HEALTH PROMOTION

# Oral Hygiene practices and Oral Health Related Quality of Life observed in patients reporting to Dental Institution in North India during COVID-19 Pandemic

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Keywords

Oral Health • Quality of Life • COVID-19

## Summary

**Objective**. *The purpose of the study was to ascertain Oral Health Related Quality of Life (OHRQOL) and evaluate oralhygiene practices in patients visiting a dental institution during COVID-19 time.*
**Materials and methods**. *Face-to face interviews were conducted using a semi-structured close-ended questionnaire,assessing oral hygiene practices and self-reported oral problems perceived in last 6 months, using both Hindi and English version of Oral Health Impact Profile (OHIP-14) Questionnaire. Frequency distribution of oral hygiene practices were obtained, and Descriptive statistics computed the scores of OHIP-14. Kruskal-wallis test and Independent t-test were used to match the association of OHIP-14 with demographic variables. Multiple linear regression analysis was utilized to compute the association of OHIP-14 with independent variables, age and gender.*
**Results**. *Subjective evaluation of OHRQOL (Oral Health Related Quality of Life) using OHIP-14 Porforma resulted in high score for physical pain and psychological discomfort but subjects expressed less discomfort in connection to functional limitation, physical disability, psychological discomfort, social disability and handicap domains of OHIP-14. With progressive increase in age OHRQOL worsened. Females had poor OHRQOL, with significant difference as compared to males. Gender and marital status observed variance in OHIP-14 with statistically significant difference (P <0.000).*
**Conclusion**. *More than two-third subjects preferred cleaning their teeth using toothbrush and toothpaste. Therefore, COVID-19 consequently impacted OHRQOL of the general population.*

## Introduction

Coronavirus disease (COVID-19) constituted unparalleled challenge to the humanity. WHO asserted COVID-19 as a public health emergency of international concern on 30th January 2020 and on 11th March 2020 it was announced pandemic. The pandemic has left an ineradicable mark impacting people's life physically, mentally, socially and economically [1]. To break the chain of transmission people were commanded to stay at home by dictating a countrywide lockdown on 24th March 2020 which lasted for more than 8 weeks [2]. The lockdown prohibited people from moving out of their dwellings. Work from home culture was adopted and nearly all educational institutions were closed. Few reports dawned on ramifications of COVID-19 on oral health [3].

The fright of succumbing to COVID-19 heightened during pandemic and as a result many people might have delayed their routine dental care. The medications and therapies used for treating coronavirus disease might have affected oral health resulting in xerostomia, stomatitis and mouth ulcers because of impaired immune system [3]. Since COVID-19 restricted physical movement this evolved in accumulation of dental problems for instance dental sensitivity, pain, bleeding from gums, onset of oral ulcers, salty sensation in mouth, oral malador, need for restoration, need of artificial prosthesis and need for removal of teeth [4]. Those affected with COVID-19 could be at danger of contracting oral lesions such as white-hairy tongue, necrotic lesions, reddish macules and haemorrhagic ulcerations. Further poor compromised oral hygiene may cause aspiration of bacteria in oral cavity leading in inflammation of respiratory tract [5]. The earlier notion of Health defined by WHO 'Health being a state of complete physical, mental and social well being and not merely absence of disease or infirmity' [6] has changed over the course of time, now health is intermingledwith general health and people's quality of life (QOL) [7]. Now a robust approach has been conceived called Oral Health Related Quality of Life (OHRQOL) that estimates accordingly oral conditions influencing individual's attitude and social functioning [6].

