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Factors affecting oral health-related quality of life among pregnant women

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Abstract: *Objectives:* To assess oral health status and to describe the possible factors that could affect the oral health-related quality of life (OHRQoL) among a group of pregnant rural women in South India. *Materials and methods:* A total of 259 pregnant women (mean age 26 ± 5.5 years) who participated in the cross-sectional study were administered the Oral Health Impact Profile (OHIP-14) questionnaire and were clinically examined for caries and periodontal status. *Results:* The highest oral impact on quality of life was reported for 'painful mouth' (mean: 1.7) and 'difficulty in eating' (mean: 1.1). On comparing the mean OHIP-14 scores against the various self-reported oral problems, it was seen that the mean OHIP-14 scores were significantly higher among those who reported various oral problems than those who did not. Those with previous history of pregnancies had more severe levels of gingivitis than those who were pregnant for the first time. Also gingival index scores, community periodontal index of treatment needs scores and previous pregnancies was associated with poorer OHRQoL scores. *Conclusion:* Increased health promotion interventions and simple educational preventive programmes on oral self-care and disease prevention during pregnancy can go a long way in improving oral health and lessening its impact on the quality of life in this important population.

Key words: India; oral health; pregnancy; quality of life

Introduction

As the old wives' tale of 'the loss of a tooth for every pregnancy', oral health during pregnancy has long been a focus of interest. In recent years, we have witnessed an increased

emphasis on maintaining good oral health during pregnancy. Oral and dental problems associated with pregnancy include dental caries, erosion, pregnancy gingivitis and periodontal infection, pregnancy epulis, increased tooth mobility, and dental problems related to labour and delivery (1–6).

Pregnancy is often thought to be a time of happiness for the expectant mother. However, studies suggest that physical functioning and perceptions of well-being among women in the latter stages of pregnancy and the puerperium is lower compared with the prepregnancy period (7–10). Recent studies have emphasized the importance of health-related quality of life within the broader context of maternal health and pregnancy outcomes. Haas et al. (9) reported lower physical functioning and poorer perceptions of health among pregnant women when compared with their prepregnancy state. Lower physical and social functioning in pregnancy has been linked to an increased risk of preterm birth (11, 12). Although some studies on oral health-related quality of life (OHRQoL) among pregnant women have been reported, they have been limited to exploring the impact of certain factors like pain, on the OHRQoL (13).

There is a growing acceptance of the fact that oral disorders too can have a significant impact on physical, social and mental well-being during pregnancy. This has resulted in a greater clinical focus on quality of life improvement as a major, if not a primary outcome of dental care in this important population.

Documenting variations in OHRQoL in a population provides important information for the evaluation of oral healthcare. Hence, the objectives of this study were to assess oral health status and to describe the possible factors that could affect the OHRQoL among a group of pregnant rural women in South India.

Materials and methods

A convenience sample of expectant mothers reporting for antenatal checkup in a rural teaching hospital of Manipal University, India formed the study population. The abovementioned hospital caters to a predominantly lower, to a lower middle-class rural population. The cross-sectional survey was done for a period of 3 months where all the women reporting for antenatal checkup during this period were invited to participate in the study. All the participants were examined only once and hence the study population consisted of women in all stages of pregnancy (from the first month to the ninth month). A total of 316 pregnant women were invited to participate in the study out of which 259 agreed. The common reason given for not participating in the study was the fear of dental examination. There were no discernible differences in the socio-demographic characteristics between those who did and did not give informed consent for participation in the study. Approval of the Institutional Review Board of Manipal University was obtained prior to the study.

Numerous instruments have been developed to measure dental outcomes in terms of the impact of changes in OHRQoL. The Oral Health Impact Profile (OHIP) (14) is a well-known method for identifying dimensions in OHRQoL, as it is one of the most popular instruments for measuring OHRQoL (15). It measures people's perceptions of the social impact of oral disorders on their well-being. The OHIP-49 contains 49 questions that capture seven conceptually formulated dimensions based on Locker's theoretical model of oral health (16) adapted from the WHO framework used to classify impairments, disabilities and handicaps (17). The OHIP-14 (18) was developed as a shorter version of the OHIP for settings where the full battery of 49 questions is inappropriate (18). It has emerged as a powerful tool in the assessment of OHRQoL and consists of 14 items organized in seven sub-scales, which address aspects of oral health that may compromise someone's physical, psychological and social well-being. OHIP-14 (18) was included in the questionnaire as a measure of the social impact of problems that may compromise oral health.

