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DEEP CARIOUS LESIONS: RESPONDENT PERCEPTION, KNOWLEDGE AND ATTITUDE OF ITS MANAGEMENT

Ammar A Siddqui [1]*, Tahani M Alharbi [2], Fawzeyah F Rashidi [2]

[1] Faculty of Dentistry, University of Hail, Hail, Saudi Arabia

[2] College of Dentistry, University of Hail, Hail, Saudi Arabia

Abstract

Background: *The prevalence of dental caries showed a notable increase recently particularly among developing countries. It is crucial to measure the respondent perception towards its management to understand it further.*

Aim of work*: To assess the knowledge, attitude, and practice towards dental caries among respondents residing in the north region of Saudi Arabia.*

Methods: *This is a cross-sectional study conducted via an online survey distributed to respondents from the North Province of Saudi Arabia. Convenient sampling was employed, and data was mostly display as N (%). Statistics was displayed using Pearson chi square and Fisher exact test.*

Results: *Out of 195 respondents, 87% were females and 73% had a bachelor's degree. Internet was the source of dental health knowledge for 45% of participants. Halitosis was the primary reason behind brushing teeth 45%, and tooth ache was the chief reason for visiting a dentist 55%. Furthermore, 79% knew that fluoride protects against decay and 35% stated that it can reverse the decay. Only 44% of participants knew that plaque leads to dental caries. Regarding attitude, only 12% brushed their teeth thrice, 93% used tooth brush to clean teeth, 76% brushed their teeth for <3 minutes, 48% cleaned their teeth after meals, and only 27% participant didn't eat sugary food daily.*

Conclusion: *The respondent does not have satisfactory awareness toward maintaining their oral health, despite some aspects of dental care and dental health are well recognized. Moreover, only a minority of them were following proper dental care instructions to prevent dental caries.*

Keywords: *Attitudes, dental caries, knowledge, perception, Saudi Arabia.*

Corresponding author:

Ammar A Siddqui,

Faculty of Dentistry,

University of Hail,

Hail, Kingdom of Saudi Arabia,

Email: a.siddiqui@uoh.edu.sa

Mobile: +966553226295

QR code

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INTRODUCTION:

During the past two decades, the prevalence of dental caries showed a notable increase particularly among developing countries(1). Among general population, adolescents are particularly at higher risk for dental caries(2). Although adolescents usually have a basic knowledge of oral hygiene, such as importance of appropriate brushing and healthy diet in preventing dental caries, many fail to implicate that effectively and tend to consume cariogenic foods. Additionally, they may underestimate health risks and tend to oppose their teachers and parents, making it the most difficult stage for health education(3). Moreover, adolescence is a very critical turning point since most of health practices will persist during adult years(2).

The rapid shift in lifestyle throughout the world, and particularly in the Kingdom of Saudi Arabia (KSA) is closely associated to changes in dietary habits with increased consumption of sweetened foods and tobacco(4). Accordingly, the burden of oral diseases is rapidly increasing in most of the developing countries(1). There's an obvious relation between oral health and lifestyle, as increased sugar in diet can cause dental caries, gingivitis and periodontitis, ultimately leading to tooth loss(5). In the same context, tobacco can also be can cause several oral diseases, including smoker's palate, dental caries, implant failure, periodontal disease, oral pre-cancer and cancer(6).

Reduction of the high prevalence of dental caries in developing countries needs emphasis on the importance of integrating a community-oriented oral health education program(7,8) Oral health education has been proved as a cost-effective method for oral health promotion, particularly when conducted among different schools where all children - regardless their socioeconomic status or ethnicity - can be addressed(9). The Knowledge-Attitude-Practice (KAP) model of oral health education is usually the foundation of different health education programs(10,11). According to this model, proper knowledge can develop health attitudes and adequate oral health practices accordingly(10). Therefore, the aim of this study was to assess the knowledge, attitude, and oral health care practices among Saudi population and their role in preventing dental caries.

