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Dental Practitioners' Knowledge, Attitude, and Practice in Caries Risk Assessment and Management: A Cross-sectional Survey in Kampala Metropolitan, Uganda

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Abstract

Aim: The objective of this study was to determine the knowledge, attitude, and practices regarding caries risk assessment (CRA) and management among dental practitioners in Kampala Metropolitan, Uganda.

Materials and methods: This cross-sectional study was conducted among 270 dental practitioners in Kampala Metropolitan, Uganda, in May 2021. The participants were dental surgeons and public health dental officers. A self-administered structured questionnaire was used to collect data. The questionnaire included items about participants' sociodemographic characteristics, knowledge, attitude, and practices in CRA and management. Attitude and practices were rated using different Likert scales. Descriptive statistics, Chi-square/Fisher's exact and one-way analysis of variance (ANOVA) with post-hoc Bonferroni tests were used to analyze the data. The significance level was set at $p < 0.05$.

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Conflict of interest: None

Results: About 60.7% of the participants were public health dental officers with a median age of 30 years (interquartile range [IQR], 27–60). Overall, the participants were familiar with the current concepts regarding CRA and management. More than 70% of the participants correctly identified risk factors and indicators of dental caries. Most participants (98.5%) had a positive attitude toward performing CRA. However, their practices regarding caries management were inadequate as majority (>75%) of participants reported that they never or occasionally recommended evidence-based products like topical fluoride, probiotics, or xylitol products in the prevention and management of dental caries. Dental surgeons had significantly better knowledge and practices than public health dental officers (p <0.05).

Conclusion: In the present study, the participants were familiar with the current concepts about CRA and had a positive attitude toward CRA. However, their practices regarding caries prevention and management were inadequate.

Clinical significance: The study provided baseline data about knowledge, attitude, and practices regarding CRA and caries management among dental practitioners in Uganda. It is recommended to design training courses in evidence-based protocols in the prevention and management of dental caries for dental practitioners in Uganda.

Keywords

Attitude; Caries risk assessment; Dental caries management; Dental practitioners; Knowledge; Practice; Uganda

Introduction

Dental caries is a major public health problem affecting people of all ages with significant impact on general health.[1,2] In developing countries including Uganda, the disease places a big burden on the limited resources available for oral health.[3,4] In Uganda, the most recent survey, which was conducted in seven districts reported a high prevalence of caries (>75%) among adults in four out of the seven districts. The overall mean decayed, missing, filled teeth (DMFT) score was 4.71.[5] More than a decade ago, in order to reduce the prevalence and burden of dental caries in developing countries, the World Health Organization called for a change in the strategies for the control of dental caries, with more focus on prevention rather than management of severe disease.[6]

Increasingly, there has been advocacy for a shift in the management of dental caries based on a better understanding of the caries disease process. There has been a shift from the traditional surgical-restorative approach to the adoption of a caries treatment model focused on disease prevention based on caries risk assessment, caries prevention, and management.[7-10] As such dental practitioners are urged to routinely perform CRA in order to increase the probability of patients receiving appropriate caries preventive treatment.[7,9-11]

Considering the benefits CRA has toward effective caries management,[10] along with the context that dental caries is a prevalent disease globally,[1] it is important to identify whether there is a gap between what scientific evidence suggests should be occurring with regard to CRA and what is actually the case with everyday dental practice. The willingness of dental practitioners to perform CRA could be based on their understanding about the caries disease

process, attitude, and their experience in using various preventive methods.[12] Studies from developed countries and Asia report differing levels of knowledge, attitude, and practices in CRA and caries management among dental practitioners.[13-20] The knowledge, attitude, and practices in CRA are key in developing strategies for better caries management applicable in each setting.[14]

However, there is paucity of information about the knowledge, attitude, and practices in CRA and caries management among dental practitioners in Africa, including Uganda. Therefore, the objective of the present study was to determine the knowledge, attitude, and practices in CRA and caries management among dental practitioners in Kampala Metropolitan, Uganda.

Materials and Methods

Study Design

This was a cross-sectional study to determine the knowledge, attitude, and practices in caries risk assessment and management among dental practitioners in Kampala Metropolitan, Uganda, carried out in May 2021.

