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PAMJ Clinical Medicine

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Corresponding author: Emmanuel Nzabonimana, School of Dentistry, University of Rwanda, Kigali, Rwanda. enzabonimana@cartafrica.org

Received: 19 Dec 2023 - **Accepted:** 07 Jan 2024 - **Published:** 10 Jan 2024

Keywords: Oral health knowledge, oral health attitude, oral health practices, Rwanda

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Cite this article: Emmanuel Nzabonimana et al. Oral health knowledge, attitude and oral hygiene practices among adults in Rwanda. PAMJ Clinical Medicine. 2024;14(4). 10.11604/pamj-cm.2024.14.4.42461

Available online at: https://www.clinical-medicine.panafrican-med-journal.com//content/article/14/4/full

Oral health knowledge, attitude and oral hygiene practices among adults in Rwanda

Emmanuel Nzabonimana[1,2,&], Yolanda Malele-Kolisa[2], Phumzile Hlongwa[3]

[1]School of Dentistry, University of Rwanda, Kigali, Rwanda, [2]Department of Community Dentistry, School of Oral Health Sciences, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa, [3]Department of Orthodontics, School of Dentistry, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa

[&]Corresponding author

Emmanuel Nzabonimana, School of Dentistry, University of Rwanda, Kigali, Rwanda

Abstract

Introduction: *oral diseases (OD), common dental caries and periodontitis are a major public health problem. Poor oral hygiene has been associated with OD, causing tooth loss, which leads to disability and compromised patients' oral health. In Rwanda, OD is among the leading causes of morbidity at the health center level. Therefore, the purpose of this study was to assess the knowledge, attitude, and oral health practices among adult participants in Rwanda.* ***Methods:*** *a descriptive cross-sectional study was done among participants attending public health facilities in Nyarugenge District, Rwanda. Participants were interviewed using a structured questionnaire. The data were analyzed using frequency distribution, percentage distribution, and bivariate and multivariate logistic regression at a 5% significant level.*

Results: *among 426 participants who were interviewed, 39.44% (n=168) were 18-27 years old and the majority, 61.5% (n=262) were female. Poor oral health knowledge was found in 42% (n=179) of the participants, whilst 12.44% (n=53) showed poor oral health attitudes, and 67.37% (n=287) were found to have poor oral health practice. Participants with a high school level of education were more likely to have better oral health knowledge and the results were statistically significant aOR: 1.79, 95% CI 1.14; 2.82; p = 0.011*
Conclusion: *the findings of our study showed that almost half of the participants had poor oral health knowledge. Oral health attitude and oral hygiene practices were also lacking. There is a need to enhance oral health education in this community to improve their oral health knowledge, attitudes, and practices.*

Introduction

Oral diseases (OD), commonly tooth decay and periodontal disease, are a major public health problem with 3.58 billion people reported to have tooth decay, according to the Global Burden of Disease Report conducted in 2015 [1]. Periodontal diseases are prevalent in developed and developing countries and effect about 20-50% of the global population [2]. Some studies have found a strong association between poor oral hygiene and common dental diseases such as dental caries and periodontal diseases [3,4]. Globally, the burden of oral disease is high among older people and has a negative effect on their quality of life [5]. Poor oral hygiene causes tooth loss, which leads to disability and compromised patients' oral health [6]. In Africa, OD is a significant public health problem [7]. The prevalence of dental caries has increased in many African countries and may further increase due to increased sugar consumption and inadequate exposure to fluorides [7]. The prevalence of gingival inflammation is high in all age groups in several African countries [8]. In a study from Sudan, about 64.5% of participants considered poor tooth brushing habits to cause gingivitis and less than 20% of adolescents visit dentists regularly for a dental check-up [9]. In Tanzania, a study found that 44.8% of the participants had fair to poor oral hygiene status [10]. A Ugandan study found that 56% of participants had not visited oral health services in the last two years, and those who did were due to pain [11].

