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Knowledge of periodontal diseases, oral hygiene practices, and self-reported periodontal problems among patients visiting a tertiary dental care centre in Trivandrum, Kerala

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ABSTRACT

Background: The prevalence of periodontal diseases is increasing globally. This can be attributed to the deficits in the health care system, especially in educating the public about periodontal diseases, and oral hygiene practices. This issue is more severe among people living in remote and rural areas where accessibility to dental health care education is difficult. This study aims to assess the oral hygiene practices, knowledge of periodontal diseases, and self-reported periodontal problems among adults visiting the tertiary dental care centre in Trivandrum, Kerala

Materials and Methods: This cross-sectional study employed a pretested and validated questionnaire to assess the three main constructs of periodontal knowledge, practices, and self-reported periodontal health issues among adults aged more than 18 years. All the patients who visited the outpatient department of periodontology at Government Dental College, who gave informed consent were administered the questionnaire.

Results: Two hundred and twenty-nine study participants responded with a slight female gender predilection. 89.1% reported periodontal health problems. Good knowledge of periodontal diseases and oral hygiene practices was seen among 48.5% and 44.1% of the study respondents. Rural residents were found to be at a higher risk of poor periodontal knowledge and oral hygiene practices, and more self-reported periodontal health issues. The level of education also showed a significant association with periodontal knowledge and practices.

Conclusion: The findings of the study shed light on the need for devising effective educational interventions to improve the periodontal knowledge and practices of adults. Incorporating health promotional interventions into the clinical treatment regime, designing a hospital setting-based intervention with the help of house surgeons and post-graduates, and reinforcement of health education at regular intervals were a few recommendations to enhance the knowledge, practices and the oral health care seeking nature of general population.

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1. Introduction

Poor oral health is a significant global health issue, with 3.5 billion people suffering from different oral health issues such as dental caries, edentulousness, and periodontal

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diseases globally.¹ The prevalence of periodontal diseases among Indian population was found to be 51%, with mild to moderate periodontitis accounting to 26.2%, and severe periodontitis to 19%.² Kerala, the southern state in the country, with a robust health care system also has a periodontal prevalence rate of 42.4%.³ This high prevalence can be attributed to the deficits in the health care system as well as the attitude of the general population towards periodontal diseases.⁴ The prevalence of periodontal diseases varies according to the age and the regions be it urban or rural. Rural areas were found to have a higher prevalence rate compared to urban areas in different Indian states.² The knowledge of periodontal diseases among population varied according to the age, gender, education, and occupation in different regions in India.^{2,3} Further, a relationship between oral hygiene practices and knowledge was also elicited in literature.⁴

Periodontal diseases if left untreated results in several periodontal issues such as gingival recession, mobility, and loss of attachment.⁵ Further, periodontal diseases present with both local and systemic effects.⁵ It is essential to create awareness among the general population on the local and systemic effects caused by periodontal diseases. This is an important core in patient centered assessment of oral health.⁶ This knowledge is essential in identifying periodontal problems and symptoms and devising measures to adequately prevent and treat periodontal issues.⁵

Comparing the self-perceived periodontal problems with the clinical findings act as a tool in devising educational interventions for a population.⁶ Thus, to devise effective interventions, it is essential to know the knowledge, oral hygiene practices, and self-reported periodontal problems among the population.

This study is conducted in a tertiary dental care centre in the state capital where patients coming from different socioeconomic status and varying periodontal conditions seek treatment. Thus, this study that aims to assess the periodontal knowledge, oral hygiene practices, and self-reported periodontal problems is essential to know the outlook of the people towards periodontal health and to understand the focus areas for interventions aiming at reducing the prevalence of periodontal diseases.

