

Is Oral Health Literacy a Predictor of Periodontal Health Knowledge, Subjectively Rated Periodontal Status, Oral Self-Care Behaviour and Dental Attendance?

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ABSTRACT

Objective: To examine the association between oral health literacy, periodontal health knowledge, subjectively rated periodontal health status, oral self-care behaviour and dental attendance.

Methods: This cross-sectional study was conducted among patients attending University of Benin Teaching Hospital Benin City. Data were collected through interviewer-administered questionnaires. Indices used were Rapid Estimate of Adult Literacy in Dentistry-30 (REALD-30), index of periodontal health knowledge (PHK), index of subjectively rated periodontal status (SPS) and index for oral hygiene behaviour (OHB). Data were subjected to Chi square and binary regression statistics using the IBM SPSS version 21.0.

Results: A total number of 26 (12.5%) participants had poor subjectively rated periodontal health status, 55 (26.4%) had low periodontal health knowledge, 82 (39.4%) had poor oral self-care behaviour and 99 (47.6%) had never attended dental clinic. More of the participants with low oral health literacy had poor periodontal health status ($p = 0.026$; OR = 2.785, 95% CI = 1.129 – 6.873), low periodontal health knowledge ($p = 0.021$; OR = 2.192, 95% CI = 1.128 – 4.260), poor oral self-care behaviour ($p < 0.01$; OR = 4.935, 95% CI = 2.592 – 9.394) and never visited the dentist ($p = 0.590$; OR = 1.174, 95% CI = 0.654 – 2.108) when compared to those with high oral health literacy.

Conclusion: The present study revealed that oral health literacy was a positive significant predictor of oral self-care behaviour, periodontal health knowledge and status among the participants. Oral health promotion strategies directed at improving oral health literacy in adult populations will boost periodontal health knowledge, subjectively rated periodontal health status and oral self-care.

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INTRODUCTION

Transfer of sound practical or theoretical understanding of health issues and enhancement of the ability to utilize the gained knowledge in making appropriate health decisions, is one of the major goals of health promotion. These health knowledge transfers that occurs in community and clinical health care settings, are expected to

translate into positive behavioural actions. These positive behavioural actions which include optimal

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self-care, preventive activities and preventive hospital visit are closely related to positive health outcome and are considered important determinants of health (Bunk-Werkhoven et al., 2011). However, these knowledge transfers are hampered by illiteracy, ignorance, myths, misconceptions and erroneous beliefs.

Literacy plays a strategic role in making doctor-patient encounter eventful in preventive, interventional and rehabilitative health care settings (NIDCR, 2005). Literacy modeled in form of Information, Education and Communication (IEC) play active roles in achieving, protecting and sustaining health and is rightfully recognized as an integral part of policy making procedure. This is against the back drop that the process of learning empowers people to make decisions, modify behaviours and change social conditions that are embodied in IEC. The way to help people to live healthy lives is by increasing their knowledge and awareness, enabling them to take action to improve their health, and ensuring that their circumstances allow them to make healthy choices. It is therefore clear to state that health literacy promotes clear health communication, health care equity, safety, and quality.

Oral health literacy cited as a mediator among oral health determinants, such as income, education, oral health behaviour and health outcomes, is an important emerging area of public dental health research (Berkman et al., 2011). Although, low literacy is associated with several adverse health outcomes, Dewalt et al. (2004) recommended future research that will clearly define relationship between literacy and health outcome which will serve as a guide developer for new interventions. However, there exists a paucity of data on the association of oral health literacy with periodontal health knowledge, subjectively rated periodontal status, oral self-care behaviours and dental attendance. Hence the objective of this study was to examine the association of oral health literacy with periodontal health knowledge, subjectively rated periodontal status, oral self-care behaviours and dental attendance among dental patients. We hypothesized that oral health literacy is a marker of periodontal health knowledge, subjectively rated periodontal status, oral self-care behaviours and dental attendance.