MATERIALS AND METHODS:

This is an observational study having a cross-sectional design conducted in the north province of Saudi Arabia through an online questionnaire. The study was approved by the Research Ethics Committee of University of Hail, having an approval number H-2016-055. The study population included all possible participants from the North Province aged 13 years or above. Participants outside the North Province, those younger than 13 years of age and anyone associated with dentistry were excluded while the data was only collected after informed consent. In total, data from 195 respondents were gathered using the online questionnaire. First part asked the questions about socio demographic feature such as, age, gender, income and educational status. The second part of questionnaire included questions about the source of knowledge about dental care, the reasons of brushing teeth, the risk of developing caries, the importance of fluoride to the teeth, the dental plaque, and the dental caries and its susceptibility. Last part of questionnaire inquired about the attitudes of participants towards dental care such as the frequency, duration and timing of tooth brushing, frequency of visiting the dentist and dietary habits related to dental caries.

All the gathered data was analyzed by Statistical package of social sciences, SPSS version 25 (SPSS Inc, Chicago, IL, USA). Descriptive statistics were calculated for all variables. Furthermore, most of the data was described as N (%). For Inferential statistics Chi-square and Fisher exact test were used. P value of <0.05 was considered as statistically significant level in all the tests.

RESULTS:

Of 250 questionnaires distributed, 195 participants responded, giving the response rate of 78 %. The majority of respondents were females (86.7%), and the mean ± SD age of the recruited participants was 26.9±9.17 years. Almost two-thirds of the participants had a monthly income of less than 5000 Saudi Riyal. The vast majority had a bachelor education (78.9% of females and 72.8% of males). Furthermore, males' respondents had masters' degree (6.15%) and Ph.D. (1.54%) degrees in comparison to females (3.55% and 0.59%, respectively). The details of the socio-demographic characteristics of the respondent participants are depicted in table 1.

Upon studying the participant's knowledge and awareness of dental caries and oral health, it was found that the internet was the most common source of information accounting for 45.13% respondents. Advertisements and awareness campaigns were the least reported sources of knowledge accounting for

only 1.5% and 6.2% of the sources, respectively. When asked about the reasons of brushing the teeth, almost half of the participants (45.1%) stated that they do so to get rid of foul breath (Halitosis). Only 21.5% reported they brushed their teeth to prevent caries and, of note, almost 15% stated that they brushed their teeth just to set good examples to others. Toothache and regular checkup were the most common reasons of visiting dentists accounted for 54.8% and 36.4% of all the reasons, respectively. When asked about dental caries, half (50.28%) of the participants stated that the main reason of dental caries is lack of tooth brushing after meal. Only 15.38%, 5.13%, and 1.03% attributed dental caries to bacteria, chocolate, or fast food respectively. About 62% of the respondents realized that the risk to caries varied among individuals, and about 80% believed that frequent visits to dentists could prevent dental caries. Regarding fluoride, 78.97% knew it could protect against teeth decay, and 34.8% stated that it could reverse dental caries. When inquired about dental plaques, more than half of the participants (59.49%) stated that dental plaques stick in teeth, tongue, and gums all together, but only 44% knew that plaques can lead to dental caries. The details of the participant's knowledge and awareness about oral hygiene are demonstrated in table 2. Of note, there was no statistically significant difference between males and females as regards the general awareness and knowledge about oral dental hygiene.

Regarding the attitudes and practices, 60.5% of the participants believed that they were at risk for getting dental caries. Even though, only 12.8% stated that they brushed their teeth thrice daily, and only 6.15% reported that they brushed their teeth more than 3 minutes a time. Moreover, more than half (51.79%) of them did not clean their teeth after eating food. Tooth brush was the most common tool for teeth brushing (93.33%). Almost half of the respondents had their last visit to the dentist during the past 6 months. About one fourth (26.67%) ate sweats thrice daily, 67.18% ate snacks between meals, and 15.9% did not rinse their mouth with water after meals. The attitudes and practices are detailed in table 3.