2. Materials and Methods

This quantitative analytical cross-sectional study was conducted at a government tertiary dental care center in Thiruvananthapuram, the capital of Kerala. The study population included adults aged more than 18 years visiting the outpatient department of Periodontology in Government Dental College. The sample size was calculated using Cochran's formula with the type 1 error at 5% and population proportion of 50%. Two hundred and twenty-nine people from varying socioeconomic status and grades of gingival and periodontal disease responded to the

questionnaire. The study participants were selected by consecutive sampling methods.

Data collection was done using a pretested and validated questionnaire. The questionnaire was subjected to face and content validation. The face validation was acceptable. Domain representation, domain relevance, and appropriateness of the questionnaire in alignment with the research objective were assessed during content validation.⁷ Content validity index (CVI) was found to be satisfactory. The questionnaire was developed in English and was translated to Malayalam by a group of language experts. Further, back translation to English was also done. The questionnaire comprised of sociodemographic characteristics and 3 domains. The domains include Oral hygiene practices, Self-reported periodontal problems, and Knowledge of periodontal diseases. There were ten items under each domain with relevant options against each item. The total score of each domain was calculated and the median value was estimated. Those values above the 'median' was considered as good practices, good knowledge, and more self-reported problems. The participation in the study was entirely voluntary and informed consent was obtained from the participants. The duration of questionnaire administration was 15-20 minutes. Those who could not read and write were assisted by the primary investigator. The doubts that were incurred while filling the questionnaire were also clarified by the primary investigator.

The ethical clearance was obtained from the institutional ethics committee with the ethical clearance number IEC/E/28/2022/GDCT Dated 13.05.2022. All the ethical principles were followed in the study. Autonomy, informed consent, and confidentiality were assured to the study participants.

Data obtained after data collection was entered into Microsoft Excel and analyzed using SPSS (Statistical Product and Service Solution) trial version 25 developed by IBM, SPSS Inc, New York. The normality of the data was assessed using Shapiro wilk and Kolmogorov-Smirnov test. The quantitative variables were found to be non-normal with a p value less than 0.05. Quantitative variables were expressed in terms of median, and qualitative variables in terms of frequency and proportions. Inferential statistics such as Mann Whitney, Kruskal Wallis, and Chi-square test were done to assess the association between different variables. Further, correlation test was done to determine the relation between age, knowledge, oral hygiene practice, and self-reported periodontal problems score. In all the statistical analysis, p value was set at $p < 0.05$.

3. Results

The overall response rate of the questionnaire was found to be 59.6%. Two hundred and twenty-nine adults responded to the questionnaire. The study had a predisposition to

female gender, accounting to 62.5%. The median age of the study participants was found to be 28 years. Seventy-five (33.8%) study participants completed plus two or pre-degree, and seventy-four (33.5%) completed degree. Only 7(3.2%) study respondents were illiterate. The majority (55.8%) of the study participants were unemployed. Only 26(13.7%) were self-employed, and the remaining were employed in public and private sectors. Those participants who came to the outpatient department of periodontology from rural areas contributed 66.1%, and 33.9% from urban areas.

The median scores for oral hygiene practices, knowledge of periodontal diseases, and self-reported periodontal problems were found to be 17, 14, and 19, respectively.

Table 1: Oral hygiene practices among adult population

Practices	Number (Percentage) N (%)
Brushing teeth everyday	220(96.1)
Twice daily tooth brushing	169(73.8)
Toothbrushing at night before bed	14(6.1)
Use of tooth brush in tooth cleaning	213(93)
Toothpaste as a cleaning agent	213(93)
Changing toothbrush once in 3 months	101(44.1)
3-5 minutes of tooth brushing duration	111(48.5)
Regular tongue cleaning	185(80.7)
Dental floss to remove food between the tooth	21(9.2)
Use of other interdental materials	15(6.6)

Table 2: Self-reported periodontal health problems

Self-reported periodontal health problems	Number (Percentage) N (%)
Bleeding gums	48(21)
Swollen gums	24(10.5)
Reddish gums	13(5.7)
Painful gums	39(17)
Shaky tooth	20(8.7)
Receding gums	9(3.9)
Bad breath	47(20.5)
Progressive spacing between teeth	52(22.7)
Pus discharge	18(7.9)
Food lodgement between teeth	125(54.6)