Study Setting and Population

Kampala Metropolitan constitutes Kampala city, the capital (politically designated as a district) of Uganda, and the surrounding districts of Wakiso, Mukono, Mpigi, Buikwe, and Luwero. It is located in the central region of Uganda, which is the hub of dental services in the country.[3,21] The study population consisted of dental surgeons and public health dental officers licensed to practice dentistry by their respective regulatory authorities. Public health dental officers are three-year diploma holders primarily trained to provide basic community preventive and curative services whereas the dental surgeons are five-year degree holders with or without specialist training to carry out proficient dentistry.[3]

Sample Size Calculation and Participant Selection

The sample size was calculated using sample size formulae with a finite population correction:[22]

$$n = \frac{n_0 N}{n_0 + (N - 1)},$$

where n is sample size; $n_0 = (Z^2PQ)/d^2$; N is population size; Z is 1.96 (standard normal deviation at 95% confidence interval); P is the proportion (we arbitrarily used 50% as no previous study had been done in Africa); Q is $1 - P$, $Q = 1 - 0.5$, therefore, $Q = 0.5$; and d is maximum error we allowed, $d = 5\%$ (95% confidence interval). Minimum sample size was estimated at 245 which was increased by 10% to 270 to cater for possible missing data. The participants were selected based on lists of licensed dental practitioners within Kampala Metropolitan from their respective regulatory bodies. A total of 671 dental practitioners (274 were dental surgeons and 397 public health dental officers) were in active clinical practice.

Using simple random sampling technique, 270 dental practitioners were selected for the study and contacted by phone requesting them to participate in the study. For those practitioners who accepted, an appointment was made to administer the informed consent and deliver a questionnaire. Six dental practitioners who did not consent to participate in the study or were not currently practicing were excluded from the study.

Data Collection Tool

A structured self-administered questionnaire in English was used to collect data from the dental practitioners. The questionnaire was adapted from two similar studies[17,19] with some modifications. It comprised of four sections: I, solicited information on participants' sociodemographic factors; II, comprised of knowledge-related questions that included ten true/false and not sure items about CRA; III, recorded attitude toward CRA based on the 3-point Likert scale with alternatives: Agree, Not sure/Neither agree nor disagree and disagree. While section IV, contained questions regarding practices of CRA including caries preventive or management recommendations. This included items about methods or tools used for CRA and ten items to rate how often dental practitioners used particular caries preventive or management recommendations. The ten items were based on a 4-point Likert scale with alternatives: Never, sometimes, frequently and always. Participant responses were recorded by selecting the most appropriate answer from the hard copy questionnaire. Evidence-based factors that affect caries disease risk were used in the questionnaire. The practice of recommending use of antimicrobial mouthwash and probiotics were included in the questionnaire, though research on their efficacy in caries management is ongoing and the extent of current level of use is unknown.[23-25]

All items in sections II, III, and IV were recoded to ensure that a high score indicated a positive knowledge, attitude or practices while a low score indicated a negative knowledge, attitude or practices. The responses in sections II and III were recoded from 0 to 2 as (0) "incorrect answer", (1) "not sure", and (2) "correct answer" for the items in both sections. Therefore, the score range was 0–20 for the section II with 10 items determining knowledge and 0–14 for section III with 7 items determining attitudes. Responses in Section IV were recorded from 0 to 3 as (0) "never", (1) "occasionally", (2) "frequently", and (3) "always". Therefore, the score range was 0–30.

Quality Control

Prior to commencement of the study, the questionnaire was pilot tested among a convenient sample of 10 dental practitioners working in Kampala but were excluded from the main survey. This was done in order to gain feedback on the overall acceptability of the questionnaire in terms of length, language clarity, validity, and reliability. Based on the participants' feedback, minor modifications were made, including age and request to add "not sure" code in knowledge and attitude sections of the questionnaire.

Data Collection

During the main survey, three trained research assistants on scheduled appointments, visited the selected dental practitioners in their clinics to administer informed consent and deliver a hard copy of the questionnaire. The participants were requested to fill the questionnaire

selecting the most appropriate response. On the agreed dates, the research assistants returned to the dental clinics to collect filled questionnaires. A hundred percent (100%) response rate was achieved after two to three follow-ups.