In Rwanda, OD is among the leading cause of morbidity at the health center level, with poor oral hygiene, tooth decay, and periodontal disease, have been reported [12-14]. The Rwanda National Oral Health Survey in 2018 found that the oral health status of the population was poor, with 70% of individuals not utilizing oral health services. Adults aged 20 years and above from Rwanda have been reported to present with oral debris, and dental calculus [14]. Studies have associated low health literacy with greater use of emergency care and poor preventive health-seeking behavior for oral health services [15,16]. A correlation between limited oral health knowledge and poor oral health behavior has been reported [17], however, there is a scarcity of information on oral health awareness levels in Rwanda. Therefore, this study evaluated knowledge, attitude, and oral hygiene practices among adults in Rwanda. It is part of a large doctoral study entitled "Oral Health in Nyarugenge District of Rwanda: The Role of Mobile Application in Oral Health Education."

Methods

Study design and setting: a descriptive cross-sectional study was conducted among participants attending public health facilities in Nyarugenge District, Rwanda. Rwanda stands as of one of the 56 countries in the African continent. Rwanda is divided into four provinces, plus Kigali City, the capital city. The four provinces have 27 Districts, while Kigali City has three districts (Gasabo, Kicukiro, and Nyarugenge) based on Government data [18,19]. The study was conducted in July 2022 in Nyarugenge District, Kigali City, Rwanda.

Study population: adult patients aged 18 years and above attending health services in

Nyarugenge District. Participant who voluntarily agreed and signed informed consent to participate were included in the study. Patients who were hospitalised and mentally challenged were excluded from the study. The seven urban health facilities services in Nyarugenge District were randomly sampled to obtain three health centres. The participants were selected conveniently from the three health centres. The sample size was calculated based on the estimated oral health knowledge prevalence of 50%, with 95% confidence level and 5% level of precision to be 42 [20].

Data collection:data were collected by principal investigator (EN) and four research assistants who have dental background with adequate experience in collecting quantitative data. The participants were recruited conveniently and those who consent were interviewed in Kinyarwanda local language using a structured questionnaire which was adapted from previous reported studies [21-23]. The questionnaire elicited the demographic characteristics, oral health knowledge, oral health attitude, and oral hygiene practices of the participants.

Definition

Outcome variable: oral health knowledge, oral health attitude, and oral hygiene practices.

Exposure variable: demographic characteristics (age, gender, marital status, owning smartphone and level of education).

Statistical analysis: the Stata software version 16 was used for analysis (StataCorp, College Station, Tx). Descriptive statistics frequency and percentage distribution were used to analyze demographic characteristics, oral health knowledge, oral health attitude, and oral hygiene practice. Bivariate and logistic regression was done to assess factors associated with oral health knowledge, oral health attitude, and oral hygiene practices. The oral health knowledge questions were analyzed by assigning the most correct answer a score of "1", and wrong answers and don't know a score of "0". The nine statements on knowledge were summed up to a total score of 9, equivalent to 100%. A score of less than 60% was classified as 'poor oral health knowledge' and a score of 60% and above indicated 'good oral health knowledge'. The oral health attitude questions were analyzed by allocating the positive attitude a score of "1" and the negative attitude a score of "0" while neutral responses were not allocated any score and not used in computing the total attitude score. The attitude responses were summed up to a total score of 7 indicating 100% good attitude. The attitude score of less than 60% indicated a poor oral health attitude, and the score of 60% and above showed a good oral health attitude. In addition, the responses of attitudes "strongly disagree" and "disagree" were combined to "disagree" and "strongly agree" and "agree" were combined and became "agree", and neutral responses were reported as it is in the frequency tables. Oral hygiene practice questions were analyzed by allocating the most correct answer a score of "1", and the wrong answer a score of "0". The response score was summed up to a total score of 8, indicating 100% good oral hygiene practices. A score of less than 60% were categorized as 'poor oral hygiene practices' and scores of 60% and above indicated 'good oral hygiene practices'.

Ethics consideration: the Human Research Ethics Committee (HREC) (Medical) of the University of the Witwatersrand, Johannesburg provided ethics approval (M220213) to conduct the research. Permission was also obtained from the relevant healthcare authorities, Rwanda IRB ethical committee (No234/CMHS IRB/2022), and the National Health Research Committee (No NHRC/2022/PROT/26). Informed consent was signed by all participants.

Funding: "This research was supported by the Consortium for Advanced Research Training in Africa (CARTA). CARTA is jointly led by the African Population and Health Research Center and the University of the Witwatersrand and funded by

the Carnegie Corporation of New York (Grant No. G-19-57145), Sida (Grant No: 54100113), Uppsala Monitoring Center, Norwegian Agency for Development Cooperation (Norad), and by the Wellcome Trust [reference no. 107768/Z/15/Z] and the UK Foreign, Commonwealth & Development Office, with support from the Developing Excellence in Leadership, Training, and Science in Africa (DELTAS Africa) programme. The statements made and views expressed are solely the responsibility of the Fellow."