The OHIP-14 was translated into the Indian version according to accepted standards (19, 20). The Indian version of the OHIP-14 was previously validated in another study (Oral Health and Preventive Dentistry, in press) where Cronbach's α for internal consistency for the OHIP-14 instrument and its subscales were found to range from 0.5 to 0.87 respectively. Average inter-item correlations were between 0.34 and 0.47. Spearman's rank correlation was used to test the test retest reliability. The coefficient values were high with the values for the domains ranging from 0.75 to 0.96. Validity of the questionnaire was also tested by correlating the OHIP-14 scores with clinical oral health status where a statistically significant ($r = 0.21$) correlation was observed between OHIP-14 scores and the Decayed, Missing, Filled teeth scores (DMFT).

Besides OHIP-14 items, the questionnaire included sociodemographic data such as age, educational level, employment status and parity status. Information was also collected as to whether the patient had any anxieties regarding dental treatment and as to whether she had postponed any dental treatment because of pregnancy. Information regarding self-perceived oral health status was also collected.

Clinical examination

The clinical examination was carried out in the comprehensive dental care clinic of the department of Community Dentistry which was situated in the same hospital. The examination was done on a dental chair with artificial lighting. The examiners used WHO (21) criteria to register decayed, missing and filled teeth. The community periodontal index for treatment needs (22) was used to assess periodontal health. The gingival index (GI) (23) was also used to assess gingivitis. The author and a postgraduate student conducted the examinations. Both of them had been calibrated in discussion sessions and trained for 2 days.

Statistical analyses

Individual item (column) means for the OHIP-14 were first calculated. This was followed by grouping the means according to the sub-domains of the questionnaire and again calculating the average of the grouped means. Cohen's kappa was used to measure intra- and inter-examiner variability. Cronbach's alpha was used to test the internal consistency of the OHIP-14 questionnaire. Inter-group comparisons were done by Mann–Whitney test. ANOVA followed by Tukey's *post hoc* test were done for multiple groups' comparison. Spearman's correlation analysis was used to assess the relationship between the periodontal health indicators and the OHIP-14 scores. Cohen's kappa was used to measure inter-examiner reliability for the clinical variables. All statistical analysis was done using the SPSS 13, statistical software package (SPSS Inc., Chicago, IL, USA).

Results

The mean age of the study population was 26 ± 5.5 with the age ranging from 20 to 37 respectively. 90.3% of the women were housewives 24.7% had not finished high school, 46.7% had finished high school and 28.5% were graduates. A sample of 30 patients were clinically reexamined after 1 week to test the reproducibility and the Cohen's kappa was found to range from 0.74 to 0.87 respectively. 18.5% (n = 48) admitted to having some degree of anxiety regarding dental treatment. Of the 259 women, 37 (14.2%) had postponed their dental treatments for the sake of pregnancy (Table 1).

Upon clinical examination it was found that 100% of the study population suffered from some degree of gingivitis with the proportion suffering from mild, moderate and severe gingivitis being 37.8% (n = 98), 39% (n = 101) and 23.2% (n = 60) respectively. The prevalence of caries was found to be 84% (n = 218) with a mean DMFT value of 4.08 ± 3.6 and 33.2% (n = 86) of the study population had periodontal pockets (Pocket depth ≥ 4 mm).

Table 1. **Demographic characteristics of the study population**

Variables		n = 259
Age	Mean ± SD	26.0 ± 5.5
Occupation	Housewife *N* (%)	234 (90.3)
	Working *N* (%)	25 (9.6)
Education	Not finished high school *N* (%)	64 (24.7)
	Finished high school *N* (%)	121 (46.7)
	Graduate *N* (%)	74 (28.5)
Dental anxiety	Yes	48 (18.5)
	No	211 (81.4)
Postponed dental treatment?	Yes	37 (14.2)
	No	222 (85.7)

The distribution of responses to the OHIP-14 items are presented in Table 2, which shows that the majority of patients reported never having had problems in the last year on all items. This was evident from the high percentage of respondents, scoring zero for most of the OHIP-14 items. There were generally low percentages of patients reporting that they had problems very often in the last year. The highest mean scores were reported for the dimensions of 'physical pain' and 'physical disability' in that order.

Self-reported oral health status was assessed by asking eight questions that collected information about periodontal health and dental health. The eight questions were: Do you have bleeding gums?; burning gums?; swollen gums?; loose teeth?; decayed teeth?; tooth pain?; food lodgement between teeth?; sensitive teeth?

The responses to these questions showed that a majority of the respondents (n = 150) reported to suffer from dental caries and food lodgement (n = 102) followed by bleeding gums (n = 96). On comparing the mean OHIP-14 scores against the various self-reported oral problems, it was seen that the mean OHIP-14 scores were significantly higher among those who reported various oral problems than those who did not (Table 3).