3.1. Oral hygiene practices

There were ten items under this domain with multiple options for each item. The highest score was given to the most appropriate answer. Table 1 represents the oral hygiene practices seen among adult population that visited the outpatient department of periodontology. Nearly two hundred and twenty participants brushed their teeth every day. But toothbrushing at night before bed was practiced

Table 3: Knowledge of periodontal diseases among the study participants

Number (Percentage) Knowledge of Periodontal Diseases N(%)	
Dental plaque	31(13.5)
Dental Calculus	50(21.8)
Causes of gum disease	
Dental plaque and calculus	49(21.4)
Poor oral hygiene	69(30.1)
Uncontrolled blood sugar	18(7.9)
Inadequate nutrition	39(17)
Hormonal imbalance	32(14)
Symptoms of Gingival disease	
Bleeding gum	93(40.6)
Swollen gums	54(23.6)
Painful gums	38(16.6)
Reddish gums	92(40.2)
Shaky tooth	36(15.7)
Prevention of gingival disease	
Need for routine dental visits.	153(66.8)
Reduce the usage of tobacco.	106(46.3)
Regular toothbrushing	134(58.5)
Balanced diet	93(40.6)
Need for regular professional cleaning	117(51.1)
Gum disease and systemic health	115(50.2)
Dental calculus can be removed	88(38.4)
No loosening of teeth as age advances	183(79.9)
Blood stain on spitting during brushing is not natural	80(34.9)
Professional scaling is essential	117(51.1)

Table 4: Association between area of residence and oral hygiene practices using Chisquare test

Area of Residence	Periodontal practices		Total	Chi square value	Odds Ratio	p value
	Good	Poor				
Rural	56	90	146	8.465	2.15	0.015*
Urban	43	32	75			

*-p<0.05 statistically significant

Table 5: Association between area of residence and knowledge of periodontal diseases using Chi-square test.

Area of Residence	Periodontal Knowledge		Total	Chi-square value	Odds Ratio	p value
	Good	poor				
Rural	64	82	146	10.37	2.03	0.006*
Urban	46	29	75			

*-p<0.05 statistically significant

Table 6: Association between area of residence and self-reported periodontal problems using Chi-square test.

Area of Residence	Self-reported Periodontal Problems		Total	Chi-square value	Odds ratio	p value
	More	Less				
Rural	129	17	146	7.285	1.84	0.026*
Urban	70	5	75			

*- p<0.05 statistically significant

only by 6.1% of the study participants. Ninety-three percent of the study population used toothbrushes and toothpaste for cleaning the teeth.

Among two hundred and twenty-nine study participants, one hundred and one (44.1%) practiced good oral hygiene methods, and one hundred and twenty-eight (55.9%) practiced poor oral hygiene methods.

4. Self-reported Periodontal Problems

The common ten periodontal problems were included in the questionnaire and the study participants were asked to indicate the presence or absence of the periodontal condition. A higher score indicated less self-reported periodontal problems. The most common self-reported periodontal problem was found to be food lodgment between the teeth which was perceived by one hundred and twenty-five (54.6%) study participants. Only nine (3.9%) study participants perceived receding gums as a periodontal health problem. Spacing between the teeth (22.7%), bleeding gums (21%), and bad breath (20.5%) are the other main self-perceived periodontal health problems. Self-reported problems were present in 89.1% of the population. Table 2 represents the self-reported periodontal health problems.

