelines and the Declaration of Helsinki's guidelines for medical ethics in research were followed in conducting the study. The Institutional Ethical Committee (IEC) of Jamia Millia Islamia granted authorization to perform the study (letter no. EC/NEW/INST/2020/574 dated - 15-6-22). Before completing the questionnaire, each study participant was asked to give their agreement, either offline or online, after being informed of the survey's goals.

### Sample size calculation

According to the most recent data, Jamia Millia Islamia has around 7800 undergraduate students [6]. The desired sample size is calculated from EpInfo software using the formula: $N = Z2pq/e2$; where N is the sample size, Z is the abscissa of the normal curve that cuts off an area under the normal curve, which in this case is 1.96 at 95% confidence interval, and e is the desired level of precision, which is +/- 5%, and p is A sample size of 370 was determined to be adequate for this survey based on this formula. We added a 20% clustering impact to the entire sample because we are utilizing multi-stage cluster sampling. So, 444 people make up the entire sample. There were 451 people in the final sample.

### Data collection tool

In order to gather information for this survey, a questionnaire proforma was developed. It involves documenting basic data about the participants, such as name, age, gender, academic year, and course name. The Oral Health Impact in Adolescents (OHIA) scale was used to measure OHRQoL. This scale was created and tested on Indian adolescents for initial validation, and it was discovered to have good psychometric qualities, acceptable reliability, and validity. The OHIA is a 20-item scale with five domains that assesses the physical, psychological, social, role-affection, and socioeconomic effects of oral health on an individual's quality of life [2]. The study participants were also given a single-question

self-rating global question (GQ). The GQ question is – "How do you rate your present quality of life based on your oral condition?" and scores can range from 0 (poor QoL) to 4 (excellent QoL) [9]. In order to determine whether students had any trouble understanding the questions as well as to check the internal consistency and reliability of the questionnaire, a pilot study was conducted on 30 dental students. The Cronbach's alpha coefficient ($\alpha$) value was found to be 0.84, signifying the acceptable level of reliability of the overall OHIA scale.

## Implementation of the survey among the group under study

To get a representative sample of undergraduate university students for this survey, a multi-stage random sampling procedure was used. The department head/s of various departments/faculties at Jamia Millia Islamia were approached by the student investigator (KA) or guide (AM) to request their consent for data collection for the study. Depending on the number of students in the class and the required sample size, we randomly select one or two courses in each department after obtaining the necessary consent. The student investigator (KA) in these classes distributed physical survey forms after providing the pertinent instructions. KA was on hand the entire time to answer participants' questions on filling out the questionnaire and gathering completed papers. Due to covid-19 pandemic restrictions, a Google form of the final questionnaire was also created and distributed to students taking online courses. To promote student involvement in the survey, KA also routinely visited common locations like central and department canteens. It took two months (August and September 2022) to acquire all the data.