MATERIAL AND METHODS

This cross-sectional study of patients attending the outpatient dental clinic of University of Benin Teaching Hospital, Benin City in Nigeria was part of larger oral health literacy survey. Systematic sampling technique was used to recruit 208

participants which exceeded the 137 minimum sample size calculated using Cochran's formula for epidemiological studies (Cochran, 1963). $n = z^2 p (1-P) / d^2$ Where n = sample size, z = statistics for a level of confidence (set at 1.96 corresponding to 95.0% confidence level), p = prevalence = 89.7%, being the prevalence literacy of adults in English Language in Edo State, Nigeria (National Bureau of Statistics, 2010), $q = 1-P$ and d = degree of accuracy desired (error margin) = 5% (0.05) (Cochran, 1963).

Patients aged 16 to 60 years who consented were included in this study while those with hearing or vision impairment, uncooperative patients and those that self-reported inability to speak, read and understand English well were excluded. The interviewer-administrated questionnaires which elicited the demographic characteristics, periodontal health knowledge, oral health literacy, subjectively rated periodontal status, oral self-care behaviour and dental attendance was the data collection tool.

Oral health literacy was assessed with Rapid Estimate of Adult Literacy in Dentistry -30 (REALD-30), a word recognition test consisting of 30 dental health-related words arranged according to degree of difficulty (Sabbahi, 2009). It was designed to be read aloud by participants to the interviewer. For scoring, one point was assigned for each word pronounced correctly and summed up to get the overall score ranging from 0 to 30. The higher the scores indicated, the higher oral health literacy while the lower the scores indicated, the lower the oral health literacy. The predetermined cut-off points for oral health literacy level was 22.4 which was the obtained pilot study mean. The oral health literacy was therefore categorized as low when the score was less than or equal to 22.4 and high when it was greater than ≥ 22.4 .

Periodontal health knowledge was assessed with index of periodontal health knowledge (PHK), consisting of 4 items namely "gum inflammation can disappear by itself", "gum bleeding is a sign of a periodontal disease", "When brushing one's teeth it is important to put little pressure on the toothbrush" and "The more often I brush my teeth on a day, the better it is for my teeth. All items were scored with 1 = correct or 0 =incorrect, and a sum score was computed, so that a total periodontal health knowledge score was formed for each participant ranging from 0 to 4. The higher the total score, the better the periodontal health knowledge. Subjectively rated periodontal health status was assessed with index of subjectively

rated periodontal status (SPS) consisting of 8 questions culled from Hiroshima University-Dental Behavioural Inventory namely "my gums tend to bleed when I clean my teeth", "I have noticed some white sticky deposits on my teeth", "I am bothered by the colour of my gums", "I clean each of my teeth carefully", "I have never been taught professionally how to clean", "I often check my teeth in a mirror after brushing", "I worry about having bad breath" and "I use hard toothbrush to clean my teeth". All items were scored with 1 = poor outcome or 0 = good outcome and a sum score was computed, so that a total subjectively rated periodontal health status score was formed for each participant ranging from 0 to 8. The higher the total score, the better subjectively rated periodontal health status (Kawamura et al, 1997).

Oral self-care was assessed with index for oral hygiene behaviour (OHB) formulated by Buunk-Werkhoven et al. (2011). This index has eight items with respect to tooth brushing (frequency, time of brushing, measures of force, duration in minutes, method, and use of fluoride toothpaste), interdental cleaning (use of floss, tooth sticks, interdental brushes), and tongue cleaning. The item scores were assigned weights, the item values were calculated and a sum score was computed with sum OHB score range from 0 to 16. A high sum score indicated a better oral self-care behaviour. Dental attendance was assessed with one question on whether the participants had ever visited dentist for care with yes and never as the response options.