Ethical Considerations

The study was approved by the Research and Ethics Committee of Makerere University School of Health Sciences (Ref. 2021–18), as well as Uganda National Council of Science and Technology. Informed consent was obtained from the participants prior to participating in the study. Ethical considerations followed guidelines as provided in the Helsinki Declaration.[26]

Statistical Analyses

The data were analyzed using STATA, version 12.0 (College Station TX, USA). Descriptive statistics using proportions were used to summarize the data. Median (interquartile range) for age and mean (± standard deviations) for knowledge, attitude and practice scores were also calculated. Chi-square/Fisher's exact and one-way ANOVA with post-hoc Bonferroni tests were used to determine the associations. The level of significance was set at 5%.

Results

Sociodemographic Factors

About 60.7% (n = 164) of the participants were public health dental officers (Table 1). Most participants were male (61.5%) and were in the age-group 20–34 years (65.0%). The median age was 30 years (interquartile range [IQR], 27–60). More than half (63.7%) of the participants had an experience of more than five years of dental practice (Table 1).

Knowledge of CRA

Most participants (95.2%) agreed that caries is a multifactorial disease. Most participants correctly identified various risk factors of dental caries except for history of restorations within the past 3 years that was correctly identified by 43.3%. The dental surgeons had significantly better knowledge than public health dental officers regarding the implication of a history of restorations within the past 3 years or radiographic inter-proximal lesions and the use of xylitol or chlorhexidine in caries prevention and management (p <0.05, Table 2).

Attitude toward CRA

Majority of the participants (98.6%) had a positive attitude toward performing CRA as an integral part of dental practice. A third (33.7%) of the participants felt they did not have enough time to perform CRA on each patient and about 61.9% felt that caries management mainly included providing dental restorations (Table 3). Overall, the dental surgeons and public health dental officers had similar attitudes toward CRA except regarding what caries management entails (p <0.001, Table 3).

Practices of CRA and Preventive Recommendations

Most participants (85.6%) reported that they perform CRA in the management of dental caries, yet only 33.5% reported use of established CRA forms or tools. Majority of the participants reported that they never or occasionally recommended caries preventive evidence based products visa vis, topical fluoride varnish/gels, low-dose-fluoride rinses, neutral sodium fluoride gel/paste, probiotics, or xylitol products in the order of 77.1, 87.8, 92.2, 89.3, and 90.0%, respectively (Table 4, Fig. 1). Most participants recommended individualized oral hygiene instructions (76.7%), dietary counseling (72.2%), and fluoridated toothpaste (81.1%) for caries prevention (Table 4, Fig. 1). The dental surgeons had significantly better practices compared with the public health dental officers in recommending various products for caries prevention (p <0.05, Table 4).

Association of Mean Knowledge, Attitudes, and Practice with Independent Variables

The mean knowledge score was 14.5 ± 2.0 out of 20. The mean attitude score was 9.6 ± 1.7 out of 12, and mean practice score was 14.9 ± 3.71 out of 30 (Table 5). Dental surgeons had significantly better knowledge and practices than the public health dental officers regarding CRA (p =0.036, p <0.001 respectively) (Table 5).

Discussion

This study provided baseline information necessary for better understanding the level of knowledge, attitude, and practices of CRA and caries management among dental practitioners in Uganda. The findings from the present study indicate that the dental practitioners were familiar with the knowledge in CRA (Table 2) in support of previous studies.[17,19] However, the practices regarding CRA were inadequate as a majority reported that they never or occasionally recommended most of caries preventive evidence-based products (Table 4, Fig. 1) similar to dentists in Iran.[16] The inadequate practices of caries prevention and management might be because most of the dental practitioners were managing caries using the traditional surgical-restorative approach as reported that a majority (70.7%) of the participants felt that caries management mainly included providing dental restorations (Table 2). However, CRA has become the cornerstone in the modern management of dental caries due to the current understanding of the caries process and its prevention.[9]

In the present study, majority (>70%) of the dental practitioners correctly identified caries as a multifactorial disease and several risk factors for caries (Table 2) consistent with previous studies.[16,17,19] In addition, most participants correctly identified indicators of caries that include white lesions and interproximal lesions (Table 2) in contrast to previous studies.[16,17] White lesions are the earliest visible changes on tooth due to caries and prompt application of preventive measures for these early lesions provides a very significant opportunity to stop caries progression to the stage at which surgical intervention is required.[7] Thus, the dental practitioners in Uganda need to be urged to offer preventive procedures and minimal invasive services aimed at remineralization of these early carious lesions. In the present study, knowledge scores in CRA were significantly higher among the dental surgeons as compared to public health dental officers (Table 5) confirming that the training curriculum

of the two dental cadres may be at variance, which calls for continuous professional development, especially for public health dental officers.