## Statistical analysis

The data was analyzed using Statistical Package for the Social Sciences Version 21.0 (IBM Corp., Armonk, NY, USA). The reliability of the questionnaire was assessed using the Cronbach alpha test by repeating the questionnaire to ten pilot study participants. Frequency distribution tables were prepared to present overall and subgroup data. Kolmogorov-Smirnov test was done to check the normality of the distribution of OHIA scores. Mann-Whitney U was applied to identify the difference in OHIA scores based on the age and gender of students. $P < 0.05$ will be considered statistically significant.
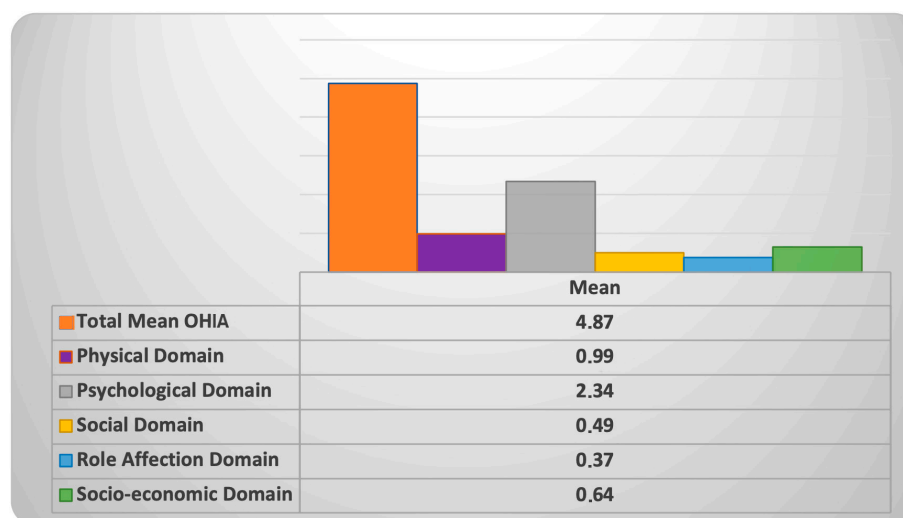
## Results

Overall, 487 students were contacted to participate in this study. In order to be excluded from the survey, not responding to even one of the OHRQOL questionnaire's items was a requirement because it can alter how the summary score is calculated. As a result, 36 students were disqualified from the survey since they didn't fill out the entire questionnaire. The final analysis includes the replies of 451 undergraduate students. Male participants made up about three times as many people (n=326) as female participants (n=125). The median age was 21.02 years (SD 1.66), with a range of 16 to 24 years. In the final sample, 7.5% of the students were enrolled in dental school, 14.3% were enrolled in polytechnic programmes, 17.2% were engineers, 10.8% were majoring in humanities and languages, 7% were majoring in architecture, and 15% were enrolled in natural and social sciences. The remaining 28% were enrolled in business, mass media, psychology, law, and hotel management courses (table I).

**Table I** – Demographic Profile of the study sample

| | Category | Frequency (%) |
|---|---|---|
| **Age groups (years)** | 17-20 | 192 (42.6) |
| | 21-24 | 259 (57.4) |
| **Gender** | Male | 326 (72.3) |
| | Female | 125 (27.7) |
| **Departments** | Dentistry | 32 (7.5) |
| | Polytech | 65 (14.3) |
| | Btech | 78 (17.2) |
| | Humanities | 49 (10.8) |
| | Architecture | 32 (7.0) |
| | Natural Sciences | 33 (7.3) |
| | Social Sciences | 34 (7.5) |
| | Others | 128 (28.3) |

In each of the OHIA's five domains, the mean scores were determined. The observed average overall OHIA score was 4.8 (SD 1.1). The role affection domain had the lowest mean score, 0.3 (SD 0.7), while the psychological domain had the greatest mean score of 2.3 (SD 1.4) (graph 1).

| | Mean |
|---|---|
| ■ Total Mean OHIA | 4.87 |
| ■ Physical Domain | 0.99 |
| ☐ Psychological Domain | 2.34 |
| ☐ Social Domain | 0.49 |
| ■ Role Affection Domain | 0.37 |
| ■ Socio-economic Domain | 0.64 |

**Graph 1** – Mean overall and each domain scores

We separated the participants into two age groups, 17-20 and 21-24 years, in order to analyze the impact of age on OHIA. The OHIA ratings for pain (0.02), sensitivity (0.006), and eating/drinking difficulty (0.02) in the physical domain, and for smile (0.04) and tooth location (0.03) influencing their psychological domain, showed a statistically significant difference between the age groups. While in the role affection domain among age groups, uncomfortable eating in front of others (0.03) and reported skipping lessons owing to dental issues (0.001) have demonstrated statistically significant results. In the socioeconomic domain among the age groups, it was shown that the parent's educational level (0.001) and place of residence (0.01) had a statistically significant impact on dental treatment (tables II and III).