US Department of Health and Human Services defines OHRQOL as a multidimensional constructwhich ponders upon people's comfort when eating, sleeping and engaging in social interaction; their pride; and their contentment with respect to their oral health. OHRQOL also deals with functional factors, psychological factors, social factors, and experience of pain [8, 9] Dental disturbances profoundly influence our social quality of life affecting mentally, emotionally and physically [10-13] An estimated 3.5 billion people are believed to be disturbed due to oral disease. Untreated

Tab. I. Distribution of Oral Hygiene Practices of OPD participants from North India (N = 391).

| Type of Aid Used | N (%) |
|---|---|
| Toothbrush | 361 (92.3%) |
| Finger | 17 (4.4%) |
| Treestick | 11 (2.8%) |
| Interdental Brush | 2 (0.5%) |
| Type of Material Used | |
| Toothpaste | 373 (95.4%) |
| Toothpowder | 18 (4.6%) |
| Type of Toothpaste Used | |
| Fluoridated | 14 (3.6%) |
| Non- Fluoridated | 1 (0.3%) |
| Donot know | 376 (96.1%) |
| **Material Used for Tongue Cleaning** | |
| Tongue Cleaner | 257 (65.7%) |
| Toothbrush | 93 (23.8%) |
| Finger | 9 (2.3%) |
| Do not Clean | 32 (8.2%) |
| **Tongue Cleaning Duration** | |
| Daily | 323 (82.6%) |
| Once a week | 17 (4.3%) |
| Two times in a week | 12 (3.1%) |
| Once a month | 8 (2%) |
| Do not Clean | 31 (7.9%) |
| **Frequency of Brushing** | |
| Once a day | 310 (79.3%) |
| Twice a day | 80 (20.5%) |
| Greater than two times | 1 (0.3%) |
| Cleaning of teeth during Day | |
| Before Meals | 310 (79.3%) |
| Before and after every meal | 80 (20.5%) |
| After meals | 1 (0.3%) |
| **Brand and type of Toothpaste used** | |
| Fluoridated-(Colgate, Close-up) | 261 (66.7%) |
| Non-fluoridated | 81 (21%) |
| Desensitizing Toothpastes | 31 (8.3%) |
| Unable to Recall | 18 (4%) |

* Fluoridated-(Colgate, Close-up); ** Non- Fluoridated-(Dabur Lal, Dantkantipatanjali, Vestige); *** Desensitizing Toothpastes-(Sensodyne &Sensodent).

Oral disease induces pain, discomfort supplemented with severe periodontal disease [6]. The in-built reluctance to seek dental care due to COVID-19 scare and physical restrictions would have certainly influenced the OHRQOL [14]. Despite previous voluminous research done assessing OHRQOL in patients affected with dental disorders still fewer studies might have been initiated to assess the effect of COVID-19 pandemic on OHRQOL. Thus, the motive of this study was to explore Oral Health Related Quality of Life and observance of oral hygiene practices in patients visiting dental OPD during COVID-19.

## Materials and methods

Ethical clearance was obtained from Institutional Ethical Committee bearing protocol number (BDC/3110) dated 2.11.2020 to conduct the cross-sectional study. The participants were interviewed face-to-face for OHRQOL, using Oral Health Impact Profile-14 questionnaire (OHIP-14) and oral hygiene practices were evaluated using a semi-structured questionnaire. OHIP-14 is based on theoretical model developed by the World Health Organization (WHO) and calculates social impact of oral disorders.

Tab. II. Mean response to sub-scales of Oral Health Impact Profile-(OHIP-14) in OPD participants from North India.

| OHIP Variables | Mean (SD) |
|---|---|
| Functional Limitation | 0.13 (0.75) |
| Physical Pain | 3.53 (2.26) |
| Psychological Discomfort | 1.21 (2.03) |
| Physical Disability | 0.77 (1.75) |
| Psychological Disability | 0.65 (1.63) |
| Social disability | 0.85 (1.81) |
| Handicap | 0.09 (0.70) |
| Total OHIP | 7.41 (4.56) |

OHIP-14 focuses on 7 dimensions which consist of functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap. It gives more prominence to behavioural and psychological impact and is preferred in identifying psychological impact among individuals.

The Responses were obtained using 5-point likert scale. Scores ranged from 0 to 56 and were obtained by adding the ordinal values for the 14 items. Higher OHIP-14 scores coincides to poor OHRQOL and lesser scores predict better OHRQOL. For an expected population size of 29,911, the sample size of 391 was determined using online sample size calculator [15] with confidence level set at 0.95 and margin of error at 5%. Thus, 391 subjects reporting to OPD were enquired for OHRQOL and oral hygiene practices using close-ended questionnaire. The respondents were interviewed, how often they felt oral problems over past 6 months using a validated English and Hindi version of OHIP-14. Reliability of OHIP scale was assessed before commencement with cronbach's alpha value $\acute{\alpha} = 0.67$ considered acceptable. Subjects who had at least 20 functional teeth were evaluated and completely edentulous subjects were excluded.