In the present study, majority of the participants had positive attitude toward CRA and caries management (Table 3) consistent with previous studies.[17,18] However, about a third felt they did not have enough time to perform CRA on each patient (Table 3) similar to finding of Francisco et al.[17] among dental hygienists in America. Time has been reported as a barrier to the incorporation of evidence-based decision making into clinical care by dental professionals.[17] However, current evidence and recommendations propose that CRA should be a routine component of all new and periodic oral examinations to address the etiology of dental caries rather than continued use of traditional surgical-restorative treatment approaches.[9,10]

In the present study, the most frequently recommended preventive measures in caries management were use of over the counter fluoridated tooth paste and individualized oral hygiene instructions (Fig. 1) consistent with previous studies.[7,17] Globally, fluoride toothpaste is the most widely used form of fluoride delivery and is the mainstay of primary therapeutic intervention of dental caries.[7] In the present study, the dental practitioners' practices regarding recommendation of the various fluoride based products other than fluoride toothpaste were inadequate (Table 4, Fig. 1), though the consistent use of fluoride paste, gel, or rinse is a key strategy for those at moderate to high risk for caries.[7,9] Furthermore, considering that several studies in Uganda have reported relatively high mean DMFT scores in several communities,[5,27,28] there is need to update the dental practitioners' knowledge about evidence-based protocols in the management of caries in communities at moderate or high risk of the disease. In the present study, practice scores in CRA were significantly higher among the dental surgeons as compared to public health dental officers (Table 5), which calls for continuous professional development. Furthermore, in the present study, majority of the dental practitioners reported no formal means of CRA were used which is consistent with literature.[7] While many dental practitioners apparently reported to carry out some form of caries risk assessment, there remains the need for adopting the formal caries risk assessment aids/tools that can help dental professionals in establishing and documenting the caries risk status of their patients as well as tracking changes over time.[7]

Study strengths:

The present study provided baseline information necessary to understand the level of knowledge, attitudes, and practices in CRA and caries management among dental practitioners in Uganda. In addition, the data collection tool used in the present study had been used in similar studies elsewhere, which validated the comparison of the findings in those instances.

Study limitations:

The assessment of knowledge, attitude, and practices was based on dental practitioners self-report; thus we could not rule out response bias and the instrument lacked the flexibility to uncover the basis for reported attitudes or practices.

Conclusion

In the present study, most dental practitioners were familiar with the concepts of CRA and their attitudes toward CRA were appropriate. However, their practices especially regarding recommendations for use of the various evidence-based products for caries prevention and management were inadequate.

Clinical Significance

The study revealed a high level of knowledge and attitude but inadequate practices in recommending evidence-based protocols in the management of caries disease, which calls for designing continuous professional development courses especially for public health dental officers.

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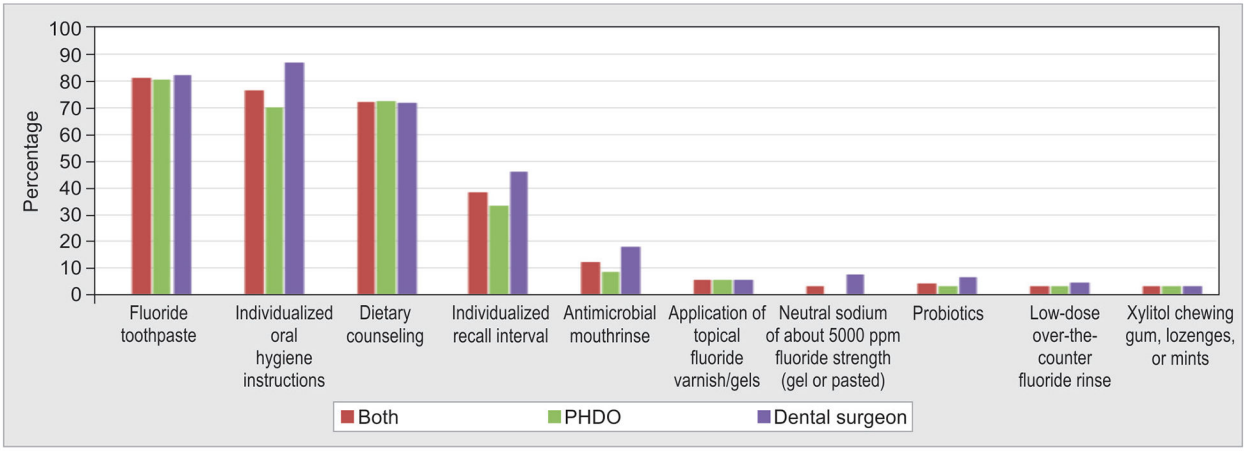