**Table II** – Comparison among age groups and gender for physical and psychosocial domains of OHIA

| Domain | OHIA Items | Age (in years) | Mean Rank | p-value | Gender | Mean Rank | p-value |
|---|---|---|---|---|---|---|---|
| **Physical** | Have you suffered from pain in tooth, gums or any other part of mouth? (Q1) | 17-20 | 211.07 | 0.027* | Male | 224.38 | 0.653 |
| | | 21-24 | 237.07 | | Female | 230.23 | |
| | Have you suffered from sensitivity in your tooth/teeth to hot or cold drink or food? (Q2) | 17-20 | 207.42 | 0.006* | Male | 219.18 | 0.059 |
| | | 21-24 | 239.78 | | Female | 243.78 | |
| | Did your gums bleeds while brushing or eating food or fruits? (Q3) | 17-20 | 222.08 | 0.556 | Male | 219.90 | 0.086 |
| | | 21-24 | 228.91 | | Female | 241.91 | |
| | Do you suffer problem of food lodgement (packing) between teeth? (Q4) | 17-20 | 214.45 | 0.092 | Male | 223.36 | 0.469 |
| | | 21-24 | 234.56 | | Female | 232.89 | |
| | Do you find difficult to eat or drink because of condition of your teeth/gums/mouth? (Q5) | 17-20 | 211.56 | 0.027* | Male | 217.53 | 0.015* |
| | | 21-24 | 236.71 | | Female | 248.08 | |
| | Do you find difficult to speak certain words because of condition of your teeth /gums/ mouth? (Q6) | 17-20 | 220.43 | 0.286 | Male | 226.60 | 0.830 |
| | | 21-24 | 230.13 | | Female | 224.44 | |
| | Are you chewing food only on one side because of condition of your teeth/ gums/ mouth? (Q7) | 17 - 20 | 217.94 | 0.212 | Male | 220.57 | 0.115 |
| | | 21-24 | 231.97 | | Female | 240.15 | |

*To be continued...*

*Continuation of table II*

| Domain | OHIA Items | Age (in years) | Mean Rank | p-value | Gender | Mean Rank | p-value |
|---|---|---|---|---|---|---|---|
| Psycho-social | Are you happy with your smile? (Q8) | 17-20 | 239.74 | 0.042* | Male | 221.48 | 0.210 |
| | | 21-24 | 215.82 | | Female | 237.80 | |
| | Are you teased by friends due to condition of your teeth/ gums/ mouth? (Q9) | 17-20 | 219.78 | 0.236 | Male | 228.06 | 0.508 |
| | | 21-24 | 230.61 | | Female | 220.63 | |
| | Are you embarrassed to see your photograph because of condition of your teeth/ gums/ mouth? (Q10) | 17-20 | 217.32 | 0.157 | Male | 220.52 | 0.094 |
| | | 21-24 | 232.44 | | Female | 240.30 | |
| | Do you feel a tooth in your mouth is not right? (Q11) | 17-20 | 212.02 | 0.039* | Male | 219.13 | 0.058 |
| | | 21-24 | 236.37 | | Female | 243.91 | |

