Oral health literacy: A practical strategy towards better oral health status among adult population of Ghaziabad district

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Abstract

Background and Aims: Despite tremendous considerable effort by health professionals to promote oral health to create beautiful smiles, gap between oral health knowledge and practice undoubtedly still remains. Thus the aim of this study was to assess the Oral health literacy level and its impact on socioeconomic and oral health status among adult population in Ghaziabad district. **Methods:** A total of 600 study subjects aged 18-64 years from all 4 blocks of Ghaziabad visiting various outreach programmes using a multistage random sampling technique were included in the study. A specially designed questionnaire assessed the demographic variables. Oral health literacy level (OHL) was assessed with help of a bilingually adapted Hindi OHL tool. Clinical examination was recorded using WHO (World Health Organization) Oral Health Assessment Form 2013. **Results:** The mean age of the study subjects was 43.9 ± 14.36 years. Majority 300 (50%) study subjects had inadequate oral health literacy level followed by Marginal oral health literacy level which was seen among 180 (30%) subjects and 120 (20%) subjects had adequate oral health literacy level. Oral health literacy level was slightly higher among females as compared to male subjects although the results were not statistically significant. A statistically significant difference was found between oral health literacy and oral health status as well as socioeconomic status. (P value ≤ 0.05). **Conclusion:** A significant association between OHL and oral health status was found stating Oral health literacy as an efficient role in influencing oral health outcome of any individual.

Keywords: Adult, dental caries, gingival bleeding, literacy, oral health

Introduction

India has a literacy rate which has improved a lot over the last one decade. As per the data published by 2011 census, India has managed to achieve an effective literacy rate of 74.04% in 2011, as compared to 64.8% in the 2001 census.[1] Literacy rate in Uttar Pradesh has seen an upward trend of 67.8% as per 2011 census. Meanwhile, now there is a shift in focus to functional literacy, which is simply the ability to read basic text and write a simple statement on everyday life.[2] It provides the individual with a better control over life-socially and economically. This holds true with respect to general health and oral health as well. Oral health literacy is a medium to extend a hand of extensive primary care to any individual which is considered to be the "foundation of an effective health care system" and to achieve better oral health outcome and improved equity in access and controlled expenditures.

The *Global Burden of Disease Study 2016* estimated that in most low income and middle income countries, with an increase in

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the urbanization and changes in living conditions, prevalence of oral diseases continues to increase notably due to inadequate exposure to primary oral health care services and poor access to basic oral health knowledge.[3]

Despite tremendous considerable efforts by the health professionals to promote oral health among the masses, the gap between oral health knowledge and practices undoubtedly still remains.[4] Thus Oral health literacy (OHL) is argued as an important and foremost determinant towards oral health status. Oral health literacy is defined as "the degree to which individuals have the capacity to obtain, process, and understand basic oral health information and services needed to make appropriate health decisions."[5,6] In concert with underutilized primary dental care, the degree to which OHL may causally influence in-appropriate acute dental care decisions over time should be definitely explored further.[7]

Most of the people in India have a perception that dentistry is an expensive means which keeps them away from registered professionals on one hand, while on the other hand turning them into hostages to services of nonregistered lay practitioners sitting on the streets. The main reason behind this is the low level of awareness regarding oral health and hygiene. Although much is known about health literacy in the medical context, knowledge about oral health literacy (OHL) is little.

A thorough knowledge of oral health and hygiene practices should be acquired by each and every individual for better upliftment of his/her own oral health. Oral health literacy might be a cornerstone of improving utilization of oral health care by the underserved populations.[8] The major risk factor is an unhealthy lifestyles and limited availability and accessibility of oral health services. Poor communication is perceived as one of the reasons for this lack of success. It is a well-known fact that an individual's literacy significantly affects the dentist- patient communication.[2] Therefore, individuals with a low literacy skill are associated with a lower understanding of the importance of prevention and maintenance consequently leading to an inferior health.[9]

Therefore, the patient's level of education was used as an indicator of clear, effective and accurate communication as well as knowledge skills. Although education is highly correlated with reading level, educational level alone cannot predict functional health literacy so we used a well versed oral health literacy (OHL) instrument given by Sistani[10] *et al.* for adults including new measures of literacy skills (OHL Adults questionnaire) a dental word recognition instrument consisting 17 items in four sections arranged in increasing order of difficulty.