Results

Demographic characteristics of the participants: a total of 426 respondents participated in the study, with majority in the 18-27 years old age category (39.44%; n=168). The median age was 30, interquartile range (IQR) at 25 - 39. The majority of the participants, (61.5%; n=262) were female (Table 1).

Oral health knowledge, attitude and practice: poor oral health knowledge was found in 42.02% (n=179) of the participants. Oral health practices, 67.37%(n=287) and oral health attitude 12.44%(n=53) were also poor.

Frequency distribution of oral health knowledge among the respondents: most of the respondent knew the importance of tooth cleaning, even though some had poor oral knowledge of the cause of gingival disease. The majority of the respondents 82.16% (n=350) new the importance of cleaning between teeth in order to prevent gum inflammation. Most of the participants knew the importance of regular dental check 74.88% (n=319), while 25.12% (n=107) of the respondents did not know. Regarding tooth brushing 39.19% (n=397) of the respondents knew that tooth brushing should be done in the morning and at night daily (Table 2).

Frequency distribution on oral health attitude among the respondents: according to the respondents' attitude towards oral health, 56.19% (n=227) do not believe that teeth can be cleaned effectively without using toothpaste, while 43.81% (n=177) agree with this statement. Believe on dentists should be visited regularly, even without having an oral problem 23.66% (n=97) disagree, 76.34% (n=313) agree. 3.33% (n=14) disagree and 96.67% (n=406) agree regarding oral health attitude on performing oral self-care regularly to identify any abnormality in my mouth, such as a hard deposit on my teeth (Table 2).

Oral health practices among the respondents: most respondents, 64.1%(n=273) brushed their teeth twice a day, while 35.9% brushed them once daily. The soft bristle toothbrush was used by 35.9%(n=153) of respondents, while 21.1% (n=90) used a hard bristle toothbrush. 32.2% (n=137) (32.2%) participants never visited dental services, whilst 51.6%(n=220) only visited dental services due to pain, and 3.1% (n=13)13 respondents (3.1%) visited dental services every six months. Most of the respondents 92.7% (n=395) had never used dental floss to clean their teeth, and only 4(0.9%) of the respondents used it twice daily,9(2.11%) used it once a day and 15 (3.52%) use dental floss sometimes and 0.7% (n=3) use once a week (Table 3).

Frequency distribution of the reason for visiting dental services: the majority of the respondents n=230 (79.58%) among 289 who visited dental services in the past, had visited dental services due to pain, while 12 (4.15%) respondents visited dental services for teeth cleaning, 16 (5.54) respondents visited dental services for oral check-ups and advice, 8 (2.77%) visited dental services for gum problems and 23 (7.96%) participants sought dental services due to gum problems.

The association between oral health knowledge, oral health attitude, oral health practices, and demographic characteristics: oral health knowledge was found to be significantly associated with oral health practices (P-value= 0.017), oral health attitude (P-value=0.000) and level of education (P-value=0.006). Owning a smartphone was found to be significantly

associated with oral health knowledge (P-value=0.011), oral health attitude (P-value=0.049) and oral health practice (P-value=0.011) (Table 4).

Logistic regression for KAP and demographic characteristics of the respondents: the variables found being significant in the univariate analysis concerning oral health knowledge were marital status, smartphone ownership, and level of education. Oral health practices showed significant associations with smartphone ownership and level of education in the univariate analysis. In the multivariate analysis, individuals with a high school education were more likely to possess better oral health knowledge aOR=1.79, 95% CI 1.14; 2.82 and p-value 0.011 (Table 5).

Discussion

Our study is among the first to report data on oral health knowledge, attitudes, and oral hygiene practices of adult participants in Nyarugenge, Rwanda. The study revealed that among Nyarugenge adults, more than 40% exhibited knowledge deficits. The oral health attitudes and oral hygiene practices were also found to be poor. The findings showed that most of the participants were young adults between 18 and 37 years old. A similar age group has been reported in India and Nigeria where the participants evaluated dental needs [24,25]. The current results showed that most of the participants were women. Previous studies have reported a similar gender predominance, citing that women were more proactive in seeking dental care [26]. Similar gender differences were reported in Saudi Arabia and India where it was found that women acted more positively than men on oral health [27,28].