* Significant with Mann-Whitney U-test. The level of significance is 0.05

**Table III** – Comparison among age groups and gender for social, role affection and socio-economic domains of OHIA

| Domain | OHIA Items | Age (in years) | Mean Rank | p-value | Gender | Mean Rank | p-value |
|---|---|---|---|---|---|---|---|
| Social | Do you feel or your friends said that you suffer from bad (smelly) breath? (Q12) | 17-20 | 223.97 | 0.742 | Male | 232.16 | 0.061 |
| | | 21-24 | 227.50 | | Female | 209.94 | |
| | Do you avoid mixing with friends because of condition of your teeth/gums/ mouth? (Q13) | 17-20 | 222.97 | 0.542 | Male | 226.75 | 0.777 |
| | | 21-24 | 228.24 | | Female | 224.04 | |
| | Are you uncomfortable to eat in front of others because of condition of your teeth/ gums/ mouth? (Q14) | 17-20 | 214.58 | 0.037* | Male | 220.07 | 0.041* |
| | | 21-24 | 234.39 | | Female | 241.46 | |
| | Are you uncomfortable to mix with individual/s of opposite gender because of condition of your teeth/gums/mouth? (Q15) | 17-20 | 221.03 | 0.384 | Male | 224.14 | 0.541 |
| | | 21-24 | 229.68 | | Female | 230.84 | |
| Role affection | Have you missed classes due to dental problems? (Q16) | 17-20 | 208.64 | 0.001* | Male | 227.94 | 0.502 |
| | | 21-24 | 238.87 | | Female | 220.95 | |
| | Do you find it difficult to concentrate in class because of because of condition of your teeth /gums/ mouth? (Q17) | 17-20 | 218.37 | 0.139 | Male | 226.29 | 0.404 |
| | | 21-24 | 231.88 | | Female | 220.02 | |
| Socioeconomic | Is your family income affected by the dental treatment? (Q18) | 17-20 | 216.03 | 0.081 | Male | 227.37 | 0.654 |
| | | 21-24 | 233.39 | | Female | 222.44 | |
| | Do you feel your place of living has any effect on you getting dental treatment? (Q19) | 17-20 | 211.97 | 0.019* | Male | 228.65 | 0.407 |
| | | 21-24 | 236.40 | | Female | 219.08 | |
| | Do you feel your parents' education level has affected your chances of getting dental treatment on time? (Q20) | 17-20 | 206.20 | 0.001* | Male | 227.60 | 0.605 |
| | | 21-24 | 240.68 | | Female | 221.84 | |

* Significant with Mann-Whitney U-test. The level of significance is 0.05

Compared to age, there aren't many noticeable changes when comparing gender for OHIA scores. In the social domain, the sensation of discomfort eating in front of others (0.04) was reported to be statistically significant, while females reported higher OHIA scores for the assessment of eating/drinking difficulty (0.01) in the physical domain (tables II and III).

In general, 74% of research participants thought their OHRQOL was excellent, good, or very good, while only 6% thought it was poor. The mean Global Question (GQ) score was 2.01 (SD 0.9), and only 6% thought it was poor (graph 2).
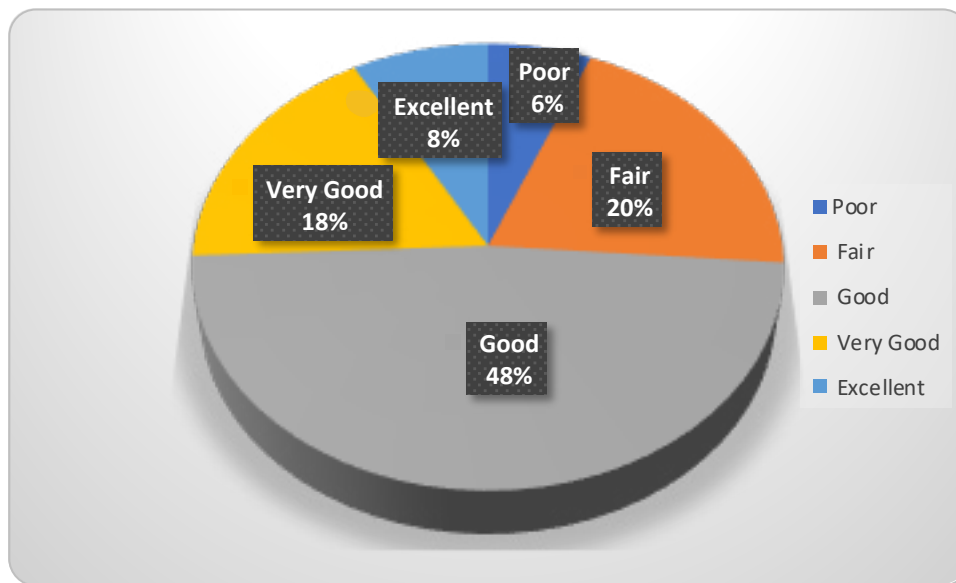