Longer format OHL tools like Rapid Estimate of Adult Literacy in Dentistry REALD 30[11] REALD – 99 items,[12] Rapid Estimate of Adult Literacy in Medicine and Dentistry,[13] Test of Functional Health Literacy in Dentistry (TOFHLiD),[14] the OHL Instrument (OHLI),[15] and the Comprehensive Measure of Oral Health Knowledge (CMOHK)[11] were used previously among the adult population but these tools did not incorporated any new measures like decision making and listening section in their assessment. Therefore this study used a shorter format OHL tool thus making it easy for the participants to fill the questionnaire. Moreover, there is no definite picture regarding oral health literacy level among the general masses of Ghaziabad district. Keeping this in mind, a study was attempted to assess the oral health literacy level with the help of a pre-validated literacy tool and to know its impact on the oral health status of an individual.

Methods

A cross-sectional study was conducted to assess oral health literacy level and its impact on oral health status among adult population of Ghaziabad district, India. The present study was conducted among study subjects having access to preventive, diagnostic, and curative services in the outreach program. Most of them were then referred to the dental hospitals for further care. Therefore, these outreach programs were chosen to collect the baseline data regarding the oral health status of adult subjects of Ghaziabad district. A total of 600 samples from all the 4 blocks of Ghaziabad district were included in the study [Figure 1].

The sample size for the present study was calculated based on the data obtained from the pilot study. For the present study, the sample size was determined at 95% confidence interval. Prevalence of dental caries was found to be 85%, and adequate literacy rate of 17% was observed based on the pilot study.

600 study subjects were proportionately selected from each block using a multistage random sampling [Figure 1].

Inclusion criteria

All the subjects who were healthy and ambulant aged 18 years and above. Literate subjects[16] having atleast 20 teeth were included in the study.

Exclusion criteria

Medically compromised patients and subjects who were not willing to participate were excluded from the study.

The study protocol was approved by the Institutional Ethical Committee and Review Board, Ghaziabad to conduct the study in various outreach activities conducted by the institute in all the 4 blocks of Ghaziabad. A written informed consent was sought from the study subjects after explanation of the nature of the study.