### Statistical Analysis

The data obtained was subjected to statistical analysis using SPSS Version 21.0 Armonk,NY:IBM Corp [16]. Descriptive statistics were computed for demographic variables and oral hygiene practices. Comparison of OHIP-14 in relation to age, gender and marital status was done using Kruskal-Wallis Test and Independent-t test. Chi-square test observed the association of oral hygiene practices with gender. Multiple linear regression analysis was conducted to substantiate the association between independent variables, such as gender and marital status with dependent variable (OHIP-14).

**Tab. III.** Distribution of Responses to Oral Health Impact Profile (OHIP-14) among OPD Participants from North India (N = 391).

| Items | Responses | | | | | Mean (SD) |
|---|---|---|---|---|---|---|
| | Never | Hardly Ever | Occasionally | Fairly Often | Very Often | |
| Have you had trouble pronouncing any words because of problems with your teeth/mouth | 385 (98.4%) | 3 (0.7%) | 1 (0.3%) | 1 (0.3%) | 1 (0.3%) | 0.03 (0.28) |
| Have you felt that your sense of taste has worsened because of problems with your teeth/mouth | 371 (94.9%) | 1 (0.3%) | 16 (4.1%) | 3 (0.7%) | 0 (0%) | 0.10 (0.47) |
| Have you had painful aching in your mouth because of problems with your teeth/mouth | 89 (22.7%) | 2 (0.5%) | 180 (46.1%) | 115 (29.4%) | 5 (1.3%) | 1.85 (1.11) |
| Have you found it uncomfortable to eat any food because of problems with your teeth/mouth | 110 (28.2%) | 3 (0.7%) | 184 (47.1%) | 88 (22.5%) | 6 (1.5%) | 1.68 (1.15) |
| Have you been self-conscious because of your teeth/mouth | 270 (69.1%) | 3 (0.7%) | 88 (22.5%) | 29 (7.4) | 1 (0.3%) | 0.69 (1.06) |
| Have you felt tense because of problems with your teeth/mouth | 299 (76.5%) | 2 (0.5%) | 69 (17.6%) | 20 (5.1%) | 1 (0.3%) | 0.52 (0.97) |
| Has your diet been unsatisfactory because of problems with your teeth/ mouth | 333 (85.2%) | 2 (0.5%) | 44 (11.3%) | 9 (2.3%) | 3 (0.7%) | 0.32 (0.82) |
| Have you had to interrupt meals because of problems with your teeth/ mouth | 312 (79.8%) | 1 (0.3%) | 60 (15.4%) | 15 (3.8%) | 3 (0.7%) | 0.45 (0.93) |
| Have you found it difficult to relax because of problems with your teeth/ mouth | 326 (83.3%) | 0 (0%) | 44 (11.3%) | 21 (5.4%) | 0 (0%) | 0.38 (0.88) |
| Have you been a bit embarrassed because of problems with your teeth/ mouth | 343 (87.7%) | 0 (0%) | 37 (9.5%) | 10 (2.5%) | 1 (0.3%) | 0.27 (0.75) |
| Have you been a bit irritable because of problems with your teeth/ mouth | 273 (69.8%) | 1 (0.3%) | 90 (23%) | 25 (6.4%) | 2 (0.5%) | 0.67 (1.06) |
| Have you had difficulty doing your usual job because of problems with your teeth/mouth | 340 (87%) | 0 (0%) | 41 (10.4%) | 10 (2.6%) | 0 (0%) | 0.28 (0.75) |
| Have you that life in general was less satisfying because of problems with your teeth/mouth | 378 (96.8%) | 2 (0.5%) | 8 (2%) | 3 (0.7%) | 0 (0%) | 0.06 (0.38) |
| Have you been totally unable to function because of problems with your teeth/mouth | 386 (98.7%) | 1 (0.3%) | 2 (0.5%) | 0 (0%) | 2 (0.5%) | 0.03 (0.32) |