**Graph 2** – Participants responses to global question on oral health

## Discussion

According to the results of this questionnaire study, Jamia Millia Islamia University undergraduate students' QoL is negatively impacted by poor oral health. The OHRQoL of university students around the world has been rated in a number of research [3, 4, 14, 15] and the results are conflicting. Some studies reported a high impact of oral health on the QOL of students [4, 13] whereas others found little or no impact [3, 15].

The mean OHIA score in our study was quite low compared to the original study (18.1, SD 9.7), although the mean GQ score was comparable (1.9 SD1.03). Different cultural and socioeconomic backgrounds of the study population could be the reason for this variation. Test-retest reliability score (Cronbach alpha) was similar to the original study providing some evidence that OHIA can be used in younger adults.

In our study, students who were older in age (between 21 and 24) thought their OHRQoL was worse than when it was compared to those who from younger group. The most likely explanation is that most teenagers believe they have good oral health, which is reflected in lower OHRQoL ratings [14]. As dental diseases such as caries and gingivitis are chronic in progression, their effect is cumulative in nature. Therefore, the older age group will feel more impact of oral conditions on their QoL.

In our survey, women reported lower OHRQoL ratings. Higher self-awareness of looks and oral aesthetics, as well as females' lower pain thresholds, may be contributing factors [4]. Although a study done in Russia found no gender difference in OHRQOL scores [15].

Low OHIP-14 scores were found in studies on dentistry students, indicating a smaller effect of oral health on quality of life [1, 13]. Although the comparison to other students was not statistically significant, dental students in our study also experienced fewer dental issues. It's possible that students with a background in health typically have greater knowledge of oral health and access to dental treatment; as a result, they may have a better view of oral health and its impact on quality of life is lesser than other students [4].

The OHRQoL scores in this study are dominated by the psychosocial and physical areas. The

psychosocial domain has been revealed to be more important for older adolescents' OHRQoL than any other aspect [5]. The OHRQOL of adolescents and young adults is significantly impacted by these two domains, according to studies done on similar age groups [15].

Because OHRQOL is influenced by a person's expectations, experiences, psychosocial, cultural, and demographic factors in addition to their oral health state, it is important to compare the results of our study with those of studies on university students in other countries with caution [4]. Additionally, the scale used in this study to measure OHRQOL is different from the Oral Health Impact Profile -14 (OHIP-14) which is the scale that is most frequently used.

### Strengths

The OHIA, a new age-group-specific tool that enables the assessment of both positive and negative consequences of oral health, was employed in the current investigation. The two new dimensions, Socio-economic and Role Affection, which are not included in existing Quality of Life measures, are added to assess the concerns of adolescents in their current socio-cultural environment. In order to better understand their psychometric properties, specific questions were asked in the psychological and social domains, such as "happy with your smile", "teasing by friends", "smelly breath", "avoidance of mixing with friends" etc. [2]. As a result, the OHIA is a more thorough questionnaire than the OHIP-14 because it has 20 specifically designed questions covering multiple domains affecting an individual's OHRQOL.

Although we did not assess the participants' oral disease status, it has not been demonstrated that oral health outcomes at this age significantly affect OHRQOL scores [14] because the two most prevalent diseases in adolescents and young adults around the world –caries and gingivitis – are chronic illnesses and do not exhibit severe symptoms in the early stages.

OHIA was originally designed and validated in the adolescent population with oral diseases. The results of our study show good internal consistency as well as face and content validity of OHIA when applied to young adults.