The demographic details of the patients were recorded using a basic performa among the adult population. An assessment of per capita income classified according to modified B.G. Prasad Scale (2019)[17] for the socioeconomic status was used.
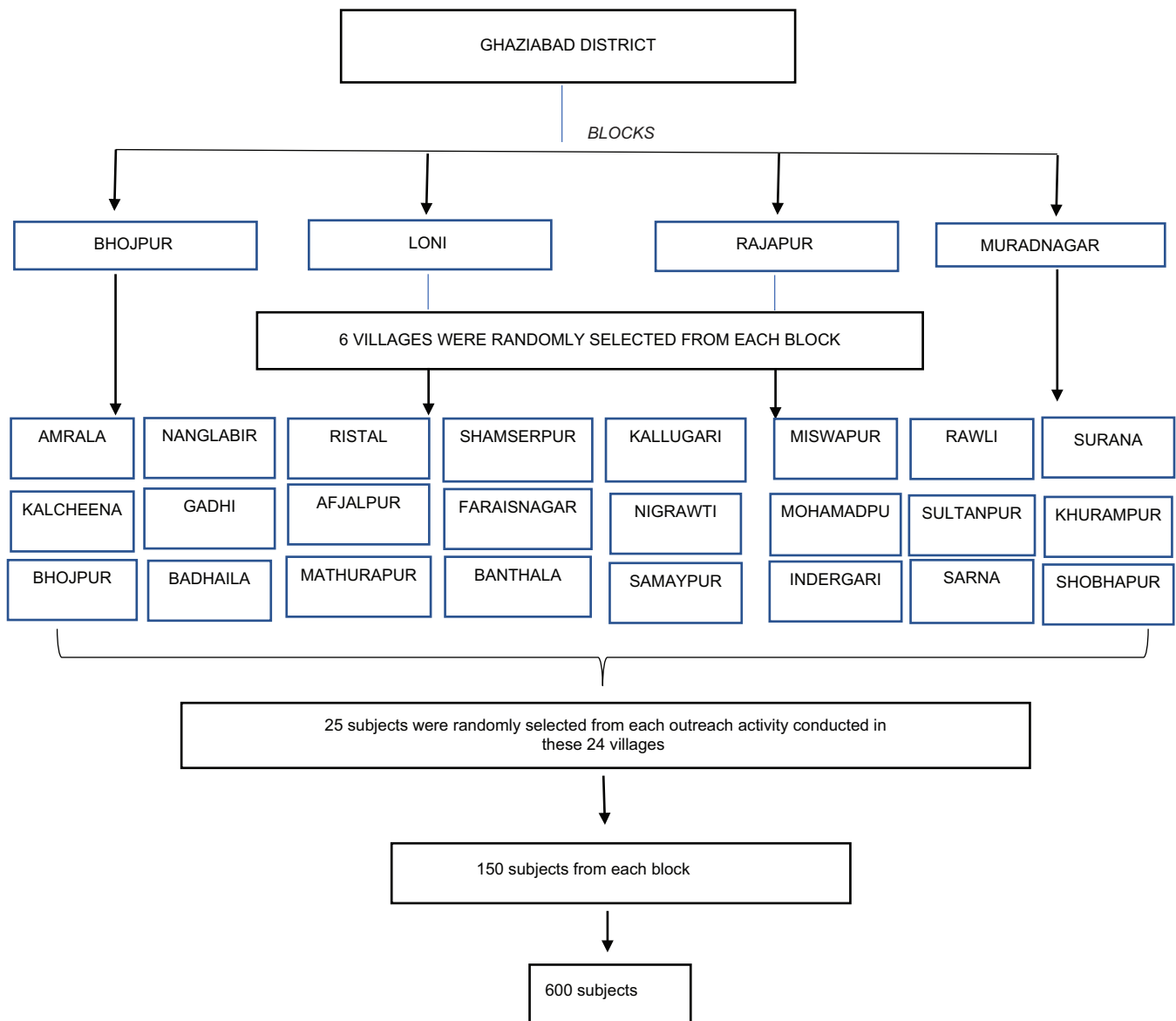
Figure 1: Sampling Frame

A functional linguistically adapted prevalidated 17 item Oral Health Literacy Adult Questionnaire (OHL-AQ) developed by Sistani[10] divided into 4 segments, namely reading comprehension, numeracy, listening and decision making were distributed among the respondents to check their oral health literacy levels. The questionnaire was further selected in the local language Hindi for easy understanding of the participants. Correct answers were scored 1 and incorrect answers or questions that were unanswered scored 0. The sum of correct answers was then calculated to provide the total score for the questionnaire ranging from 1 to 17. OHL scores were then categorised into 3 categories namely inadequate (0-9), marginal (10-11), and adequate (12-17).

Clinical examination

The oral health status of study subjects were assessed using the basic WHO Oral Health Assessment Form (2013).[18]

A training session was organised in the Department of Public Health Dentistry for standardization and calibration of the data collection method. The training sessions consisted of a revaluation of outlined criteria followed by an examination of adult subjects based on stimulation of field technique for reliability. Intraexaminer reliability was assessed through Cohen's kappa which was 0.88.

Statistical analysis

Data was analysed using the SPSS v16.0 software package. Descriptive statistics were addressed such as mean, percentage and standard deviation. Association was evaluated using Chi square. Any p value less than 0.05 was considered significant. Spearman correlation rank test was also assessed to correlate dmft scores with oral health literacy scores.

Results

Demographic Characteristics

Table 1 depicts the sociodemographic characteristics of the study participants. The present study was conducted among 18 to 64 years adult population with a mean age of 43.9 ± 14.36 years. 74% males and 26% female study subjects participated in the study. Among 600 study subjects, 28% were residents from urban areas, 22% belonged to semi urban areas and 50% were from rural areas.