Correlation analysis was done to investigate the relationship between the clinical periodontal health indicators and OHIP-14 scores among the pregnant women (Table 4). The results showed that there was a statistically significant correlation between the GI score ($P < 0.001$); community periodontal index of treatment needs (CPITN) scores ($P < 0.01$) and the OHIP-14 scores. Also, the age and the number of pregnancies was significantly correlated (r = 0.21and 0.14) with the OHIP-14 scores.

Table 2. **Responses to the OHIP-14 responses**

	OHIP-14 items	0, *n* (%)	1, *n* (%)	2, *n* (%)	3, *n* (%)	4, *n* (%)	Mean/SD
1	Have you had trouble pronouncing any words because of problems with your teeth or mouth	210 (81.1)	20 (7.7)	27 (10.4)	1 (0.4)	1 (0.4)	0.3 ± 0.7
2	Have you felt that your sense of taste has worsened because of problems with your teeth or mouth	189 (73.0)	28 (10.8)	25.1 (9.7)	15.0 (5.8)	2 (0.8)	0.5 ± 0.9
3	Have you had painful aching in your mouth	66 (25.5)	15 (5.8)	117 (45.2)	54 (20.8)	7 (2.7)	1.7 ± 1.1
4	Have you found it uncomfortable to eat any foods because of problems with your teeth or mouth	136 (52.5)	28 (10.8)	57 (22.0)	33 (12.7)	5 (1.9)	1.0 ± 1.2
5	Have you been self-conscious because of your teeth or mouth	212 (81.9)	26 (10.0)	14 (5.4)	5 (1.9)	2 (0.8)	0.3 ± 0.7
6	Have you felt tense because of problems with your teeth or mouth	184 (71.0)	30 (11.6)	29 (11.2)	14 (5.4)	2 (0.8)	0.5 ± 0.9
7	Has been your diet been unsatisfactory because of problems with your teeth of mouth	175 (67.6)	33 (12.7)	32 (12.4)	16 (6.2)	3 (1.2)	0.6 ± 1.0
8	Have you had to interrupt meals because of problems with your teeth or mouth	179 (69.1)	26 (10.0)	34 (13.1)	16 (6.2)	4 (1.5)	0.6 ± 1.0
9	Have you found it difficult to relax because of problems with your teeth or mouth	199 (76.8)	28 (10.8)	24 (9.3)	7 (2.7)	1 (0.4)	0.4 ± 0.8
10	Have you been a bit embarrassed because of problems with your teeth or mouth	218 (84.2)	22 (8.5)	11 (4.2)	5 (1.9)	3 (1.2)	0.3 ± 0.7
11	Have you been a bit irritable with other people because of problems with your teeth or mouth	218 (84.2)	29 (11.2)	11 (4.2)	1 (0.4)	0	0.2 ± 0.5
12	Have you had difficulty doing your usual jobs because of problems with your teeth or mouth	220 (84.9)	30 (11.6)	8 (3.1)	1 (0.4)	0	0.2 ± 0.5
13	Have you felt that life in general was less satisfying because of problems with your teeth or mouth	229 (88.4)	17 (6.6)	9 (3.5)	4 (1.5)	0	0.2 ± 0.6
14	Have you been totally unable to function because of problems with your teeth or mouth	230 (88.8)	18 (6.9)	9 (3.5)	2 (0.8)	0	0.2 ± 0.5

OHIP, Oral Health Impact Profile.

Table 3. **Self-reported oral health in relation to OHRQoL**

Self-reported oral health status	Status	Prevalence, *n*	Mean (SD) OHIP-14 Scores	*P*-value*
Bleeding gums	Present	96	8.7 (7.0)	<0.01
	Absent	163	5.9 (6.1)	
Burning gums	Present	33	12.0 (8.0)	<0.001
	Absent	226	6.2 (6.0)	
Swollen gums	Present	25	12.8 (8.1)	<0.001
	Absent	234	6.4 (6.1)	
Loose teeth	Present	31	11.5 (9.0)	<0.001
	Absent	228	6.4 (5.9)	
Decayed teeth	Present	150	8.5 (6.9)	<0.001
	Absent	109	4.8 (5.5)	
Tooth pain	Present	67	9.9 (7.6)	<0.001
	Absent	192	6.0 (5.9)	
Food lodgement	Present	102	10.1 (7.3)	<0.001
	Absent	157	4.9 (5.1)	
Sensitive teeth	Present	41	11.2 (8.4)	<0.001
	Absent	218	6.2 (5.9)	

OHRQoL, oral health-related quality of life; OHIP, Oral Health Impact Profile.
*Mann–Whitney test.
$P \leq 0.05$ – significant.

