RESEARCH ARTICLE

Oral Health-related Quality of Life in Relation to Oral Health Status among Residents in the Surrounding Areas of Rural Health Training Center Attached to a Medical College Hospital

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ABSTRACT

Background: The literature on oral health-related quality of life in relation to oral health status among rural population in India is scanty.

Aims: To assess the oral health-related quality of life in relation to oral health status among residents in surrounding areas of a rural health training center attached to a medical college hospital in Madhya Pradesh, India

Materials and methods: This cross-sectional study was conducted over a period of 4 weeks among the residents in the surrounding areas of Rural Health Training Centre (RHTC), Ratua, attached to People's College of Medical Science and People's Dental Academy, Bhopal, Madhya Pradesh. A pilot study was conducted on a convenient sample of 20 participants at RHTC. The result of the pilot study enabled us to estimate the sample size. The selection of participants was done using a stratified random sampling technique. The selected participants were interviewed by a calibrated investigator to collect the desired information on OHRQOL using the pretested OHIP-14 questionnaire. The oral health assessment was done using mouth mirrors, explores, and CPITN probe on a plastic chair under natural daylight by a calibrated investigator. The comparison of the mean values between different subgroups was done using independent sample t test and one-way analysis of variance (ANOVA). The comparison of the qualitative data between the different subgroups of the population was done using the chi-square test. The comparison of the mean values between different subgroups where the distribution was skewed was done using the Kruskal–Wallis test.

Results: A total of 254 participants were examined in the present study. The mean OHIP-14 score was significantly higher (suggesting a higher oral health-related quality of life) among the participants without caries experience (p < 0.001). The mean OHIP-14 score significantly decreased (p < 0.001) as the periodontal status worsened. The mean OH1P-14 score was significantly lower (p = 0.017) among participants with oral mucosal lesions with no difference between participants with and without malocclusion.

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Conclusion: Oral health-related quality of life was poor among participants with oral diseases.

INTRODUCTION

Oral health is integral and essential to general health. Oral health means more than good teeth; it is integral to general health and essential for well-being. It implies being free of chronic orofacial pain, oral and pharyngeal (throat) cancer, oral tissue lesions, birth defects, such as cleft lip and palate, and other diseases and disorders that affect the oral, dental, and craniofacial tissues, collectively known as the craniofacial complex.

Oral diseases are the most common among chronic diseases and are an important public health problem because of their prevalence, their impact on individuals and society and the expense incurred in their treatment. Oral health affects people physically and psychologically and influences how they grow, enjoy life, look, speak, chew, taste food, and socialize as well as their feelings of social well-being.[1] The psychosocial impact of these diseases often significantly diminishes quality of life. In an effort to focus on the assessment of health and quality of life issues, the term "health-related quality of life" is now widely used. Regarding the relationship of health and disease to quality of life, there appears to be an association between these domains, which is not clearly defined. Locker suggested that health problems may affect quality of life but such a consequence is not inevitable.

In studies that assessed the association between objective measures of dental disease (such as presence of dental caries or periodontal attachment loss) and patient-based opinions of oral status, the relationship was weak

and objective measures did not accurately reflect patients' perceptions. This clearly indicated the need to develop a paradigm that encompassed the multidimensional nature of health and all its possible outcomes. Reisine and Gift et al have indicated that approximately 160 million work hours a year are lost due to oral disorders. As research into health-related quality of life has grown, so has the use of health status measures.[2]

Oral health-related quality of life (OHRQoL) is an integral part of general health and well-being. In fact, it is recognized by the World Health Organization (WHO) as an important segment of the Global Oral Health Program (2003). It is important because of its implications for oral health disparities and access to care.[3] The literature on OHRQoL in relation to oral health status among rural population in India is scanty. This study was undertaken to assess OHRQoL in relation to oral health status among residents in the surrounding areas of a rural health training center attached to a medical college hospital in Madhya Pradesh, India.

MATERIALS AND METHODS

This was a cross-sectional study conducted among the residents in the surrounding areas of Rural Health Training Center (RHTC), Ratua, attached to the People's College of Medical Sciences and People's Dental Academy, Bhopal, Madhya Pradesh. The data on oral health status and OHRQoL was collected from the eligible participants residing in the surrounding areas of RHTC.