Data were subjected to chi-square and binary logistic regression statistics using the IBM SPSS version 21.0. Regression was done with periodontal health knowledge, subjectively rated periodontal status, oral health behaviours and dental attendance as dependent variables and oral health literacy as the independent variable. Statistically significance was set at $P < 0.05$.

The income earning status was categorized based on basic earning power of occupations in Nigeria into low [(students, labourers and traders) earning 50,000Naira or less per month] medium [(civil servants, teachers, businessmen/women) earning 51,000 to 100,000naira per month] and High (professional like lawyers, engineers, accountants etc) earning more than 100,000naira per month].

Ethical approval was obtained Ethics and Research Committee of the University of Benin Teaching Hospital, Benin City with protocol number ADM/E 22/A/VOL. VII/14747. Participants were assured of confidentiality in the handling of volunteered information and written informed consent obtained from participants or parents in cases where the participant is below 18 years of age.

RESULTS

A total of 208 patients aged between 16 and 60 years with a mean age of 28.32 ± 10.53 years participated in the study. Older people, females, never married and low income earners had significantly lower periodontal health knowledge. Participants with low literacy also had significantly lower periodontal health knowledge. Participants with low oral health literacy had 2.192 odds to have poor periodontal health knowledge and this was statistically significant ($p < 0.05$) (Table 1).

Older people, males, never married and low income earners significantly reported poorer periodontal health status than younger people, females, married and high income earners respectively. Participants with high oral health literacy reported better periodontal health status than those with low oral health literacy. Income earning status and oral health literacy emerged as significant predictor of subjectively reported periodontal health status. Participants with low oral health literacy and high income had 5.138 and 2.785 odds to have poor periodontal health status as compared with participants with high oral health literacy and low income respectively (Table 2).

Males, never married, low income earners and low oral health literate participants significantly reported poorer oral self-care behaviours than their counterparts. Participants with low oral health literacy had 4.935 odds to have poor oral self-care behaviour and this was statistically significant ($P < 0.001$) (Table 3).

Higher number of males, never married, low income earners and those with high oral health literacy reported nil dental clinic attendance for treatment or check-up. Participants with low oral health literacy had 1.174 (0.654 – 2.108) odds to have not attended the dental clinic for treatment or check-up. However, this was not statistically significant ($P = 0.590$) (Table 4).

Table 1: Association and predictors of periodontal health knowledge among the participants using binary logistic regression

Characteristics	High knowledge	Low knowledge	Total	P-value	OR (95% C. I)	P-value
Age (years)				0.482		
16-24	78 (75.7)	25 (24.3)	103 (100.0)			
25-60	75 (71.4)	30 (28.6)	105 (100.0)		0.790(0.321-1.940)	0.607
Gender				0.007		
Male	104 (80.0)	26 (20.0)	130 (100.0)			
Female	49 (62.8)	29 (37.2)	78 (100.0)		2.286 (1.193 – 4.379)	0.013
Marital status				0.137		
Single	116 (76.3)	36 (23.7)	152 (100.0)			
Married	37 (66.1)	19 (33.9)	56 (100.0)		1.163 (0.464 – 2.919)	0.748
Income earning status				0.066		
Low	117 (77.0)	35 (23.0)	152 (100.0)			
Middle/high	36 (64.3)	20 (35.7)	56 (100.0)		1.526 (0.562 – 4.149)	0.407
Oral health literacy				0.008		
High	98 (80.3)	24 (19.7)	122 (100.0)			
Low	55 (64.0)	31 (36.0)	86 (100.0)		2.192 (1.128 – 4.260)	0.021
Total	153 (73.6)	55 (26.4)	208(100.0)			

Table 2: Association and predictors of subjectively rated periodontal health status among the participants using binary logistic regression