4.1. Knowledge of periodontal diseases

Ten questions under this domain with three options 'Yes', 'No', 'Don't know' were assessed. One hundred and thirty-four (58.5%) study participants were aware of the role of toothbrushing, and one hundred and six (46.3%) believed that reducing the tobacco use aid in the prevention of gingival disease. One hundred and eighty-three (79.9%) study participants firmly believed that tooth loosening is not age dependent. A good knowledge of periodontal diseases was found only among one hundred and eleven participants (48.5%). Table 3 represents the positive responses of the study participants to the knowledge of periodontal diseases.

4.2. Correlation of age with oral hygiene practices, self-reported periodontal problems, and knowledge of periodontal diseases

Correlation was assessed using Pearson correlation tests. The correlation coefficient value ranges from -1 to +1. A value of 0.8-1 is shown to have a strong positive correlation.

The self-reported problems increased with age, but the knowledge and oral hygiene practices were found to decrease with increase in age. A significant association with a p value less than 0.01 was seen between oral hygiene practices and knowledge, showing a positive correlation. A significant mild positive correlation was also found between self-reported periodontal problem and practice score. Increase in self-reported score (less reported periodontal health problems) with increase in oral hygiene practices and knowledge were found. However, a strong positive correlation was not found between any of these variables.

4.3. Association of sociodemographic factors (gender, education, employment, and area of residence) with oral hygiene practices, knowledge, and self-reported periodontal health problems

Association of gender with oral hygiene practices, knowledge of periodontal diseases, and self-reported periodontal health problems did not show any significant association. When the education level with the three main domains were assessed using Kruskal Wallis test, a significant association with a p value of 0.007 was found with oral hygiene practices, and a p value of 0.009 with knowledge of periodontal diseases. The oral hygiene practices and knowledge of periodontal diseases differed considerably among different levels of education. There was no association of level of education with the self-reported periodontal health problems. Employment status did not show any significant association with oral hygiene practices, knowledge of periodontal diseases, and self-reported periodontal health problems.

When the association between area of residence and oral hygiene practices was assessed, it was found that rural residents were 2.15 times at a higher risk of poor oral hygiene practices as compared to the urban residents who visited the tertiary dental care centre (Table 4).

Similarly, knowledge of periodontal diseases also showed an association with the area of residence. The rural respondents were 2.03 times at a higher risk of having poor periodontal knowledge than urban respondents (Table 5). Self-reported periodontal health problems were also found to be higher among rural residents, with an odds ratio of 7.285 (Table 6)

5. Discussion

The study results showed that 89% of the respondents reported periodontal health problems, 48.5% had good knowledge of periodontal diseases, and only 44.1% followed good oral hygiene practices. The decrease in knowledge of periodontal diseases and increase in self-perceived periodontal health issues deserve attention. This confirms the fact that increasing knowledge is essential in reducing periodontal health issues. This also warrants the need for customizing the educational interventions for different target populations. A study that assessed the difference in the pre-post knowledge of periodontal diseases showed that regularly visiting the dentist and doing professional scaling improved the knowledge to a great extent.⁸ This is similar to our study where many respondents emphasized the need for regular professional cleaning, which aids in prevention of gingival disease.

The most frequent self-perceived periodontal trouble was found to be bleeding gums and sensitive teeth in a study done by Martensson et al in Sweden. However, considering oral health literacy, 'sensitivity' was not asked in the self-reported periodontal health problems in this study. Bleeding gums was reported as a perceived periodontal health problem by nearly fifty percent of the study participants. Though 89% of our study respondents perceived periodontal health problems, the low level of knowledge of periodontal diseases might have influenced their oral health care seeking behavior.⁹ This high proportion of perceived periodontal health problems may be due to the hospital-based study setting as all who visit the dental tertiary care centre may have one or the other oral health issue. A study in Nigeria showed that those having very high dental anxiety perceived more periodontal health problems.¹⁰ However, we have not explored the psychological status of participants in the study. In another study, low level of awareness was associated with less perceived periodontal health issues.⁹ Thus, unaddressed periodontal health care needs rise, increasing the burden of oral diseases, which is a grave public health issue.¹¹ Thus, more focus should be given to seeking periodontal treatment at the earliest stage.⁹