DISCUSSION:

Dental caries is a prevalent disease that burdens millions of people and impairs their quality of life. The high morbidity of dental caries increases healthcare costs and the financial burden to families and societies, (12). Although the overall prevalence of caries and the number of decayed, missing and filled teeth (DMFT) have decreased in adolescents and adults in past decades, the burden associated with caries remains high in disadvantaged, poor and older populations(13,14).

In Saudi Arabia, many studies were conducted to assess the oral health in children. In 1982, Younes and El-Angbawi reported caries prevalence as high as77.65% and decayed missing filled teeth (DMFT) of 2.90 in Riyadh(15). A decade later, Akpata et al. found caries prevalence around 76.5% and score of DMFT is 2.10 in Riyadh(16). The highest prevalence of caries (>90%) and DMFT (>7) were observed in Riyadh and Qaseem in 2003 with a major increase of 65% in DMFT between 1982 and 2003(15–17). Nevertheless, the prevalence of caries and DMFT scores reported by AlDosari et al. were 70% and 3.25, respectively in 2010(18). In another study, Al-Shammery et al. showed an increase of 2.85 in DMFT score (baseline DMFT 1.95 and final DMFT 4.81) over a 3-year-period, with a rate one tooth affected by dental caries per child each year(19). In the same context, many studies showed increased caries prevalence and severity, over time, among Saudi adults. In a cross-sectional study, Almas et al. observed prevalence of caries to be 68.5% and DMFT score to reach up to 8.36 in 1993 in Riyadh, which is one of the lowest caries estimates in the Saudi literature(20).

In our study, our main aim was to assess the adolescents and adults' knowledge about caries. The results revealed that the internet was the main source of information (45.13%) about dental care followed by the dentists. The educational institutes, advertisements, awareness campaigns, and parents were the source of knowledge in a minority of participants (12.3%, 6.15%, 1.45%, and 8.72%, respectively). Given the fact that not all the internet pages are valid sources for proper information particularly in the medical field, the relevant Saudi authorities should exert efforts to educate the students at school as well as their parents about the correct place of gathering oral health data for improved oral health knowledge and awareness. The results of our study were closely similar to the results reported by Al Subait et el. when they studied the knowledge of university students in Saudi Arabia about dental care(21). Researchers of this study reported that almost 40% of the participants stated that inappropriate teeth brushing was the main cause of dental caries(21). However, the data from our study was different and reported no significant difference between males and females as regards the awareness

and attitudes towards dental care Previous studies demonstrated that implementing health educational programs at schools had a significant positive impact on knowledge and awareness of adolescents and adults(22). For instance, Tewari et al. observed that daily tooth brushing became more frequent after a community education program about oral hygiene(23). In other studies, based on the KAP model of oral health education, the educational intervention significantly improved oral health practice(3,9,24). About half of the participants stated that they brush their teeth to get rid of foul breath, and only one fifth reported brushing their teeth to prevent dental caries, showing an interesting perception. This denotes a significance lack of knowledge about the importance of tooth brushing. Though the vast majority of participants show knowledge that regular visits to the dentists are essential, only one third of them (36.4%) visited their dentists for regular check-ups, further studies are recommended to know the reasons. This should shed the light on the importance of emphasizing the positive attitude along with the proper educational programs. Regarding the details about fluoride, almost two thirds of the participants claimed that they knew what fluoride was. However, only one third of them stated that fluoride reverse dental caries. Knowledge about dental plaques was also lacking. Almost 60% of participants stated that plaques stick in teeth, gums, and tongue, collectively, and less than half of them knew that plaques might result in teeth caries. Moreover, around half of the participants thought that the main cause of teeth caries is not brushing the teeth.

It was evident that the attitude towards dental caries was generally negative despite having almost 60% think they might be susceptible to dental decay, only 12% brushed their teeth thrice, and only 6% brushed their teeth for more than 3 minutes at a time, less than half of them cleaned their teeth after each meal, and almost three-fourths of them were eating sweats at least once daily. In comparison with previous studies, the results from Saudi university students showed that the university students were more likely to brush their teeth frequently and to clean their teeth after meals(21). School children from Davangere were reported to brush their teeth only twice, indicating that the awareness of Saudi adults and adolescents is a bit better than other countries but is still needed to be emphasised(25).