Our results showed that almost half of the participants had poor oral health knowledge. Our sample knowledge (58.0%) was lower compared to 62.2% reported in Nigeria, but it was similar to that reported in Spain with oral health knowledge of 58.5% [29,30]. Although in our study participants knew that they must brush their teeth to prevent tooth decay (84.27%) and that to prevent gum inflammation, it is also necessary to clean between teeth (82.16%), most of them did not feel that a regular dental visit was necessary. Our study participants' knowledge of dental and gum care was lower than in the results reported in Cyprus at 97.3% and 96% respectively [31] and Romanians at 95.3 and 88.3% [32]. The knowledge of the participants in our study was strongly associated with the ownership of a smartphone (P=0.011), secondary education (P=0.006), good oral hygiene practices (P=0.017), and good oral health attitudes (P=0.000). A study conducted in Iran found an association between oral health knowledge and financial status, which can be reflected in our study as the ownership of a smartphone [33]. In addition, a similar association was reported between oral health knowledge and a higher level of education among adult populations in Spain [30]. More educated people are more likely to use reading, social media, news, and the internet to learn more. Bastani *et al*. found that smartphone-delivered oral health information enhanced knowledge [34]. The association between oral health knowledge and attitude was consistent with what was found in China [35] but contrasting results were found in the South Indian population [36].

These differences might be due to different geographic location, sociodemographics of the participants, and access to oral health care. The knowledge of study participants also reflected on their attitude, where 69.25% demonstrated a good attitude. This overall attitude was better compared to the South Indian, Saudi Arabian, and Nigerian populations where the attitude levels were 33.3%, 48.3%, and 44.5% respectively [36,37]. The differences could be attributed to the different settings where the studies were conducted. In our study, only 76.34% of the participants agreed that dentists should be visited regularly, even without having an oral problem. The participants agreed that waiting until they have a toothache before visiting the dentist can lead to tooth extraction. Our findings are almost similar to the study with Libyan's parents,

who agreed that regular dental check-ups are important for the prevention of dental problems at 79.5% [38]. However, the attitude of Romanian dental patients was better compared to our study participants because 88.3% of them agreed that regular dental check-ups can prevent dental problems [32]. Our study findings showed that the participants attitudes were associated with oral health knowledge (P=0.002). A similar association between attitude and oral health knowledge was also found among Iranian patients [18] and Brazilian patients [39]. According to Rodrigues *et al*. a patient's attitude is a key construct for causing them to adopt a certain behavior and maintain that behavior [39]. The participants' attitudes in our study were also associated with ownership of a smartphone (P=0.049). The relationship between the ownership of the smartphone and the level of attitude could be that smartphone users tend to obtain more information online, which may improve their attitude.

The knowledge and oral health attitudes levels of our study participants did not translate to improve their oral hygiene practices. Only a third of our study participants displayed good oral hygiene practices, in contrast to the Libyan study, where 78.7% of parents displayed good oral hygiene practices [38]. Similarly, good practice findings have been reported in the literature [32,33,35] except in Brazil where low oral health literacy was associated with poor oral hygiene practices [33,40]. Approximately 64.08% of our study participants brushed their teeth twice a day, compared to the Chinese dental patients who reported that 77.4% brushed their teeth twice a day [41].

Furthermore, 51.64% of our study participants responded that they should visit dentists only when they experience pain, as compared to 55% of the Saudi Arabian participants [42]. The results of our study found poorer oral hygiene practices in contrast to the Indian study where 82.0% of the participants went for routine dental check-up and 25.8% expressed that the reason for their last dental visit was only consultation and advice [27,38]. Dental flossing was not popular among our study participants because 92.7% reported never using a dental floss. Similarly, dental flossing was low in Romania at 27.9% [32]. Oral hygiene practices in our study were found to be only associated with oral health knowledge. The result of our study differed from what was found in Brazil, where level of education was associated with oral health practices [40].

One of our study's limitations is the use of a cross-sectional design, which cannot establish causality. However, we addressed this limitation by conducting a regression analysis that adjusted for confounding factors likely to influence the outcomes. Additionally, our study's sample bias arose from recruiting participants solely from government facilities, limiting the generalizability of results to those using private facilities. Moreover, because the data was collected from one district with a limited sample size, this study cannot be generalized to the entire country.