Preparation of Questionnaire for Assessing Oral Health-related Quality of Life

We used a modified OHIP-14 questionnaire. Two questions from each of the seven dimensions in the original OHIP-49 were selected by the investigators. Each question was coded with 5 responses, namely

1. Very often
2. Fairly often
3. Occasionally
4. Hardly ever
5. Never.

The selection of participants was done using a stratified random sampling technique. The data was analyzed using Statistical Package for the Social Sciences (SPSS) version 20 (IBM, Chicago, USA). The comparison of the mean values between different subgroups was done using independent sample t test and one-way analysis of variance (ANOVA). Tukey's *post hoc* test was used for multiple pair-wise comparisons wherever ANOVA yielded a significant result. The comparison of the qualitative data between the different subgroups of the population

Table 1: Gender distribution of the study population in different socioeconomic status groups

SES group	Males n (%)	Females n (%)	Total n (%)
Middle	55 (84.6)	10 (15.4)	65 (100)
Lower middle	80 (50.0)	80 (50.0)	160 (100)
Lower	8 (27.6)	21 (72.4)	29 (100)
Total	143 (56.3)	111 (43.7)	254 (100)
Statistical inference	χ^2 value: 33.48, df: 2, p=0.001		

was done using the chi-square test. The comparison of the mean values between different subgroups where the distribution was skewed was done using the Kruskal–Wallis test.

RESULTS

A total of 254 participants were examined in the present study. The mean age of the study population was 29.09 years with a standard deviation of 6.52. The age range of the study population was 20 to 40 years. There was no statistically significant difference in the age distribution of the study population in different socioeconomic status (SES) categories (p=0.447, Table 1). Among the 254 study participants, 143 (56.3%) were males and 111 (43.7%) were females.

Reasons for Dental Visits among Participants

A total of 129 study participants (91.9%) visited a dentist to get treatment for their decayed tooth/teeth while 11 (8.1%) visited for periodontal reasons. No significant difference was noted with regard to reasons for dental visits among the participants in different SES groups (p=0.699, Table 2).

Reasons for Not Visiting a Dentist among Participants

Majority of the participants without dental visits cited no perceived need for dental care (96.6%) while only one participant each (0.8%) cited cost barrier and lack of access as the reasons for not visiting a dentist in the last 1 year. No statistically significant difference was noted with regard to reasons for not having dental visits between the participants in different SES groups (p=0.326, Table 3).

Table 2: Reasons for dental visits among the study population in different SES groups

SES group	Dental caries N (%)	Periodontitis N (%)	Total N (%)
Middle	31 (91.2)	3 (8.8)	34 (100)
Lower middle	80 (93.0)	6 (7.0)	86 (100)
Lower	13 (86.7)	2 (13.3)	15 (100)
Total	124 (91.9)	11 (8.1)	135 (100)
Statistical inference	χ^2 value: 0.72, df: 2, p=0.699		

Table 3: Reasons for not having dental visits among the study population without dental visits in different SES groups

SES group	Cost barrier N (%)	No perceived need N (%)	Lack of access N (%)	Others N (%)	Total N (%)
Middle	0 (0)	29 (93.5)	0 (0)	2 (6.5)	31 (100)
Lower middle	1 (1.4)	72 (97.3)	1 (1.4)	0 (0)	74 (100)
Lower	0 (0)	14 (100)	0 (0)	0 (0)	14 (100)
Total	1 (0.8)	115 (96.6)	1 (0.8)	2 (1.7)	119 (100)
Statistical inference	χ^2 value: 6.99, df: 6, p = 0.326				

Table 4: Dental caries experience among the study participants in different SES groups

SES group	Decayed Mean	Missing Mean	Filled Mean	DMFT Mean (SD)
Middle	1.03 (0.90)	0.46 (0.83)	0.45 (0.83)	1.94 (1.48)
Lower middle	1.48 (1.19)	0.71 (1.02)	0.18 (0.54)	2.37 (1.72)
Lower	2.07 (1.33)	0.79 (1.45)	0.07 (0.26)	2.93 (2.03)
Total	1.43 (1.18)	0.66 (1.04)	0.23 (0.62)	2.32 (1.72)
Statistical inference	*χ^2 value: 15.87, df: 2, p = 0.001	*χ^2 value: 2.71, df: 2, p = 0.258	*χ^2 value: 11.28, df: 2, p = 0.004	*χ^2 value: 6.33, df: 2, p = 0.042