### Limitation

Our study's external validity and generalisability to the entire population of university students in India are compromised by the fact that it was restricted to students at a single university in Delhi. The present study did not evaluate factors related to OHRQOL, such as socioeconomic level and place of residence. Only the last three months, or less than a year of OHIP, were considered in the OHIA scale's assessment of the effect of oral health on QOL.

## Conclusion

Due to its importance to overall health and how prevalent it is, oral health should be given top emphasis in public health policies. An evaluation of the study population's OHRQOL is necessary to determine the dental health needs of the population. The influence of OHRQOL on university students is being studied for the first time through this survey. In order to obtain an accurate picture of the effects of oral diseases and conditions on university undergraduate students' QOL, a similar survey can be carried out in populations similar to those in India using the baseline data.

## Authors' contributions

Conceptualization: AM, KA. Data curation: AM, AV, KA. Formal analysis: AM, AV. Funding acquisition: AM, KA. Methodology: AM, AV, KA. Project administration: AM, AV, KA. Writing – original draft: AM, AV, KA. Writing – review & editing: AM, AV, KA.

## Conflict of interest

The authors have no conflicts of interest to declare for this study.

## References

1. Acharya S, Sangam, DK. Oral health-related quality of life and its relationship with health locus of control among Indian Dental University students. Eur J Dent Educ. 2008;12(4):208-12.

2. Baiju R, Peter E, Varghese N, Varughese J, Sivaram R, Narayan V. Development and initial validation of an oral health-related quality of life scale for older adolescents. Indian J Dent Res. 2019;30(6):826-33.

3. Chantre M, Mendes S, Bernardo M. Oral health-related quality of life in Portuguese undergraduate students. J Clin Exp Dent. 2021;13(12):1202-8.

4. Drachev SN, Brenn T, Trovik TA. Oral health-related quality of life in young adults: a survey of Russian undergraduate students. IJERPH. 2018;15(4).

5. Foster Page LA, Thomson WM, Ukra A, Baker SR. Clinical status in adolescents: Is its impact on oral health-related quality of life influenced by psychological characteristics? Eur J Oral Sci. 2013;121:182-7.

6. Jamia Millia Islamia. Self study report for assessment & accreditation. New Delhi; 2015. Available from: URL:https://www.jmi.ac.in/upload/menuupload/naac2015/erd_volume_1/Erd_VolumeI.pdf.

7. Inglehart MR, Bagramian RA (eds). Oral health-related quality of life. 1st ed. Illinois: Quintessence Publishing Co. Inc; 2002.

8. Krisdapong S, Sheiham A, Tsakos G. Oral health-related quality of life of 12-and 15-year-old Thai children: Findings from a national survey. Community Dent Oral Epidemiol. 2009;37(6): 509-17.

9. Lawal F. Global self-rating of oral health as summary tool for oral health evaluation in low-resource settings. J Int Soc Prev Community Dent. 2015;5(7):1.

10. Locker DAF. What do measures of "oral health-related quality of life" measure? Community Dent Oral Epidemiol. 2007;35:401-11.

11. Mehta A, Kaur G. Oral health-related quality of life – the concept, its assessment and relevance in dental research and education. Indian J Dent. 2011;2(2):26-9.

12. Peres MA, Macpherson LMD, Weyant RJ, Daly B, Venturelli R, Mathur MR et al. Oral diseases: a global public health challenge. Lancet. 2019;394:249-60.

13. Priya H, Sequeira PS, Acharya S, Kumar M. Oral health related quality of life among dental students in a private dental institution in India. J Int Soc Prev Community Dent. 2011;1(2):65-70.

14. Roberto P, Colussi G, Hugo FN, Wilker F, Gomes Muniz M, Rösing CK. Oral health – related quality of life and associated factors in Brazilian adolescents. Braz Dent J. 2017;28(1):113-20.

15. Uzarevic Z, Bulj A. Oral health-related quality of life among Croatian university students. IJERPH. 2021;18(12).