## Results

Total of 391 subjects reporting in OPD were evaluated for oral hygiene practices and OHRQOL. The mean age was 35.13 ± 2.49 years out of which 63.7% (249) were males and 36.3% (142) were females. More than two-third were in the habit of cleaning their teeth using toothbrush and toothpaste. Nevertheless, a small proportion of subjects used finger (4.4%), treestick (2.8%) and interdental brush (0.5%) for cleaning. Four-fifth of the participants were unable to comprehend between fluoridated and non-fluoridated toothpaste. 82.6% maintained daily cleaning of their tongue and 79.3% practiced brushing their teeth before intake of meals. Practice of cleaning teeth, twice a day was observed in only 20.5% subjects. About a quarter of study subjects (29.3%) reported the use of desensitizing toothpaste and non-fluoridated toothpaste and greater than two-third of subjects (66.7%) trusted Colgate toothpaste for cleaning their teeth (Tab. I). Out of the seven dimensions of OHIP-14 the subjects rated higher mean score for physical pain (3.53 ± 2.26) and psychological discomfort (1.21 ± 2.03) (Tab. II). However, less discomfort was perceived in relation to functional limitation, physical disability, psychological disability, social disability and handicap (Tab. III). The total OHIP-14 score ranged between 0 to 29. Females had higher mean OHIP-14 score (8.96 ± 5.57) in comparison with males (6.52 ± 3.60).

Females perceived more discomfort in OHRQOL when compared to males with significant differences seen in domains of psychological discomfort, physical disability, social disability and handicap. Similarly females beingmore conscious for their oral health, felt more tense because of problems with their teeth ($P < 0.001$).

Inter-group comparisongender wise observed significant difference in context to unsatisfactory diet and inability to consume meals. (Tab. IV).

**Tab. IV.** Gender association with Oral Health Impact Profile (OHIP-14) in OPD Participants from North India using Independent T Test.

| Sr. No. | OHIP-14 | Male Mean (SD) | Female Mean (SD) | T-value | P-value |
|---|---|---|---|---|---|
| 1 | Have you had trouble pronouncing any words because of problems with your teeth/mouth | 0.03 (0.25) | 0.02 (0.33) | 0.13 | 0.81 |
| 2 | Have you felt that your sense of taste has worsened because of problems with your teeth/mouth | 0.10 (0.44) | 0.10 (0.51) | 0.05 | 0.95 |
| 3 | Have you had painful aching in your mouth because of problems with your teeth/mouth | 1.80 (1.08) | 1.95 (1.17) | -1.31 | 0.39 |
| 4. | Have you found it uncomfortable to eat any food because of problems with your teeth/mouth | 1.59 (1.13) | 1.85 (1.16) | -2.17 | 0.22 |
| 5. | Have you been self-conscious because of your teeth, mouth | 0.64 (1.05) | 0.77 (1.09) | -1.176 | **0.09** |
| 6. | Have you felt tense because of problems with your teeth, mouth | 0.37 (0.82) | 0.78 (1.14) | -4.078 | **< 0.001** |
| 7. | Has your diet been unsatisfactory because of problems with your teeth, mouth | 0.21 (0.63) | 0.53 (1.05) | -3.802 | **< 0.001** |
| 8. | Have you had to interrupt meals because of problems with your teeth/mouth | 0.37 (0.85) | 0.59 (1.09) | -2.181 | **< 0.001** |
| 9. | Have you found it difficult to relax because of problems with your teeth/ mouth | 0.30 (0.78) | 0.53 (1.02) | -2.527 | **< 0.001** |
| 10. | Have you been a bit embarrassed because of problems with your teeth/ mouth | 0.27 (0.75) | 0.28 (0.76) | -0.018 | 0.85 |
| 11. | Have you been a bit irritable because of problems with your teeth/ mouth | 0.49 (0.94) | 0.99 (1.18) | -4.582 | **< 0.001** |
| 12. | Have you had difficulty doing your usual job because of problems with your teeth/ mouth | 0.25 (0.70) | 0.33 (0.83) | -1.021 | **0.03** |
| 13. | Have you that life in general was less satisfying because of problems with your teeth/ mouth | 0.03 (0.23) | 0.13 (0.56) | -2.500 | **< 0.001** |
| 14. | Have you been totally unable to function because of problems with your teeth/ mouth | 0.16 (0.25) | 0.06 (0.41) | -1.397 | **< 0.001** |
| Total | Total OHIP-14 | 6.52 (3.60) | 8.96 (5.57) | -5.247 | **< 0.001** |