CONCLUSION:

The awareness of adults and adolescents in Saudi Arabia about dental care is lacking. Though some aspects of dental care and dental health are well recognized, others are considerably lacking. Moreover, even when the participants knew the importance of dental care, only a minority of them were following proper dental care instructions to prevent dental caries. Therefore, a well-designed educational program is highly recommended to enhance the knowledge as well as the attitude of the Saudi children towards appropriate dental care.

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Tables

Table 1. Sociodemographic characteristics of the participants (Stratified by Gender)

Variables		**Female**		**Male**		**Total**		**`P-value ¥** **0.064 ¶**
Age: Mean (SD)		**26.46 (7.99)**		**30.04 (14.58)**		**26.93 (9.17)**		
		N	%	N	%	N	%	
Monthly Income	**5000-10000 Riyal**	36	21.30%	8	30.77%	44	22.56%	0.170
	<5000 Riyal	110	65.09%	12	46.15%	122	62.56%	
	>10000 Riyal	23	13.61%	6	23.08%	29	14.87%	
Education	**Bachelor**	130	76.92%	12	46.15%	142	72.82%	<0.001**
	High School	32	18.93%	6	23.08%	38	19.49%	
	Master	6	3.55%	6	23.08%	12	6.15%	
	PhD	1	0.59%	2	7.69%	3	1.54%	

¥ Chi-Square, ¶ t-Test, ** P-value < 0.001

Table 2. Assessment of Participants' Knowledge (Stratified by Gender)

Variables		Female		Male		Total		P-value ¥
		N	%	N	%	N	%	
Source of knowledge	Advertisement	3	1.78%	0	0.00%	3	1.54%	0.439
	Awareness Campaigns	9	5.33%	3	11.54%	12	6.15%	
	Educational Institutes	22	13.02%	2	7.69%	24	12.31%	
	From Parents or Family Members	15	8.88%	2	7.69%	17	8.72%	
	Internet	73	43.20%	15	57.69%	88	45.13%	
	The Dentist	47	27.81%	4	15.38%	51	26.15%	
what are the reasons for brushing your teeth?	Clean Bright Teeth	24	14.20%	3	11.54%	27	13.85%	0.19
	Prevention of Caries	41	24.26%	1	3.85%	42	21.54%	
	Prevention of Gum Bleeding	5	2.96%	1	3.85%	6	3.08%	
	Prevention of Oral Ulcers	4	2.37%	0	0.00%	4	2.05%	
	To Get Rid of Foul Breath	72	42.60%	16	61.54%	88	45.13%	
	To Set Good Example to Others	23	13.61%	5	19.23%	28	14.36%	
Reasons to see a dentist	Cosmetics	6	3.55%	1	3.85%	7	3.59%	0.770
	Dental Filling	9	5.33%	0	0.00%	9	4.62%	
	For Extraction	1	0.59%	0	0.00%	1	0.51%	
	For Regular Dental Check Up	62	36.69%	9	34.62%	71	36.41%	
	Tooth Ache	91	53.85%	16	61.54%	107	54.87%	
Risk of tooth-decay differ among individuals	I Don't Know	29	17.16%	8	30.77%	37	18.97%	0.256
	No	33	19.53%	4	15.38%	37	18.97%	
	Yes	107	63.31%	14	53.85%	121	62.05%	
The Main Cause of Dental Caries	Bacteria	28	16.57%	2	7.69%	30	15.38%	< 0.001**
	Chocolate	5	2.96%	5	19.23%	10	5.13%	
	Fast Food	0	0.00%	2	7.69%	2	1.03%	
	I Do Not Know	10	5.92%	1	3.85%	11	5.64%	
	Not brushing teeth after eating	90	53.25%	8	30.77%	98	50.26%	
	Soft Drinks	6	3.55%	1	3.85%	7	3.59%	
	Sweets	30	17.75%	7	26.92%	37	18.97%	
Know What Fluoride Is	No	47	27.81%	9	34.62%	56	28.72%	0.475
	Yes	122	72.19%	17	65.38%	139	71.28%	
Fluoride protects teeth against decay	No	35	20.71%	6	23.08%	41	21.03%	0.783
	Yes	134	79.29%	20	76.92%	154	78.97%	
Fluoride reverse the dental cavity	No	109	64.50%	18	69.23%	127	65.13%	0.637
	Yes	60	35.50%	8	30.77%	68	34.87%	
Where does dental plaque stick in the mouth?	All of The Above	105	62.13%	11	42.31%	116	59.49%	0.162
	Gum	6	3.55%	3	11.54%	9	4.62%	
	I Do Not Know	13	7.69%	4	15.38%	17	8.72%	
	Teeth	36	21.30%	7	26.92%	43	22.05%	
	Tongue	9	5.33%	1	3.85%	10	5.13%	
What Does Plaque Do to Your Teeth?	Change the Colour of Teeth	42	24.85%	7	26.92%	49	25.13%	0.781
	Gum Bleeding	19	11.24%	2	7.69%	21	10.77%	
	I Do Not Know	33	19.53%	7	26.92%	40	20.51%	
	Tooth Caries	75	44.38%	10	38.46%	85	43.59%	
Frequent visits to dentist prevent dental caries?	I Do Not Know	14	8.28%	5	19.23%	19	9.74%	0.114
	No	16	9.47%	4	15.38%	20	10.26%	
	Yes	139	82.25%	17	65.38%	156	80.00%	