Oral health literacy

Majority 300 (50%) study subjects had an inadequate oral health literacy level followed by Marginal oral health literacy level which was seen in 180 (30%) subjects and 120 (20%) subjects had an adequate oral health literacy level. Oral health literacy level was slightly higher among female subjects as compared to the male subjects but the results were not statistically significant.

Extraoral Examination and Temporomandibular Joint Assessment

The study subjects examined had normal extraoral appearance, and none of them had any symptoms of temporomandibular joint (TMJ) disorders.

Oral Mucosa Examination

On intra oral examination of the oral mucosa, 529 (88.16%) of the adults had a healthy mucosa, 18 (3.0%) had tobacco pouch keratosis, 8 (1.3%) had oral submucous fibrosis and ulceration, 04 (0.6%) had leukoplakia and 02 (0.3%) had lichen planus.

Periodontal Conditions

The present study showed gingival bleeding and periodontal pocket formation in 312 (52%) and 300 (50%) of the study subjects respectively [Table 2]. Among 312 subjects with gingival bleeding, majority 65.4% had an inadequate oral health literacy level whereas among 288 subjects with absence of any such condition 29.2% had an adequate oral health literacy level which is statistically significant. Among 300 subjects with periodontal pocket formation, majority 60% had an inadequate oral health literacy level whereas among 300 subjects with absence of any such condition 36% had an adequate oral health literacy level which is statistically significant (*P* value ≤ 0.05) [Table 3].

Periodontal Loss of Attachment

The present study showed that 126 (21%) study subjects had periodontal pocket formation. Among 474 subjects with absence of any such condition 22.66% subjects had an inadequate oral health literacy level whereas 85.83% subjects had an adequate oral health literacy level which is statistically significant. (*P* value ≤0.05) [Tables 2 and 3].

Table 1: Distribution of study subjects according to sociodemographic characteristics

Variables	Number (*n*)	Percentage
Age group (in years)		
18-27 years	96	16
28-37 years	132	22
38-47 years	168	28
48-57 years	96	16
Above 58 years	108	18
Gender		
Males	444	74
Females	156	26
Geographic Location		
Urban	168	28
Semiurban	132	22
Rural	300	50
Socioeconomic status		
Lower	29	4.84
Upper Lower	201	33.5
Lower middle	209	34.83
Upper middle	140	23.33
Upper	21	3.5
Literacy scores		
Inadequate	300	50
Marginal	180	30
Adequate	120	20

Table 2: Distribution of oral health status among adult population in various blocks of Ghaziabad

Oral mucosal lesions	Number	Percentage
Tobacco pouch keratosis	18	3.00
Leukoplakia	04	0.67
Lichen planus	02	0.34
Ulceration	08	1.33
Osmf	08	1.33
Candidiasis	10	1.67
Enamel fluorosis		
Present	96	16.00
Absent	504	84.00
Dental erosion		
Present	32	5.3
Absent	568	94.6
Traumatic injuries		
Present	6	1
Absent	594	99
Partial Denture wearer		
Present	23	3.83
Absent	577	96.16
Dental Caries		
Present	510	85
Absent	90	15
Gingival Bleeding		
Present	312	52
Absent	288	48
Periodontal Pocket		
Present	300	50
Absent	300	50
Loss of attachment		
Present	126	21
Absent	474	79

Dentition Status

The prevalence of dental caries among the study subjects was found to be 85%.

Table 3 depicts that the mean dmft score (6.28) were significantly higher among study subjects with inadequate oral health literacy level followed by marginal and adequate oral health literacy level which was statistically significant. (*P* value ≤ 0.05).

The *post hoc* analysis further suggested that there is a significant mean difference of dmft score between inadequate and marginal as well as inadequate and adequate oral health literacy level whereas there is no significant mean difference of dmft score between marginal and adequate oral health literacy level.

Prosthetic Status and Prosthetic Needs

Among 600 study subjects, 23 (3.83%) reported were partial denture wearers and 577 (96.16%) did not have any such condition. Completely edentulous participants or complete denture wearers were excluded from the study.