Further, the poor oral hygiene practices associated with self-reported periodontal problems should be dealt with seriously. In a study done among women in Zambia, it was found that more than 95% of them used toothbrush and tooth paste for cleaning the tooth, which is true to our findings also.¹²

Rural residents need to be made more aware of the periodontal health related knowledge and practices. A study where rural and urban areas were taken for 1:2 ratio also showed greater periodontal health issues in rural population.¹³ The authors attribute this to the resource constraints and lack of awareness campaigns in those areas as compared to urban counterparts.¹³ A study in rural Tanzania showed that those who used mobile phone for

getting information on oral health, and more than seven years of formal school education showed more knowledge and adhered to good oral hygiene practices.¹⁴ Thus, this study seeks the attention of stake holders in utilizing mobile phone and other social media platforms in improving the periodontal knowledge and practices of people in rural and remote areas where routine dental health screening or regular educational interventions are not feasible. However, constraints regarding internet connection pose a threat to the villages in rural Kerala for oral health education utilizing digital and tele health.

The level of education and employment status play a key role in periodontal knowledge and oral hygiene practices. As majority of our respondents are female and unemployed, this study could not establish the association between employment and periodontal knowledge and practices. A study in Iran showed that those with degree and above as educational qualification presented with an increase in periodontal knowledge and practices.¹⁵ A study in Tehran also supported this finding and said that it is the positive attitude of educated people that plays a role in periodontal knowledge and practices.¹⁶ Our findings also showed an association of education level with knowledge and practices.

6. Limitations

The overall response rate of 59.6% shows the attitude of the respondents towards periodontal health and research. Response rate for e-surveys vary from 25-30%, and direct questionnaire studies can procure a response rate up to 70%.¹⁷ Multi-mode approach was found to yield the highest response rate of 72%.¹⁷ However multi-mode approach was not feasible in this study setting as the majority of the study participants do not even remember their phone number or email id. Though there was adequate waiting time in the outpatient department, many of them were not willing to administer the questionnaire. This may be either due to social desirability bias, other priorities, or considered this as a complete waste of time. This reflects the ignorance towards the 'research' component and its relevance among the general population.

We have omitted a few common self-reported periodontal health issues like sensitivity. Further, there was no correlation of oral hygiene practices with clinical findings. Thus, the true periodontal health status or the need for periodontal treatment cannot be inferred. The inclusion of more females in the study failed to bring about the true gender differences. More females in the study can also be seen as a positive step where females are more conscious and is ready to seek dental treatment than males. The increase in the number of females following good oral hygiene practices and seeking oral health care is evident in several studies.^{8,12,14,16,18} The questionnaire seems to be a bit lengthy, which may be one of the reasons for many incomplete questionnaires.

7. Conclusion and Future Recommendations

The study findings highlight the need to improve periodontal knowledge and oral hygiene practices especially among rural residents visiting the tertiary dental care centre. Though the study participants perceived periodontal health issues, they were not aware of the causes or the prevention modalities. Hence, there is a need to plan appropriately different methods of educational interventions. A setting-based health promotion program comprising of oral health education, displaying pictures on the causes of gingival and periodontal diseases, and complications can be beneficial. The house surgeons and post-graduates can be trained in this regard. From the study findings, it is evident that the study participants are aware of basic oral hygiene method of using toothbrush and paste for teeth cleaning. Hence, educational interventions need to be focused on inter dental aids, brushing techniques, plaque, and calculus.

Further studies need to be conducted to correlate the knowledge and practices with clinical findings. The oral health seeking behavior needs to be thoroughly addressed by conducting an in-depth interview among the individuals with oral health issues. More qualitative studies in this regard will help in knowing the reasons for not following good oral hygiene practices.

8. Source of Funding

None.

9. Conflicts of Interest

None.


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
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