**Tab. V.** Distribution of Oral Hygiene Practices of OPD participants from North India according to Gender using Chi-square test.

| **Type of Aid Used** | **Male (N = 249)** | **Female (N = 142)** | **P-value** |
|---|---|---|---|
| Toothbrush | 233 (93.6%) | 128 (90.2%) | **0.08** |
| Finger | 5 (2%) | 11 (7.7%) | |
| Treestick | 1 (0.4%) | 0 (0%) | |
| Toothbrush + Treestick | 8 (3.2%) | 2 (1.4%) | |
| Toothbrush + Finger | 1 (0.4%) | 0 (0%) | |
| Toothbrush + Interdental Brush | 1 (0.4%) | 1 (0.7%) | |
| **Type of Material Used** | **Male (N = 249)** | **Female (N = 142)** | 0.46 |
| Toothpaste | 239 (95.9%) | 134 (94.4%) | |
| Toothpowder | 10 (4.1%) | 8 (5.6%) | |
| **Content of Toothpaste Used** | **Male (N = 249)** | **Female (N =1 42)** | 0.19 |
| Do not Know | 242 (97.2%) | 134 (95%) | |
| Fluoridated | 6 (2.4%) | 8 (5%) | |
| Non-Fluoridated | 1 (0.4%) | 0 (0%) | |

**Tab. VI.** Age-wise Comparison of Oral Health Impact Profile-14 (OHIP-14) in OPD participants from North India using Kruskal-Wallis Test.

| OHIP-14 | Age Groups | Mean Rank | Mean (SD) | P-value |
|---|---|---|---|---|
| Have you had trouble pronouncing any words because of problems with your teeth mouth | 18-26 yrs | 196.34 | 0.03 (0.28) | 0.17 |
| | 27-34 yrs | 195.23 | | |
| | 35-44 yrs | 193.00 | | |
| | 45-54 yrs | 195.85 | | |
| | 55-64 yrs | 205.38 | | |
| | 65-74 yrs | 209.33 | | |
| Have you felt that your sense of taste has worsened because of problems with your teeth mouth | 18-26 yrs | 201.04 | 0.10 (0.47) | 0.23 |
| | 27-34 yrs | 190.58 | | |
| | 35-44 yrs | 192.52 | | |
| | 45-54 yrs | 203.04 | | |
| | 55-64 yrs | 186.00 | | |
| | 65-74 yrs | 186.00 | | |
| Have you had painful aching in your mouth because of problems with your teeth mouth | 18-26 yrs | 149.18 | 1.85 (1.11) | **0.00** |
| | 27-34 yrs | 209.01 | | |
| | 35-44 yrs | 219.09 | | |
| | 45-54 yrs | 217.50 | | |
| | 55-64 yrs | 223.28 | | |
| | 65-74 yrs | 224.92 | | |
| Have you found it uncomfortable to eat any food because of problems with your teeth mouth | 18-26 yrs | 152.66 | 1.68 (1.15) | **0.00** |
| | 27-34 yrs | 201.05 | | |
| | 35-44 yrs | 207.53 | | |
| | 45-54 yrs | 218.69 | | |
| | 55-64 yrs | 293.44 | | |
| | 65-74 yrs | 236.00 | | |
| Have you beenself-conscious of teeth because of problems with your teeth mouth | 18-26 yrs | 242.24 | 0.69 (1.06) | **0.00** |
| | 27-34 yrs | 177.94 | | |
| | 35-44 yrs | 184.93 | | |
| | 45-54 yrs | 161.31 | | |
| | 55-64 yrs | 181.81 | | |
| | 65-74 yrs | 175.58 | | |
| Have you felt tense because of teeth because of problems with your teeth mouth | 18-26 yrs | 190.88 | 0.52 (0.97) | 0.75 |
| | 27-34 yrs | 199.08 | | |
| | 35-44 yrs | 205.50 | | |
| | 45-54 yrs | 189.74 | | |
| | 55-64 yrs | 182.66 | | |
| | 65-74 yrs | 204.79 | | |
| Has your diet been unsatisfactory because of problems with your teeth mouth | 18-26 yrs | 183.36 | 0.32 (0.82) | **0.00** |
| | 27-34 yrs | 187.01 | | |
| | 35-44 yrs | 194.90 | | |
| | 45-54 yrs | 216.18 | | |
| | 55-64 yrs | 228.56 | | |
| | 65-74 yrs | 234.92 | | |
| Have you had to interrupt meals because of problems with your teeth mouth | 18-26 yrs | 179.73 | 0.30 (0.81) | 0.31 |
| | 27-34 yrs | 206.37 | | |
| | 35-44 yrs | 201.81 | | |
| | 45-54 yrs | 199.40 | | |
| | 55-64 yrs | 203.25 | | |
| | 65-74 yrs | 206.38 | | |
| Have you found it difficult to relax because of teeth because of problems with your teeth mouth | 18-26 yrs | 186.47 | 0.38 (0.88) | 0.30 |
| | 27-34 yrs | 196.52 | | |
| | 35-44 yrs | 205.70 | | |
| | 45-54 yrs | 192.62 | | |
| | 55-64 yrs | 223.34 | | |
| | 65-74 yrs | 194.33 | | |