Distribution of traumatic injuries among study subjects

The study participants examined had no history of traumatic injuries, only 6 (1%) reported with traumatic injuries and rest 594 (99%) did not have any such condition.

Distribution of enamel fluorosis among study subjects

Among 600 study subjects, 76 (3.83%) had fluorosis and 524 (87.33%) reported absence of any such condition.

Distribution of dental erosion among study subjects

Only 32 (5.33%) subjects reported of dental erosion and 568 (94.6%) did not have any such condition.

Need for Immediate Care and Referral

There was a need for immediate care and referral for 8 (1.3%) of the subjects who presented with oral submucous fibrosis and 20 (3.34%) who presented with either dental pain or abscess.

Comparison of Oral Health Literacy and Socioeconomic status

Table 2 states that among 31 poor socioeconomic class subjects, 64.5% and among 190 lower middle class subjects, 82.11% subjects had inadequate oral health literacy level. Among 217 upper middle class subjects, 47.93% subjects had an inadequate oral health literacy level. Out of 165 high class subjects, 66.06% and among 77 upper high class subjects, 58.04% had an adequate literacy level. A statistically significant difference was observed between oral health literacy scores and socioeconomic status. (*P* value ≥ 0.05) [Table 4].

Correlation of dmft (Decayed Missing Filled Teeth) index and oral health literacy scores

A highly significant negative correlation (-0.639**) was found between the dmft scores and oral health literacy scores of the study subjects where ** signifies that correlation is significant at 0.01 level.

Discussion

Lack of awareness and knowledge about oral health among the masses has made them victims to layman practitioners. Therefore, a proper assessment of an individual's oral health literacy is important to provide a level of primary care and also to get a better picture in order to eradicate this problem from the grassroot level.

In the present study, 600 literate adult individuals with a mean age of 43.94 ± 14.36 were included in the study. They represented a considerable fraction of the both men and women of Ghaziabad district as a major portion of the individuals visited these health camps.

Majority of the study subjects that is 50% study subjects were from the rural areas which is lower compared to a study done in Bangladesh (85%).[19] This difference might be due to the fact that in Bangladesh, major portion of the people from rural areas had a low income level and less access to the dental health care services. So probably a dental check-up free of cost in their locality increased their active participation in such outreach activities.

Table 3: Oral health literacy vs oral health status among adult population in Ghaziabad

Variables	Inadequate n (%)	Marginal n (%)	Adequate n (%)	P
Gingival Bleeding				0.001
Absent (288)	96 (33.3%)	108 (37.5%)	84 (29.2%)	
Present (312)	204 (65.4%)	72 (23.1%)	36 (11.5%)	
Loss of attachment				0.001
Absent (474)	232 (77.33%)	139 (77.22%)	103 (85.83%)	
Present (126)	68 (22.66%)	41 (22.77%)	17 (14.16%)	
Periodontal pocket				0.001
Absent (300)	120 (40%)	72 (24%)	108 (36%)	
Present (300)	180 (60%)	108 (36%)	12 (4%)	
Mean DMFT scores				0.001
	6.28±2.68	2.00±1.04	1.05±0.93	

Table 4: Oral health literacy vs socioeconomic status among adult population in Ghaziabad

Variable	Inadequate n (%)	Marginal n (%)	Adequate n (%)	P
Socioeconomic status				
Poor	20 (64.5%)	9 (29%)	2 (6.45%)	0.001
Lower middle	131 (68.95%)	23 (12.11%)	11 (5.78%)	
Upper middle	99 (45.6%)	70 (32.26%)	33 (15.21%)	
High	12 (18.46%)	44 (26.67%)	89 (53.94%)	
Upper High	8 (10.38%)	14 (18.18%)	35 (45.45%)	

In the present study, findings indicated that half of the study population (50%) had inadequate oral health literacy level which is comparable to a study done by D'Cruz and Shankar Aradhya, which reported that about 60.4% of the adult patients seeking oral health care in a private dental hospital in India had a low literacy level.[20] The present findings are in contrast to the studies done among the adult population in Iran[10] (39.2%) and another study done by John *et al.* which suggested that almost one third of the subjects had a low oral health literacy (OHL) according to Rapid Estimate Of Adult Literacy in Dentistry (REALD -30 score <22).[21] Low levels of oral health literacy might be due to lack of oral health resources and complicated oral health instructions. Also, it might be due to use of jargons among dentist and inability to assess the literacy need of the patients.