Among the pregnant women, a variation in gingival health was observed between those having their first and second pregnancy where the mean number sextants with the CPITN score of two was significantly higher among those having their second pregnancy. GI scores too showed the same variation (Table 5). Gingivitis was more among those who had had a previous pregnancy.

Discussion

This study was done to describe the OHRQoL and its correlates among expectant mothers belonging to a low-income population in India. The results of this study showed that dental caries, gingival bleeding and food lodgement between teeth, were the most pressing problems reported by a large section of expectant mothers who participated in this study.

Previous studies have suggested that perception of physical and psychological well-being is lower among women in the latter stages of pregnancy and the puerperium when compared with the prepregnancy period (7, 8, 10). This study sought to find out whether oral health, subjective and objective, too had a role to play in affecting this perception. The results of this study showed that OHRQoL as reflected by the OHIP-14 scores was uniformly and significantly poorer among those who reported oral problems than those who did not.

Increased age, multi-parity, dental caries and periodontal ill health were associated with a poorer OHRQoL for the

Table 4. **Correlation* between the variables and OHRQoL**

	Functional limitation score	Physical pain score	Psychological discomfort score	Physical disability score	Psychological disability score	Social handicap score	Handicap score	Total OHIP-14 score
Age	0.06	0.07	0.14	0.15	0.04	0.12	0.05	0.14
P-value	0.37	0.24	<0.05	<0.05	0.52	<0.05	0.39	<0.05
Number of pregnancies (*r*-value)	0.19	0.12	0.19	0.18	0.08	0.07	0.11	0.21
P-value	<0.01	<0.05	<0.01	<0.01	0.19	0.25	0.07	<0.01
Gingival index scores (*r*-value)	0.19	0.27	0.20	0.26	0.18	0.13	0.18	0.31
P-value	<0.01	<0.001	<0.01	<0.001	<0.01	<0.05	<0.01	<0.001
CPITN scores (*r*-value)	0.12	0.19	0.09	0.17	0.05	0.04	0.003	0.19
P-value	0.05	<0.01	0.15	<0.01	0.45	0.53	0.96	<0.01

OHRQoL, oral health-related quality of life; OHIP, Oral Health Impact Profile.
*Spearman's correlation analysis.
$P \leq 0.05$ – significant.

Table 5. **Periodontal health among pregnant women in relation to history of previous pregnancies**

	1st pregnancy, *N* = 124	2nd pregnancy, *N* = 90	3rd pregnancy, *N* = 33	4th pregnancy, *N* = 12	*P*-value*
CPITN-0 (mean no. of sextants)	0.7 (1.0)	0.6 (1.2)	0.2 (0.4)	0.5 (0.5)	0.56, NS
CPITN-1 (mean no. of sextants)	2.0 (1.8)	1.7 (1.5)	2.1 (2.3)	0.5 (0.7)	0.55, NS
CPITN-2 (mean no. of sextants)	2.5 (0.5)	3.0 (1.1)	2.0 (1.9)	4.0 (0.0)	0.05, 1 < 2
CPITN-3 (mean no. of sextants)	0.7 (1.3)	0.6 (1.2)	1.3 (1.8)	0.0 (0.0)	0.40, NS
CPITN-4 (mean no. of sextants)	0.1 (0.2)	0.01 (0.1)	0.0	0.0	0.55, NS
GI score (mean)	1.1 (0.9)	1.5 (0.9)	1.4 (0.9)	2.5 (0.1)	<0.05, 1 < 2

CPITN, community periodontal index of treatment needs; GI, gingival index.
*ANOVA followed by Tukey's *Post hoc* analysis.

expectant mothers. These kind of associations were in agreement with previous studies of Atchison and Dolan (24) and Locker and Slade (25) who reported significant but weak correlation scores between clinical indices (e.g. caries, periodontal pockets) and summary scores derived from Geriatic Oral Health Assessment Index (GOHAI) and OHIP respectively.

Conclusion

Pregnancy is a unique time in a woman's life and is a particularly important time to access oral health care because the consequences of poor oral health can have a lifelong impact (26–28). It is also a time when women are more receptive to changing behaviours that have been associated with an increased risk of poor pregnancy outcomes. It is possible that appropriate management of routine and dental emergencies can be denied by the practitioner because of misconceptions about pregnancy and foetal tolerance. Substantial numbers of women were found to have anxiety regarding dental treatment and many had postponed their dental treatment for the sake of pregnancy in this study. The role of health professionals in creating this misconception cannot be overestimated. To conclude, it can be stated that there is a need for the healthcare profession to acknowledge the importance of good oral health in ensuring a safe and successful pregnancy and overcome misconceptions regarding rendering of essential dental care during this vital period in a woman's life.

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