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| | | | | |
|---|---|---|---|---|
| Have you been a bit embarrassed because of problems with your teeth mouth | 18-26 yrs | 217.70 | 0.27 (0.75) | **0.00** |
| | 27-34 yrs | 198.48 | | |
| | 35-44 yrs | 182.70 | | |
| | 45-54 yrs | 180.38 | | |
| | 55-64 yrs | 183.88 | | |
| | 65-74 yrs | 172.00 | | |
| Have you been a bit irritable because of problems with your teeth mouth | 18-26 yrs | 184.69 | 0.67 (1.06) | 0.63 |
| | 27-34 yrs | 199.86 | | |
| | 35-44 yrs | 198.99 | | |
| | 45-54 yrs | 207.65 | | |
| | 55-64 yrs | 186.22 | | |
| | 65-74 yrs | 202.63 | | |
| Have you had difficulty doing your usual job because of problems with your teeth mouth | 18-26 yrs | 196.99 | 0.28 (0.75) | 0.67 |
| | 27-34 yrs | 198.24 | | |
| | 35-44 yrs | 200.65 | | |
| | 45-54 yrs | 192.91 | | |
| | 55-64 yrs | 182.41 | | |
| | 65-74 yrs | 170.50 | | |
| Have you felt life in general less satisfying because of problems with your teeth mouth | 18-26 yrs | 192.83 | 0.69 (0.38) | 0.12 |
| | 27-34 yrs | 193.93 | | |
| | 35-44 yrs | 200.34 | | |
| | 45-54 yrs | 192.29 | | |
| | 55-64 yrs | 213.88 | | |
| | 65-74 yrs | 206.21 | | |
| Have you been totally unable to function because of problems with your teeth mouth | 18-26 yrs | 193.50 | 0.03 (0.32) | **0.06** |
| | 27-34 yrs | 193.50 | | |
| | 35-44 yrs | 199.93 | | |
| | 45-54 yrs | 196.37 | | |
| | 55-64 yrs | 193.50 | | |
| | 65-74 yrs | 209.92 | | |

Gender wise non-significant association was obtained in comparing usage of oral hygiene materials. However, males showed significant difference in relation to oral cleanliness aids used for cleaning their teeth ($P < 0.08$) (Tab. V).

Significant differences were drawn, age-wise in connection to physical pain and psychological discomfort (Tab. VI).

Symbolic association was reported in married subjects, when compared with unmarried subjects in relation to domains of physical pain ($P < 0.001$) and physical disability. Yet, unmarried subjects were more self-conscious and uncomfortable for their oral problems (Tab. VII).