Conclusion

Almost half of the adults in Nyarugenge district had poor oral health knowledge, one-third of them had poor oral hygiene practices despite showing good oral health attitudes. The discordance requires that oral health education and oral health attitudes be improved. The association between smartphone ownership and oral health knowledge was identified among the participants. This suggests an opportunity to utilize smartphones as educational tools for oral health alongside traditional methods to enhance knowledge and promote better oral hygiene practices.

What is known about this topic

- *Optimal oral health is the gateway to general health of all individuals;*
- *Oral health knowledge may influence oral hygiene attitudes and practices;*

- *Good oral hygiene practices depend on several factors including individual level community level, organisational level as well as oral health policies.*

What this study adds

- *This is one of the first studies to report on the oral health status, knowledge, attitude, and practices of adults in Nyarugenge, Rwanda;*
- *The findings of this study will be useful in planning the oral health educational in the community;*
- *This is study show the relationship between KAP and demographic characteristics.*

Competing interests

The authors declare no competing interests.

Authors' contributions

Conception and study design: Emmanuel Nzabonimana, Phumzile Hlongwa, and Yolanda Malele-Kolisa. Data collection: Emmanuel Nzabonimana. Data analysis and interpretation: Emmanuel Nzabonimana, Phumzile Hlongwa, and Yolanda Malele-Kolisa. Manuscript drafting: Emmanuel Nzabonimana. Manuscript revision: Emmanuel Nzabonimana, Phumzile Hlongwa, and Yolanda Malele-Kolisa. Guarantor of the study: Emmanuel Nzabonimana. All authors approved final version of the manuscript.

Acknowledgments

We appreciate the Biostatistician team from both University of Rwanda and Wits University for their contribution and guidance.

Tables

Table 1: demographic characteristics of the participants

Table 2: frequency distribution of oral health knowledge and oral health attitude

Table 3: oral health practice

Table 4: association between KAP and demographic characteristics

Table 5: logistic regression for oral health knowledge, oral health attitude, oral health practice and demographic characteristics

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Table 1: demographic characteristics of the participants		
Demographic (n=426)	**Frequency**	**Percentage**
Age		
18-27 years	168	39.44%
28-37 years	129	30.28%
38-47 years	73	17.14%
48-57 years	34	7.98%
58-88 years	22	5.16%
Gender		
Male	164	38.5%
Female	262	61.5%
Marital status		
Single	136	31.9%
Married	271	63.6%
Divorced	12	2.8%
Other	7	1.6%
Participant own smartphone		
Yes	151	35.4%
No	275	64.6%
Level of education		
Primary	189	44.6%
Secondary	178	42%
University	31	7.3%
No education	26	6.1%

Table 2: frequency distribution of oral health knowledge and oral health attitude			
Oral health knowledge n=426	**Yes (n %)**	**No**	**Don't know**
To prevent tooth decay, I have to brush, especially on the crown covers of my teeth	359 (84.27%)	36 (8.45%)	31 (7.28%)
Toothbrushing should be done in the morning after waking up and at night before going to bed every day	397 (93.19 %)	22 (5.16 %)	7 (1.64%)
Dental plaque can cause gum diseases and tooth decay	390 (91.55%)	12 (2.82%)	24 (5.63%)
Gum bleeding is a sign of gum disease	376 (88.26%)	26 (6.10%)	24 (5.63%)
To prevent gum inflammation, you also have to clean between your teeth	350 (82.16 %)	21 (4.93%)	55 (12.91%)
The hard deposit on your teeth can remove itself with toothbrushing alone	213 (50.00%)	164 (38.50%)	49 (11.50%)
Bad breath can be caused by gum disease	241 (56.57%)	97 (22.77%)	88(20.66%)
When my gum does not bleed while brushing my teeth, there is nothing wrong with my gum	324 (76.06%)	60 (14.08%)	42(9.86%)
A regular dental check-up is necessary	319 (74.88%)	89 (20.89%)	18 (4.23%)
Oral health attitude n=426	Disagree	Agree	Neutral
Do you think the hardness of the bristles of the toothbrush affects teeth and gums?	29 (7.04%)	383 (92.96%)	14 (3.29%)
Do you think well-cleaning of teeth can be done without using toothpaste?	227 (56.19)	177 (43.81%)	22 (5.16%)
Do you think dentists should be visited regularly, even without having an oral problem?	97 (23.66%)	313 (76.34%)	16 (3.76)
Do you think you must perform oral self-care regularly to identify any abnormality in your mouth, such as a hard deposit on your teeth?	14 (3.33 %)	406 (96.67%)	6 (1.41%)
Do you think you cannot remove the hard deposit on your teeth with toothbrushing alone?	154 (38.79%)	243 (61.21%)	29 (6.81%)
Do you think waiting until you have toothache before visiting dentists can lead to tooth extraction?	93 (22.96%)	312 (77.04%)	21 (4.93%)
I think caring for my mouth is as important as caring for other parts of the body	6 (1.44%)	412 (98.56%)	8 (1.88%)