*Kruskal-Wallis test applied

Dental Caries Experience

The mean DMFT (decayed missing filled teeth) score among the study participants was 2.32 (1.72). The mean DMFT among the participants in the middle, lower middle, and lower SES groups were 1.94 (1.48), 2.37 (1.72), and 2.93 (2.03) respectively. The mean DMFT score significantly decreased with the increasing SES (p = 0.042, Table 4).

Periodontal Status

In each participant, the highest CPITN score from the six sextants was considered to assess the periodontal status. Among the study participants, 11 (4.3%) had healthy periodontium (CPITN score 0), 225 (88.6%) had gingivitis (CPITN score 1 and 2), and 18 (7.1%) had periodontitis (CPITN score 3 and 4). There was no statistically significant difference in the periodontal status between the participants in different SES groups (p = 0.920, Table 5).

Oral Health-related Quality of Life in Relation to Dental Caries

The mean OHIP-14 for the study population was computed using the responses for 14 different questions under seven different dimensions. The mean OHIP-14 score for the study population was 58 (10.2). The mean OHIP-14 among the participants with and without caries experience were 56.7 (9.9) and 69.7 (0.6) respectively. The mean OHIP-14 score was significantly higher (suggesting a higher OHRQoL) among participants without caries experience (p < 0.001, Table 6).

The functional limitation (dimension 1) in the present study was assessed using two questions that included difficulty encountered while chewing any food and food impaction. The mean functional limitation score was significantly lower (p < 0.001, Table 6) among the participants with dental caries (6.3 ± 1.9, mean ± SD) compared to participants who were caries free (9.9 ± 0.2).

The physical pain (dimension 2) was assessed using the questions on history of toothache and painful gums (dimension 2). The mean physical score was significantly lower among the participants with dental Caries compared to the participants who were Caries free.

The psychological discomfort (dimension 3) in the present study was assessed using two questions that elicited the information on the history of anxiety due to problems in the teeth. The mean psychological discomfort score was significantly lower (p < 0.001, Table 6) among participants with dental caries (8.7 ± 1.4) compared to participants who were caries free (9.9 ± 0.3).

Table 5: Distribution of the study participants in relation to periodontal status in different SES groups

SES group	Healthy periodontium (CPITN score 0) N (%)	Gingivitis (CPITN score 1 and 2) N (%)	Periodontitis (CPITN score 3 and 4) N (%)	Total N (%)
Middle	3 (4.6)	59 (90.8)	3 (4.6)	65 (100)
Lower middle	7 (4.4)	140 (87.5)	13 (8.1)	160 (100)
Lower	1 (3.4)	26 (89.7)	2 (6.9)	29 (100)
Total	11 (4.3)	225 (88.6)	18 (7.1)	254 (100)
Statistical inference	χ^2 value: 0.93, df: 4, p = 0.920			

The physical disability (dimension 4) was assessed using the questions related to difficulty encountered while brushing and eating some foods. The mean physical disability score was significantly lower (p < 0.001, Table 6) among participants with dental caries 7.6 ± 2.0) compared to participants who were caries free (10.0 ± 0.0).

The psychological disability (dimension 5) was assessed using the questions on sleep interruptions and the inability to focus attention. The mean psychological disability score was significantly lower (p < 0.001, Table 6), among participants with dental caries (8.3 ± 2.0) compared to participants who were caries free (10.0 ± 0.0).

The social disability (dimension 6) in the present study was assessed using the questions on difficulty encountered in getting along with other people and accomplishing the routine jobs. The mean social disability score was significantly lower (p = 0.004, Table 6).

Handicap as a dimension (dimension 7) was assessed using two questions that elicited any feeling of general health becoming worse due to problems in the teeth and financial loss associated with dental problems. The mean handicap score was significantly lower (p < 0.009, Table 6) among participants with dental caries (9.4 ± 1.2) compared to participants who were caries free (10.0 ± 0.0).