On conducting multiple regression analysis both gender and marital status predicted OHIP-14 in a statistically significant manner $F(2,388) = 18.164$, $P < 0.001$ $R^2 = 0.081$ (Tab. VIII).

## Discussion

The overall mean OHIP-14 Score 7.41 ± 4.56 was much lower in comparison to earlier studies measuring OHRQOL [10, 17-20] which could be associated with better awareness about oral health.Females under prioritized their oral health which could be because of more involvement in household work, dependence on spouses and laid back attitude towards seeking immediate treatment which was in disagreement with previous studies where females utilized oral care services [10, 18]. Similarly, females subjects in this studyreported poor OHRQL which could be linked with rural background, hormonal imbalances and systemic illnesses such as diabetes and heart disease which are known to affect oral health [21].

Almost 90% of subjects reported the use of toothpaste and toothbrush and this observation was in agreement with previous studies [22, 23], still 7.8% subjects relied on traditional practices such as tree stick and finger. One-third (8.3%) revealed the use of desensitizing toothpastes which was higher when compared to earlier evidence [22, 24] and the probable reason could be readily available OTC toothpastes and media promotion of desensitizing toothpastes. Only 4.6% study subjects were accustomed to cleaning their teeth using toothpowder which differed with earlier study [23] however, similar observation was noted in a study from central India [22]. Only 20.5% of subjects reported cleaning of their teeth twice a day and this low proportion was comparable to previous studies [22, 23].

High mean scores for physical pain and psychological discomfort were reported with consistent findings from earlier research [10, 19, 25] and gender based differences were in concordance with a study done in

**Tab. VII.** Relationship of Marital status with Oral Health Impact Profile (OHIP-14) in OPD participants from North India using Independent T Test.

| Sr. No. | OHIP-14 | Marriedan = 256 (65.5%) Mean (SD) | Single[b] n = 135 (34.5%) Mean (SD) | T-value | P-value |
|---|---|---|---|---|---|
| 1 | Have you had trouble pronouncing any words because of problems with your teeth/ mouth | 0.03 (0.29) | 0.02 (0.27) | 0.05 | 0.95 |
| 2 | Have you felt that your sense of Taste has Worsened because of problems with your teeth mouth | 0.08 (0.43) | 0.14 (0.53) | -1.010 | 0.31 |
| 3 | Have you had painful aching in your mouth because of problems with your teeth/ mouth | 2.12 (0.95) | 1.34 (1.22) | 6.970 | **< 0.001** |
| 4. | Have you found it uncomfortable to eat any food because of problems with your teeth/ mouth | 1.96 (1.04) | 1.16 (1.16) | 6.899 | **< 0.001** |
| 5. | Have you been self-conscious because of problems with your teeth/ mouth | 0.42 (0.89) | 1.20 (1.18) | -7.287 | **< 0.001** |
| 6. | Have you felt tense because of problems with your teeth/mouth | 0.57 (1.02) | 0.41 (0.84) | 1.585 | 0.11 |
| 7. | Has your diet been unsatisfactory because of problems with your teeth/mouth | 0.42 (0.91) | 0.15 (0.58) | 3.073 | **< 0.001** |
| 8. | Have you had to interrupt meals because of problems with your teeth/ ,mouth | 0.52 (0.98) | 0.31 (0.83) | 2.103 | **0.03** |
| 9. | Have you found it difficult to relax because of problems with your teeth/mouth | 0.42 (0.94) | 0.30 (0.76) | 1.337 | 0.18 |
| 10. | Have you been a bit embarrassed because of problems with your teeth/mouth | 0.13 (0.53) | 0.54 (1.00) | -5.173 | 0.30 |
| 11. | Have you been a bit irritable because of problems with your teeth/mouth | 0.76 (1.11) | 0.51 (0.94) | 2.230 | **0.02** |
| 12. | Have you had difficulty doing your usual job because of problems with your teeth/ mouth | 0.31 (0.78) | 0.23 (0.68) | 0.940 | 0.34 |
| 13. | Have you that life in general was less satisfying because of problems with your teeth/ mouth | 0.08 (0.43) | 0.04 (0.29) | 0.907 | 0.36 |
| 14. | Have you been totally unable to function because of problems with your teeth/ mouth | 0.05 (0.39) | 0.00 (0.00) | 1.483 | 0.13 |
| Total | Total OHIP-14 | 7.92 (4.77) | 6.42 (3.98) | 3.122 | **< 0.001** |

[b] Single (unmarried, widowed and divorced).