The adequate oral health literacy level among female subjects was slightly higher (30.8%) as compared to that of males (16.2%) but there was no such significant difference between the two groups (*P* value 0.159) which is comparable to the studies done in Tamil Nadu,[22] Virajpet[23] India. This is in contrast to studies done in Pakistan,[24] Mangalore[25] and USA,[26] which had a significant difference between the male and female oral health literacy level. The probable reason for this might be that the female subjects were more aware of their oral health compared to that of males.

Socioeconomic status is one of the most powerful risk factor for oral health literacy and poor oral health outcomes. Majority of the study subjects in the present study who had inadequate oral health literacy levels were from the lower socioeconomic class (64.5%) and upper lower class (82.11%) which was recorded by assessing the education, occupation and income scale of the individuals. This is comparable to study done in Brazil[27] where study subjects from the lower class had a lower oral health literacy level.

The subjects with inadequate oral health literacy level had a high mean decayed, missing, filled (DMFT) score of 6.28 ± 2.68, which can even lead to tooth loss as the essential markers of tooth loss are dental caries and periodontal disease.[28] A strong negative correlation was found between the OHL and the DMFT scores which is comparable to the studies done in Virajpet[23] and US.[26] This could be due to the reason that individuals with low OHL level are more prone to delayed diagnosis of any dental condition and as a result their conditions get worsen.

Periodontal disease is a chronic disease which requires a proper patient understanding and compliance in order to maintain a successful long term maintenance and periodontal stability.[29] Majority of the individuals with inadequate oral health literacy showed a higher level of gingival bleeding (65.4%), pocket formation (60%) and loss of attachment (52%). This might be due to lack of oral health awareness and a low socio economic status among the study subjects. A study from US[30] showed a significant association between oral health literacy and periodontal status utilizing the REALD-30 assessment. Another study in USA,[26] Japan[31] showed that subjects with limited OHL had higher prevalence of severe periodontitis.

In our study, no study subjects with any extra-oral changes were found. Only 5.3% subjects reported with dental erosion and 3.83% wore partial denture. Only 1% (6 subjects) showed history of past traumatic injuries.

The prevalence of oral mucosal lesions was comparatively minimal in the study. The prevalence of tobacco pouch keratosis was 3%, periapical abscesses (3.34%) was observed in some patients. Leukoplakia was seen in 0.67% and OSMF in 1.33%.

The prevalence of fluorosis was significantly higher (16%) among the study subjects of Ghaziabad. This could be due to presence of fluoride above the maximum permissible limit of 1.5 ppm in the underground water according to a report of Bureau of Indian Standards 2012 of Ghaziabad district.

Thus the study discusses a strong association between the oral health literacy and oral health status as well as socioeconomic status of an individual. In addition to health determinants, OHL can be an intermediate factor that impacts on oral health outcomes, oral health behaviours and use of dental services.

Conclusion

Oral health literacy and its impact on oral health status is just a mere beginning to be explored. There is an utmost need of further research in this regard to understand the efficiency of various oral health literacy tool and its implications in various clinical settings as well on an individual's cultural and linguistic belief.

In the light of the results, oral health literacy was concluded as an essential factor influencing the oral health outcomes of any individual.

Recommendations

- Communication is one of the most important asset helpful for improving oral health literacy. The information given to the patients should be simple and precise as too much of information leads to confusion and chaos in their minds.
- Use of dental jargons and complicated technical terms should be avoided as much as possible for easy understanding of the patients.
- A shame free environment should be maintained. Patients should be offered assistance and staff should never try to single out patients they believe have low health literacy skills.
- Workshops on oral health awareness should be conducted and individuals should be motivated for periodic dental check-ups at their nearest dental centres because prevention is always better than cure which will ultimately save money in their pockets and worsening dental conditions.

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Conflicts of interest

There are no conflicts of interest.

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