Fig. 1:

Most frequently recommended caries preventive measures according to category of dental profession

Table 1:

The frequency distribution of the participants according to sociodemographic factors (n = 270)

Characteristics	Frequency (n)	Percentage (%)
Category of participants		
Public health dental officers	164	60.7
General dental surgeons	99	36.7
Specialists	7	2.6
Gender		
Male	166	61.5
Female	104	38.5
Age (in years)		
20–34	171	65.0
35–45	75	28.5
>45	17	6.5
Years of experience		
<5	98	36.3
5–10	97	35.9
>10	75	27.8
District		
Kampala	128	47.4
Mukono	34	12.6
Wakiso	57	21.1
Buikwe	26	9.6
Luwero	25	9.3

Table 2:

The frequency distribution of participants according to knowledge in CRA (n = 270)

Knowledge	Both n (%)	PHDO n (%)	Dental surgeon n (%)	p value
Dental caries is a multifactorial disease				
True	257 (95.2)[a]	156 (95.1)[a]	101 (95.3)[a]	1.000
Not sure	11 (4.1)	7 (4.3)	4 (3.8)	
False	2 (0.7)	1 (0.6)	1 (0.9)	
A person with a history of carious lesions within the past year is at a high risk for future dental caries activity				
True	240 (88.9)[a]	151 (92.1)[a]	89 (84.0)[a]	0.115
Not sure	11 (4.1)	5 (3.0)	6 (5.6)	
False	19 (7.0)	8 (4.9)	11 (10.4)	
A person with a history of restorations within the past 3 years is at a low risk for future dental caries activity				
True	132 (48.9)	98 (59.8)	34 (32.1)	<0.001
Not sure	21 (7.8)	9 (5.5)	12 (11.3)	
False	117 (43.3)[a]	57 (34.7)[a]	60 (56.6)[a]	
White spot lesions are considered carious lesion				
True	189 (70.0)[a]	117 (71.3)[a]	72 (67.9)[a]	0.118
Not sure	21 (7.8)	16 (9.8)	5 (4.7)	
False	60 (22.2)	31 (18.9)	29 (27.4)	
Radiographic interproximal lesions are disease indicators				
True	211 (78.1)[a]	119 (72.6)[a]	92 (86.8)[a]	0.021
Not sure	44 (16.3)	34 (20.7)	10 (9.4)	
False	15 (5.6)	11 (6.7)	4 (3.8)	
Decreased saliva flow increases risk for dental caries				
True	262 (97.0)[a]	158 (96.3)[a]	104 (98.1)[a]	0.217
Not sure	4 (1.5)	(4) 2.44	0 (0.00)	
False	4 (1.5)	2 (1.2)	2 (1.9)	
There is no evidence to support a twice a year or more applications of fluoride varnish to reduce risk of caries in adults with high caries risk				
True	230 (85.2)	144 (87.8)	86 (81.1)	0.084