**Tab. VIII.** Multiple Linear Regression Analysis of Oral Health Impact Profile (OHIP-14) with marital status and gender in OPD participants from North India.

| Parameters | Coefficients(SE) | t | Sig. | 95% CI |
|---|---|---|---|---|
| Constant | 5.857 (.906) | 6.463 | < .001 | 4.075-7.639 |
| Gender | 2.412 (.461) | 5.236 | < .001 | 1.506-3.317 |
| Marital Status | -1.269 (.441) | -2.878 | .004 | -2.135-.402 |

* Standard Error (SE).

similar setting [18] but contradictory findings were seen in a study done on occupational workers [25]. Less than one-third of study subjects very often felt pain and discomfort on eating food, however, more than one-third subjects occasionally had pain in their mouth because of difficulty with their teeth/ mouth and this finding matched with previous studies [18, 26]. Majority of the respondents never experienced their diet to be unsatisfactory. The subjects were very often less self-conscious about their oral problems and this observation was similar to previous studies [18, 20] but in disagreement with earlier research [17].

In spite of pandemic, very few subjects felt irritable, observed difficulty in doing their daily routine work and sensed life in general less satisfying which differed from observations drawn from earlier studies [10, 12, 20]. Nearly half of the subjects occasionally were unable to eat food because of difficulty with their teeth which could be associated with nutritional imbalance [12].

The advancing age increased the severity of OHRQOL as shown by increased scores more so in patients affected with systemic and co morbid conditions [17, 18, 25-27]. Elderly witnessed increased suffering associated with physical pain and psychological discomfort which

attributed to anxiety in undergoing dental treatment and fear for overall wellbeing during COVID-19 [20]. Notably the marital status influenced the OHRQOL which is line with earlier explorations [17, 19]. Gender and marital status observed significant variance in OHIP-14 and a similar association was predicted in a study done on occupational workers [23]. The inference that can be drawn from these points is that married people in general ignore their oral health and need to prioritize this aspect of their life.

Although patients oral problems accumulated during COVID-19 time but the extent and severity of their oral problems was not as much when compared with earlier studies assessing the OHRQOL [10, 17, 19, 26].

### Limitations

Cross-sectional pattern of this study had certain constraints, such as the subjects might have experienced difficulty in recalling oral problems and this resulted in underestimation of oral problems. No correlation was conducted between OHRQOL and clinical parameters, for instance dental caries and periodontal disease. Social desirability bias could also be one of the contributing factor yielding low scores of OHIP-14, because the participants might have shown inhibition in discussing their oral health during COVID-19. We did not estimate the OHRQOL in subjects who were wearing artificial prosthesis and in those who were completely edentulous.

## Conclusion

COVID-19 instilled fear among the general public resulting in delayed approach to seek dental treatment which was responsible for physical pain and psychological discomfort in context to oral problems perceived by the patients. Therefore COVID-19 pandemic may escalate oral health problems which if deferred may result in long-term implications on oral health of general population.

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## Conflict of interest statement

Authors must fully disclose any existing or potential conflicts of interest of a financial, personal or any other nature that could affect or bias their research. If applicable, authors are also requested to describe the role of the finding source(s) in the study design, data acquisition, analysis and interpretation, and writing of the manuscript. No potential conflicts of interest must also be explicitly stated.

The authors declare that they have no competing interest.

## Authors' contributions

The individual contributions of authors to the manuscript should be specified in this section.

AA, TK, BS: Study conception and design, AA, BS: Acquistion of data, AA, TK: Analysis and interpretation of Data, AA, BS: Drafting of Manuscript, AA, TK, BS: Critical revision. All authors have read and approved the final manuscript.

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