Table 3: oral health practice			
Oral health practice		**Frequency**	**Percentage**
The method used to clean	Toothbrush and paste	422	99.06
	Finger	2	0.47
	None	2	0.47
When do you brush your teeth	Morning before breakfast	107	25.12
	Morning after breakfast	37	8.69
	Noon after lunch	5	1.17
	Night before going to bed	4	0.94
	Morning after breakfast and night before going to bed	273	64.08
the duration of brushing teeth	Less than 1 min	27	6.34
	One min	122	28.64
	Two min	88	20.66
	More than 2 min	176	41.31
	Do not know	13	3.05
Type of toothbrush used	Hard bristle	90	21.13
	Soft bristle	153	35.92
	Medium bristle	156	36.62
	Do not know	21	4.93
	Do not use toothbrush	6	1.41
The duration of replacing the toothbrush	One month	121	28.40
	Three months	141	33.10
	Six months	20	4.69
	When the bristles are worn out	140	32.86
	I do not use a toothbrush	4	0.94
The type of motion used during brushing	Vertical strokes	31	7.28
	Horizontal strokes	276	64.79
	Circular motion	4	0.94
	Combination of the above	110	25.82
	I do not use a toothbrush	5	1.17
How often do you visit dental services?	Every 6 months	13	3.05
	Every 12 months	56	13.15
	Only when I have dental pain	220	51.64
	Never visited	137	32.16
Use of dental floss	Once a day	9	2.11
	Twice a day	4	0.94
	Sometimes	15	3.52
	Once a week	3	0.7
	Never	395	92.72
*P-value <0.05			

Table 4: association between KAP and demographic characteristics									
	Poor oral knowledge n (%)	**Good oral knowledge n (%)**	**P value**	**Poor oral attitude n (%)**	**Good oral attitude n (%)**	**P value**	**Poor oral practice n (%)**	**Good oral practice n (%)**	**P value**
Age group									
18-27 years	63 (35.2)	105 (42.51)	0.468	18 (33.96)	119 (40.34)	0.862	104 (36.24)	64 (46.04)	0.344
28-37 years	60 (33.52)	69 (27.94)		18 (33.96	91 (30.85)		89 (31.01)	40 (28.78)	
38-47 years	29 (16.2)	44 (17.81)		10 18.87	50 (16.96)		53 (18.47)	20 (14.39)	
48-57 years	16 (8.94)	18 (7.29)		5 (9.43)	20 (6.78)		24 (8.36)	10 (7.19)	
58-88 years	11 (6.15)	11 (4.5)		2 (3.77)	15 (5.08)		17 (5.92)	5 (3.6)	
Total	179 (100)	247 (100)		53 (100)	295 (100)		287 (100)	139 (100)	
Gender									
Male	66 (36.31)	99 (40.08)	0.430	24 (45.28)	117 (39.66)	0.443	113 (39.37)	51 (36.69)	0.594
Female	114 (63.69)	148 (59.92)		29 (54.72)	178 (60.34)		174 (60.63)	88 (63.31)	
Total	179 (100)	247 (100)		53	295		287 (100)	139 (100)	
Own a smartphone									
Yes	51 (28.49)	100 (40.49)	0.11*	14 (26.42)	120 (40.68)	0.049*	90 (31.36)	61 (43.88)	0.011*
No	128 (71.51)	147 (59.51)		39 (73.58)	175 (59.32)		197 (68.64)	78 (56.12)	
Total	179	247 (100)		53 (100)	295 (100)		287 100	139 (100)	
Level of education									
Primary	97 54.19	92 (44.58)	0.06*	31 58.49	121 (41.30)	0.12	137 (47.74)	52 (37.96)	0.054*
Secondary	60 33.52	118 (48.16)		18 33.96	131 (44.71)		111 (38.68)	67 (48.91)	
University	11 6.15	20 (8.16)		2 3.77	26 (8.87)		18 (6.27)	13 (9.49)	
No education	11 6.15	15 (6.12)		2 3.77	15 (5.12)		21 (7.32)	5 (3.65)	
	179 100	245 (100)		53	293		287 (100)	137 (100)	
Oral health knowledge									
Poor knowledge	NA	NA	NA	32(60.38)	102(34.58)	0.000*	132(45.99)	47(33.81)	0.017*
Good knowledge				21(39.62)	193(65.42)		155(54.01()	92(66.19)	
Total				53(100)	295(100)		287(100)	139(100)	
*P-value≤. 0.5 statistical significant									