Knowledge	Both n (%)	PHDO n (%)	Dental surgeon n (%)	p value
Not sure	23 (8.5)	14 (8.5)	9 (8.5)	
False	17 (6.3)[a]	6 (3.7)[a]	11 (10.4)[a]	
Daily oral use of 6–10 grams of xylitol does nothing to reduce incidence of caries				
True	32 (11.9)	16 (9.8)	16 (15.1)	<0.001
Not sure	104 (38.5)	80 (48.8)	24 (22.6)	
False	134 (49.6)[a]	68 (41.4)[a]	66 (62.3)[a]	
Patients at moderate or high risk of caries need to be counseled about the role of sugary and starchy foods in increasing caries risk				
True	264 (97.8)[a]	16 1 (98.2)[a]	103 (97.2)[a]	0.276
Not sure	4 (1.5)	3 (1.8)	1 (1.9)	
False	2 (0.7)	0 (0.0)	2 (1.9)	
Chlorhexidine is known to kill all caries pathogenic organisms				
True	82 (30.4)	38 (23.2)	44 (41.5)	<0.001
Not sure	74 (27.4)	59 (36.0)	15 (14.2)	
False	114 (42.2)[a]	67 (40.8)[a]	47 (44.3)[a]	

n, number; %, percentage; PHDO, public health dental officer; Correct response designated by[a]; Chi-square/Fisher's exact tests were used for analysis; Category *PHDO* (public health dental officer) was taken as the reference group

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Table 3:

The frequency distribution of the participants according to their attitude toward CRA (n = 270)

Attitude	Both n (%)	PHDO n (%)	Dental surgeon n (%)	p value
Performing CRA is an integral part of dental practice				
Agree	266 (98.5)	160 (97.6)	106 (100.0)	0.418
No idea	2 (0.7)	2 (1.2)	0 (0.0)	
Disagree	2 (0.7)	2 (1.2)	0 (0.0)	
Caries management mainly includes providing dental restorations				
Agree	167 (61.8)	116 (70.7)	51 (48.1)	0.001
No idea	10 (3.7)	5 (3.1)	5 (4.7)	
Disagree	93 (34.4)	43 (26.2)	50 (47.2)	
I feel I have enough time to perform CRA on each patient				
Agree	170 (63.0)	104 (63.4)	66 (62.3)	0.893
No idea	9 (3.3)	6 (3.7)	3 (2.8)	
Disagree	91 (33.7)	54 (32.9)	37 (34.9)	
I am confident in my ability to explain CRA results with the patient				
Agree	250 (92.6)	156 (95.2)	94 (88.7)	0.094
No idea	8 (3.0)	4 (2.4)	4 (3.8)	
Disagree	12 (4.4)	4 (2.4)	8 (7.5)	
I am confident in my ability to identify carious lesions in the stages when they can be reversed				
Agree	258 (95.6)	158 (96.4)	100 (94.3)	0.655
No idea	7 (2.6)	3 (1.8)	4 (3.8)	
Disagree	5 (1.8)	3 (1.8)	2 (1.9)	
CRA is not effective in dental caries control				
Agree	10 (3.7)	8 (4.9)	2 (1.9)	0.531
No idea	28 (10.4)	17 (10.4)	11 (10.4)	
Disagree	232 (85.9)	139 (84.7)	93 (87.7)	

n, number; %, percentage; Chi-square/Fisher's exact tests were used for analysis; Category *PHDO* (public health dental officer) was taken as the reference group

Table 4:

Frequency distribution of participants according to their practices in recommending measures for caries prevention and management (n = 270)

Practices	Both n (%)	PHDO n (%)	Dental surgeon n (%)	p value
Fluoride toothpaste				
Never	2 (0.7)	2 (2.2)	0 (0.0)	0.625
Occasionally	17 (6.3)	12 (7.3)	5 (4.7)	
Frequently	32 (11.8)	18 (11.0)	14 (13.2)	
Always	219 (81.1)	132 (80.5)	87 (82.1)	
Application of topical fluoride: varnishes/gels				
Never	35 (13.0)	30 (18.3)	5 (4.7)	0.010
Occasionally	173 (64.1)	101 (61.6)	72 (67.9)	
Frequently	47 (17.4)	24 (14.6)	23 (21.7)	
Always	15 (5.5)	9 (5.5)	6 (5.7)	
Low-dose over-the-counter fluoride rinse				
Never	109 (40.4)	79 (48.2)	30 (28.3)	0.003
Occasionally	128 (47.4)	71 (43.3)	57 (53.8)	
Frequently	26 (9.6)	12 (7.3)	14 (13.2)	
Always	7 (2.6)	2 (1.2)	5 (4.7)	
Neutral sodium of about 5000 ppm fluoride strength (gel or paste)				
Never	152 (56.3)	97 (59.1)	55 (52.0)	0.003
Occasionally	97 (35.9)	59 (36.0)	38 (35.8)	
Frequently	13 (4.8)	8 (4.9)	5 (4.7)	
Always	8 (3.0)	0 (0.0)	8 (7.5)	
Antimicrobial mouthrinse				
Never	54 (20.0)	44 (26.8)	10 (9.4)	0.002
Occasionally	129 (47.8)	74 (45.1)	55 (51.9)	
Frequently	54 (20.0)	32 (19.5)	22 (20.8)	
Always	33 (12.2)	14 (8.6)	19 (17.9)	
Probiotics				
Never	156 (57.8)	99 (60.4)	57 (53.7)	0.429
Occasionally	85 (31.5)	49 (29.9)	36 (34.0)	