Oral Health-related Quality of Life in Relation to Periodontal Status

The mean OHIP-14 score significantly decreased (p < 0.001, Table 7), as the periodontal status worsened. This indicates that the periodontal status had a negative impact on OHRQoL.

Table 6: Mean OHIP among the participants with and without dental caries

Caries prevalence	Dimension 1 Mean (SD)	Dimension 2 Mean (SD)	Dimension 3 Mean (SD)	Dimension 4 Mean (SD)	Dimension 5 Mean (SD)	Dimension 6 Mean (SD)	Dimension 7 Mean (SD)	Mean OHIP-14 Mean (SD)
Yes	6.3	7.3	8.7	7.6	8.3	9.1	9.4	56.7
	(1.9)	(1.8)	(1.4)	(2.0)	(2.0)	(1.4)	(1.2)	(9.9)
No	9.9	9.9	9.9	10	10	9.7	10	69.7
	(0.2)	(0.3)	(0.3)	(0.0)	(0.0)	(0.2)	(0.0)	(0.6)
Overall	6.7	7.6	8.8	7.9	8.4	9.2	9.4	58
	(2.1)	(1.9)	(1.4)	(2.0)	(2.0)	(1.4)	(1.2)	(10.2)
Statistical inference	t = 9.71	t = 7.17	t = 4.52	t = 6.041	t = 4.35	t = 2.95	t = 2.63	t = 6.69
	df: 252	df: 252	df: 252	df: 252	df: 252	df: 252	df: 252	df: 252
	p < 0.001	p < 0.001	p < 0.001	p < 0.001	p < 0.001	p = 0.004	p = 0.009	p < 0.001

Table 7: Mean OHIP in relation to periodontal status among the study participants

Periodontal status	Dimension 1 Mean (SD)	Dimension 2 Mean (SD)	Dimension 3 Mean (SD)	Dimension 4 Mean (SD)	Dimension 5 Mean (SD)	Dimension 6 Mean (SD)	Dimension 7 Mean (SD)	Mean OHIP-14 Mean (SD)
Healthy	9.0	9.3	9.8	9.5	10	9.9	10	67.5
	(1.7)	(1.3)	(0.4)	(1.5)	(0)	(0.3)	(0)	(4.5)
Gingivitis	6.7	7.7	8.8	7.9	8.5	9.3	9.5	58.5
	(2.0)	(1.8)	(1.4)	(2.0)	(1.9)	(1.3)	(1.1)	(9.7)
Periodontitis	4.8	5.6	7.6	6.4	6.2	7.9	8.2	46.8
	(1.5)	(1.8)	(1.1)	(2.1)	(2.2)	(1.7)	(2.0)	(9.9)
Total	6.7	7.6	8.8	7.9	8.4	9.2	9.4	58
	(2.1)	(1.9)	(1.4)	(2.0)	(2.0)	(1.4)	(1.2)	(10.2)
Statistical inference	F:15.5	F:16.8	F:10.1	F:8.6	F:16.3	F:10.8	F:12.0	F:18.1
	df: 2	df: 2	df: 2	df: 2	df: 2	df: 2	df: 2	df: 2
	p < 0.001	p < 0.001	p < 0.001	p < 0.001	p < 0.001	p < 0.001	p < 0.001	p < 0.001
Posthoc results	0 Vs	0 Vs	0 Vs	0 Vs	0 Vs	0 Vs	0 Vs	0 Vs
	1:0.001	1:0.013	1:0.05	1:0.02	1:0.034	1:0.29	1:0.33	1:0.007
	0 Vs	0 Vs	0 Vs	0 Vs	0 Vs	0 Vs	0 Vs	0 Vs
	2 < 0.001	2 < 0.001	2 < 0.001	2 < 0.001	2 < 0.001	2 < 0.001	2 < 0.001	2 < 0.001
	1 Vs	1 Vs	1 Vs	1 Vs	1 Vs	1 Vs	1 Vs	1 Vs
	2 < 0.001	2 < 0.001	2 = 0.001	2 = 0.009	2 < 0.001	2 < 0.001	2 < 0.001	2 < 0.001