Characteristics	Fair/Good periodontal health status	Poor periodontal health status	Total	P-value	OR (95% C. I)	P-value
Age (years)				0.228		
16-24	93 (90.3)	10 (9.7)	103 (100.0)			
25-60	89 (84.8)	16 (15.2)	105 (100.0)		0.745 (0.213 – 2.607)	0.645
Gender				0.040		
Male	109 (83.8)	21 (16.2)	130 (100.0)			
Female	73 (93.6)	5 (6.4)	78 (100.0)		0.279 (0.095 – 0.822)	0.021
Marital status				0.636		
Single	134 (88.2)	18 (14.3)	152 (100.0)			
Married	48 (85.7)	8 (14.3)	56 (100.0)		0.449 (0.126 -01.598)	0.216
Income earning status				0.018		
Low	138 (90.8)	14 (9.2)	152 (100.0)			
Middle/high	44 (78.6)	12 (21.4)	56 (100.0)		5.138 (1.203 – 21.952)	0.027
Oral health literacy				0.008		
High	113 (92.6)	9 (7.4)	122 (100.0)			
Low	69 (80.2)	17 (19.8)	86 (100.0)		2.785 (1.129 – 6.873)	0.026
Total	182 (87.5)	26 (12.5)	208(100.0)			

Table 3: Association and predictors self oral-care behaviour among the participants using binary logistic regression

Characteristics	Fair/Good oral self-care	Poor oral self-care	Total	P-value	OR (95% C. I)	P-value
Age (years)				0.911		
16-24	62 (60.2)	41 (39.8)	103 (100.0)			
25-60	64 (61.0)	41 (39.0)	105 (100.0)		1.027 (0.471 – 2.237)	0.947
Gender				0.608		
Male	77 (59.2)	53 (40.8)	130 (100.0)			
Female	49 (62.8)	29 (37.2)	78 (100.0)		0.876 (0.465 – 1.650)	0.682
Marital status				0.768		
Single	93 (61.2)	59 (38.8)	152 (100.0)			
Married	33 (58.9)	23 (41.1)	56 (100.0)		1.723 (0.682 – 4.354)	0.250
Income earning status				0.192		
Low	88 (57.9)	64 (42.1)	152 (100.0)			
Middle/high	38 (67.9)	18 (32.1)	56 (100.0)		0.273 (0.100 – 0.746)	0.011
Oral health literacy				0.000		
High	90 (73.6)	32 (26.2)	122 (100.0)			
Low	36 (41.9)	50 (58.1)	86 (100.0)		4.935 (2.592 – 9.394)	0.000
Total	126 (60.6)	82 (39.4)	208(100.0)			

Table 4: Association and predictors self-reported dental attendance among the participants using binary logistic regression

Characteristics	Ever attended	Never attended	Total	P-value	OR (95% C. I)	P-value
Age (years)				0.013		
16-24	45 (43.7)	58 (56.3)	103 (100.0)			
25-60	64 (61.0)	41 (39.0)	105 (100.0)		0.491 (0.237 – 1.020)	0.057
Gender				0.971		
Male	68 (52.3)	62 (47.7)	130 (100.0)			
Female	41 (52.6)	37 (47.4)	78 (100.0)		0.961 (0.537 – 1.721)	0.893
Marital status				0.037		
Single	73 (48.0)	79 (52.0)	152 (100.0)			
Married	36 (64.3)	20 (35.7)	56 (100.0)		0.579 (0.247 – 1.361)	0.210
Income earning status				0.253		
Low	76 (50.0)	76 (50.0)	152 (100.0)			
Middle/high	33 (58.9)	23 (41.1)	56 (100.0)		1.534 (0.616 – 3.825)	0.358
Oral health literacy				0.985		
High	64 (52.5)	58 (47.5)	122 (100.0)			
Low	45 (52.3)	41 (47.7)	86 (100.0)		1.174 (0.654 – 2.108)	0.590
Total	109 (52.4)	99 (47.6)	208(100.0)			