Table 5: logistic regression for oral health knowledge, oral health attitude, oral health practice and demographic characteristics

	Oral health knowledge				Oral health attitude				Oral health practice			
Factors	**COR (95%CI)**	**P-value**	**AOR (95%CI)**	**P-value**	**COR (95%CI)**	**P-value**	**AOR (95% CI)**	**P-value**	**COR (95%CI)**	**P-value**	**AOR (95% CI)**	**P-value**
Age	0.98 (0.97; 1.00)	0.093	1.00 (0.98; 1.02)	0.759	0.99 (96; 1.01)	0.456	0.996 (0.96; 1.026)	0.830	.986 (0.96; 1.004)	0.142	0.985 (0.96 ; 1.007)	0.18
Gender												
Male	1.00		1.00		1		1		1		1	
Female	0.85 (0.57; 1.26)	0.430	0.95 (0.63; 1.45)	0.846	1.25 (0.69; 2.26)	0.443	1.32 (0.70; 2.48)	0.375	1.120 (0 .73; 1.70)	0.594	1.073 (0.68; 1.67)	0.754
Marital status												
Single	1.00		1.00		1		1		1		1	
Married	0.61 (0.400; 0.94)	0.026*	0.62 (0.377; 1.03)	0.068	1.030 (0.54; 1.94)	0.927	1.074 (0.49 ;2.34)	0.856	1.21 (0.77; 1.89)	0.396	1.52 (0.90; 2.57)	0.11
Divorced	0.51 (0.15; 1.67)	0.267	0.513 (0.15;1.75)	0.287	0.35 (0.081; 1.57)		0.325 (0.06; 1.5)	0.162	1.2 (0.341; 4.21)	0.776	1.49 (0.40; 5.48)	0.545
Other	0.38 (0.08; 1.78)	0.222	0.40 (0.07; 2.00)	0.266	1				3.2 (0.68; 14.95)	0.139	5.064 (0.95; 26.85)	0.057
Own smartphone												
Yes	1.00		1.00		1		1		1		1	
No	0.58 (0.38; 0.88)	0.011*	0.68 (0.42; 1.09)	0.113	0.523 (0.27; 1.00)	0.052	0.665 (0.32; 1.37)	0.272	0.584 (0.38; 0.88)	0.012*	0.703 (0.43; 1.13)	0.147
Level of Education												
Primary	1.00		1.00		1		1		1		1	
Secondary	2.07 (1.35; 3.16)	0.001*	1.79 (1.14; 2.82)	0.011*	1.86 (0.99; 3.50)	0.053	1.670 (0.84; 3.31)3	0.143	1.59 (1.02; 2.46)	0.039*	1.437 (0.89; 2.31)	0.135
University	1.91 (0.87; 4.22)	0.106	1.49 (0.62; 3.54)	0.365	3.33 (0.74; 14.79)		2.38 (0.48; 11.643)	0.281	1.90 (0.87; 4.15)	0.107	1.40 (0.59; 3.31)	0.443
No education	1.43 (0.62; 3.29)	0.390	1.65 (0.70; 3.88)	0.250	1.92 (0.41; 8.84)		2.44 (0.503; 11.89)	0.268	0.627 (0.22;1.75)	0.373	0.62 (0.21; 1.79)	0.379

Note: COR: Crude odds ratio; AOR: Adjusted odds ratio; CI: Confidence interval *p-value ≤0.05 statistically significant