0 = Healthy, 1 = Gingivitis, 2 = Periodontitis

Table 8: Mean OHIP among the participants with and without dental visits

Dental visits	Dimension 1 Mean (SD)	Dimension 2 Mean (SD)	Dimension 3 Mean (SD)	Dimension 4 Mean (SD)	Dimension 5 Mean (SD)	Dimension 6 Mean (SD)	Dimension 7 Mean (SD)	Mean OHIP-14 Mean (SD)
Yes	5.6 (1.5)	6.8 (1.7)	8.2 (1.4)	6.9 (1.9)	7.6 (2.0)	8.8 (1.5)	9.1 (1.4)	53.0 (9.5)
No	8.0 (2.0)	8.6 (1.7)	9.4 (1.0)	9.0 (1.6)	9.4 (1.4)	9.6 (1.0)	9.8 (0.6)	63.8 (7.6)
Overall	6.7 (2.1)	7.6 (1.9)	8.8 (1.4)	7.9 (2.0)	8.4 (2.0)	9.2 (1.4)	9.4 (1.2)	58 (10.2)
Statistical inference	$t = -11.0$ df: 252 $p < 0.011$	$t = -8.6$ df: 252 $p < 0.011$	$t = -7.4$ df: 252 $p < 0.011$	$t = -9.6$ df: 252 $p < 0.011$	$t = -7.6$ df: 252 $p < 0.011$	$t = -4.8$ df: 252 $p < 0.011$	$t = -5.4$ df: 252 $p < 0.011$	$t = -9.9$ df: 252 $p < 0.011$

Oral Health-related Quality of Life in Relation to Dental Visits

The mean OHIP-14 score was significantly lower among participants who had a dental visit in the last 1 year (53.0 ± 9.5) compared to those without dental visits (63.8 ± 7.6) ($p = 0.011$, Table 8).

DISCUSSION

Although dental diseases are rarely life-threatening, they do impact quality of life. Dental problems can cause severe pain, loss of work days, and morbidity. Thus, they are an important public health concern. According to WHO, the prevalent oral diseases are dental caries, periodontal diseases, and edentulousness. Dental diseases are expensive to treat; however, they are simple to prevent.[4]

In an oral health context, the question of which measure to use has been the subject of intense research effort in recent years. At the present time, both generic and disease-specific measures of health status are employed. As oral and other chronic diseases have determinants in common, more emphasis should be on the common risk factor approach by integrating oral health into strategies for promoting general health and by assessing oral needs in a sociodental way. Health planners can greatly enhance both general and oral health by such strategies.

In recent times, there has been a growing interest in oral health outcomes with regard to how oral health affects quality of life. When OHRQoL measures are used alongside traditional clinical methods of measuring oral health status, a more comprehensive assessment of the impact of oral diseases on the several dimensions of subjective well-being becomes possible. In this context, we attempted to study the impact of oral diseases on quality of life, so as to address the patient's needs in an appropriate way and thereby improve one's quality of life.

At present, we are at the beginning of the process of constructing quality-of-life indices and searching for the best measures for assessing the impact of social determinants on oral health.[5] The OHIP-14 (the most common OHRQoL measuring tool) was used in the present study. The OHIP-14 contained items organized in seven subscales that addressed aspects of oral health

that may compromise a person's physical, psychological, and social well-being. The present study was conducted among the adult population aged between 20 and 40 years residing in the surrounding areas of a rural health training center attached to a medical and dental college in Madhya Pradesh.

The authors presumed that the responses in a questionnaire study would be more reliable when elicited from adults in comparison with those from children and the elderly. Hence, the study was scheduled in the morning sessions anticipating most of the adult populations at home.

Kusdhany LS et al[6] in their study assessed OHRQoL in Indonesian middle-aged and elderly women. They presumed that this stage of life was important to prepare them for entering the old age and preventive services could be initiated earlier in order to achieve optimum quality of life for the elderly.

The mean DMFT (decayed missing filled teeth) score among the study participants was 2.32 (1.72). The mean DMFT score significantly decreased with the increasing SES ($p = 0.042$). The prevalence of dental caries among the study population was 89.8%.