DISCUSSION

In the health literacy model painted by Macek's, we can infer that it is of utmost importance for an individual to have an adequate level of oral health literacy as this is required in making appropriate decisions regarding health, whether in the professionally recommended frequency of use of dental health services or in oral health-related behaviour, which in turn will impact oral health

outcomes (Macek et al., 2010). In this study, oral health literacy was associated with subjectively rated periodontal health status and also emerged as its significant predictor. Similarly, lower level of health literacy has been reported to be associated with worse self-rated oral health status (Lee et al., 2012; Naghibi Sistani et al., 2013; Guo et al., 2014) even in vulnerable population (Jones et al., 2014). Low oral health literacy is reported to be

associated with worse oral hygiene status and periodontal condition (Ueno et al., 2013; Kanupuru et al., 2015; Holtzman et al., 2017), more severe periodontal disease (Wehmeyer et al., 2014; Holtzman et al., 2017; Baskaradoss, 2018), lower number of retained teeth and more periodontal attachment loss (Firmino et al., 2017). This may explain why participants with low oral health literacy had worse rating of their periodontal health status. The fact that people with low oral health literacy are more likely to have dissatisfaction with their oral health (Tenani et al., 2019) may also be a contributory explanation for the relationship between oral health literacy and subjectively rated periodontal health status in this study.

Oral health literacy was associated with oral self-care behaviour and emerged as its significant predictor in this study. Previous studies similarly reported that low oral health literacy was associated with less frequency of daily tooth brushing, irregular tooth flossing and increased oral biofilm (Parker & Jamieson, 2013; Batista et al., 2017; Sistani et al., 2017). Ueno et al. (2013) also reported that the lower the oral health literacy, the less frequently the patients brushed their teeth or dentures. The poorer oral self-care behaviour noticed among participants with low oral health literacy may be related to the fact that oral health literacy also emerged as a significant predictor of periodontal health knowledge in this study because such knowledge is known to improve and sustain optimal oral self-care. This therefore emphasizes that improving the oral health literacy of patients may help in the efforts to improve the adherence to instructions from clinicians, self-management skills and the overall treatment outcomes (Baskaradoss, 2018).

Health literacy has been documented to influence the pattern of utilization of healthcare services as patients with inadequate health literacy indulge in higher utilization of the emergency department (Griffey et al., 2014). In this study, Participants with low oral health literacy had 1.174 (0.654 – 2.108) odds to have not attended the dental clinic for treatment or check-up than those with high oral health literacy though this is not statistically significant. This is in tandem with findings of previous studies that reported that individuals with low oral health literacy are more likely to have missed dental appointments (Baskaradoss, 2016) and less likely have visited the dentist in the past year (Henderson et al., 2018). This is because limited oral health literacy has been linked to lower participation in the oral health care system (Calvasina et al., 2016), poorer patient-dentist

communication, which in turn corresponded with irregular dental care (Guo et al., 2014). whereas high oral health literacy significantly improved the use of dental services (Sistani et al., 2017). Previous study stated that literacy could mediate access to dental care as individuals with low oral health literacy are significantly more likely to obtain oral health information from sources other than the dentist (Calvasina et al., 2016).

The limitation of this study is the reliance on self-reported information, selection of adults who are capable of reading and writing and also that the study was confined to a single health institution which may not be correctly considered representative of the population as a whole. In spite of these limitations, the information obtained from this pioneer study on the relationship between oral health literacy with periodontal health knowledge, subjectively rated periodontal health status, oral self-care behaviour and dental attendance in Nigeria may be useful in the development of oral health promotion strategies to enhance knowledge and behaviour toward better oral health among individuals attending dental clinics and those in the community.

CONCLUSION

The present study revealed that oral health literacy was a significant predictor of periodontal health knowledge, subjectively rated periodontal health status and oral self-care behaviour among the participants. Dental clinicians must take oral health literacy into account for better oral health outcomes. Oral health promotion strategies directed at improving oral health literacy in adult populations will boost periodontal health knowledge, subjectively rated periodontal health status and oral self-care.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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