Practices	Both n (%)	PHDO n (%)	Dental surgeon n (%)	p value
Frequently	17 (6.3)	11 (6.7)	5.7)	
Always	12 (4.4)	5 (3.0)	7 (6.6)	
Dietary counseling				
Never	3 (1.1)	3 (1.8)	0 (0.0)	0.408
Occasionally	17 (6.3)	8 (4.9)	9 (8.5)	
Frequently	55 (20.4)	34 (20.7)	21 (19.8)	
Always	195 (72.2)	119 (72.6)	76 (71.7)	
Individualized oral hygiene instructions				
Never	7 (2.6)	5 (3.0)	2 (1.9)	0.012
Occasionally	8 (3.0)	7 (4.3)	1 (0.9)	
Frequently	48 (17.8)	37 (22.6)	11 (10.4)	
Always	207 (76.6)	115 (70.1)	92 (86.8)	
Individualized recall interval				
Never	17 (6.3)	12 (7.3)	5 (4.7)	0.195
Occasionally	80 (29.6)	51 (31.1)	29 (27.4)	
Frequently	69 (25.6)	46 (28.1)	23 (21.7)	
Always	104 (38.5)	55 (33.5)	49 (46.2)	
Xylitol chewing gum, lozenges, or mints				
Never	132 (48.9)	95 (57.9)	37 (34.9)	0.001
Occasionally	111 (41.1)	57 (34.8)	54 (50.9)	
Frequently	20 (7.4)	8 (4.9)	12 (11.3)	
Always	7 (2.6)	4 (2.4)	3 (2.8)	

n, number; %, percentage; PHDO, public health dental officer was taken as the reference group; Chi-square/Fisher's exact tests were used for analysis

Table 5:

Association of mean knowledge, attitude, and practice of CRA according to independent variables

	Knowledge		Attitude		Practice	
Variables	**Mean+/−SD**	**p value**	**Mean+/−SD**	**p value**	**Mean+/− SD**	**p value**
Overall	14.5 ± 2.0		9.6 ± 1.7		14.9 ± 3.7	
Gender						
Male	14.7 ± 2.0	0.052	9.6 ± 1.6	0.416	15.0 ± 4.0	0.774
Female	14.2 ± 2.1		9.7 ± 1.7		14.8 ± 3.2	
Category of profession						
PHDO	14.3 ± 1.9	0.036	9.5 ± 1.5	0.076	14.1 ± 3.8	<0.001
Dental surgeon	14.9 ± 2.3		9.8 ± 1.8		16.2 ± 3.2	
Age						
20–34	14.5 ± 2.2	0.768	9.6 ± 1.7	0.375	14.7 ± 3.9	0.566
35–45	14.6 ± 1.8		9.5 ± 1.7		15.2 ± 3.4	
>45	14.2 ± 1.4		10.2 ± 1.1		15.4 ± 3.7	
Years of experience						
<5	14.5 ± 2.4	0.996	9.6 ± 1.8	0.729	15.2 ± 3.9	0.484
5–10	14.6 ± 1.8		9.6 ± 1.6		14.6 ± 3.8	
>10	14.5 ± 1.8		9.8 ± 1.5		15.0 ± 3.3	

SD, standard deviation; PHDO, public health dental officer; One-way ANOVA with *post-hoc* Bonferroni tests were used for analysis; Italicized categories are taken as reference groups