The study found no significant difference in the periodontal status between the participants in different SES groups ($p = 0.920$) contradictory to the findings of many studies,[7-9] which found an inverse relation between SES and periodontal status. The differences could be due to lack of participants in the upper SES groups in our study. Similarly, there was no statistically significant difference in the prevalence of oral mucosal lesions ($p = 0.408$)[7,8,10] and malocclusion (0.920) between the participants in different SES groups. This also was contradictory to the findings of other studies.

Oral Health-related Quality of Life in Relation to Dental Caries

The mean OHIP-14 among the participants with and without caries experience were 56.7 (9.9) and 69.7 (0.6) respectively. The mean OHIP-14 score was significantly higher (suggesting a higher OHRQoL) among participants without caries experience. Dental caries cause considerable pain and anxiety.[10] The pain and anxiety associated with

dental caries along with tooth loss and lack of immediate access for treatment may be responsible for a poor OHRQoL among participants with dental caries.

Scapini et al[11] conducted a study to assess the effect of dental caries and malocclusion on OHRQoL of adolescents. They found that dental caries had a significant impact on OHRQoL.

Oral Health-related Quality of Life in Relation to Periodontal Status

The mean OHIP-14 score significantly decreased as the periodontal status worsened, suggesting a negative impact on OHRQoL. The results were similar even when a separate comparison was made using the mean values of each of the seven dimensions used for computing the OHIP-14 score.

Sundaram et al[12] in their study to assess the impact of OHRQoL on patients presenting for scaling and oral prophylaxis using an OHRQoL) questionnaire found that 98% of the patients perceived that their oral health status impacted on their quality of life in one or more ways before the treatment. Bad breath was the most common complaint. Social well-being, personality, and psychological function were identified as compromised OHRQoL domains. More than 60% of the patients stated their overall general health was affected by periodontal disease. They concluded that periodontitis had a negative impact on quality of life and suggested that the conventional nonsurgical periodontal therapy and personality development counseling will have a potential to ameliorate patient perceptions of oral health and improve quality of life.

Oral Health-related Quality of Life in Relation to Oral Mucosal Lesions

The mean OHIP-14 score was significantly lower among participants with oral mucosal lesions, indicating an inverse relation between OHRQoL and oral mucosal lesions. The results were similar even when a separate comparison was made using the mean values of each of the seven dimensions. Oral mucosal lesions irrespective of whether acute or chronic will increase the stress and anxiety of the individual due to the associated pain and discomfort.

Saimadhavi et al[13] conducted a study to assess the impact of oral diseases on quality of life in subjects attending the outpatient department of a dental hospital in India and to evaluate the impact of different oral diseases on quality of life using a modified OHIP-14 questionnaire. They concluded that OHRQoL was moderately impaired among those suffering with oral diseases, which was in agreement with our study.

Oral Health-related Quality of Life in Relation to Malocclusion

There was no statistically significant difference in the mean OHIP-14 scores between the participants with (56.9 ± 8.3) and without gross malocclusion (58.1 ± 10.3). The results were similar even when a separate comparison was made using the mean values of each of the seven dimensions.

Oliveira and Sheiham[14] in their study to assess the effect of orthodontic treatment on OHRQoL among Brazilian adolescents concluded that the adolescents who had completed orthodontic treatment had a better OHRQoL than those currently under treatment or those who never had treatment.

Oral Health-related Quality of Life in Relation to Socioeconomic Status

The mean OHIP-14 score significantly decreased as the SES decreased, suggesting a positive association between SES and OHRQoL. Similar results were found even when a separate comparison was made between different SES categories with regard to the mean scores in individual dimensions. Lawrence et al[5] found that the impact of worse-than-average self-rated oral health was greater among the low-SES group. Kumar et al[15] in their systematic review found that a majority of the studies suggest that the children from families with high income, parental education, and family economy had better OHRQoL.

There was a negative correlation between mean OHIP-14 and age, gender, SES, dental caries, and periodontal status. The study found a positive association between mean OHIP-14 and oral hygiene practices, dental visits, oral mucosal lesions, malocclusion, and orofacial disorder. Oral diseases are multifactorial with age, gender, SES, oral hygiene practices, dental visits, etc. acting as independent risk factors. Oral diseases have been found to impact OHRQoL. Hence, the association between these independent variables and OHRQoL may be indirectly due to their effect on oral health status.

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