¥ Chi-Square, ** P-value < 0.001

Table 3. Assessment of Participants' Attitude and Perception (Stratified by Gender)

Variables		Female		Male		Total		P-value ¥
		N	%	N	%	N	%	
Do you think you are at high risk for tooth-decay?	**I do not know**	25	14.79%	3	11.54%	28	14.36%	0.242
	No	39	23.08%	10	38.46%	49	25.13%	
	Yes	105	62.13%	13	50.00%	118	60.51%	
How many times a day you brush your teeth?	**Once**	74	43.79%	14	53.85%	88	45.13%	0.107
	Thrice	25	14.79%	0	0.00%	25	12.82%	
	Twice	70	41.42%	12	46.15%	82	42.05%	
What do you use to brush your teeth?	**Rinsing with toothpaste**	0	0.00%	1	3.85%	1	0.51%	0.001*
	Miswak	5	2.96%	4	15.38%	9	4.62%	
	Tooth brush	162	95.86%	20	76.92%	182	93.33%	
	Both miswak and toothbrush	2	1.18%	1	3.85%	3	1.54%	
How much time you spent on brushing teeth?	**Less than 3 minutes**	127	75.15%	22	84.62%	149	76.41%	0.571
	More than 3 minutes	11	6.51%	1	3.85%	12	6.15%	
	Three minutes	31	18.34%	3	11.54%	34	17.44%	
Do you clean your teeth after eating?	**No**	83	49.11%	18	69.23%	101	51.79%	0.056
	Yes	86	50.89%	8	30.77%	94	48.21%	
When was the last visit to dental clinic?	**Last 6 months**	95	56.21%	9	34.62%	104	53.33%	0.029*
	Last year	60	35.50%	11	42.31%	71	36.41%	
	Never visited before	14	8.28%	6	23.08%	20	10.26%	
How many times a day you eat sweets?	**I do not eat sweets everyday**	43	25.44%	10	38.46%	53	27.18%	0.515
	Once daily	34	20.12%	4	15.38%	38	19.49%	
	Thrice	45	26.63%	7	26.92%	52	26.67%	
	Twice	47	27.81%	5	19.23%	52	26.67%	
Do you eat snacks between meals?	**No**	52	30.77%	12	46.15%	64	32.82%	0.12
	Yes	117	69.23%	14	53.85%	131	67.18%	
Do you rinse your mouth with water after eating?	**No**	25	14.79%	6	23.08%	31	15.90%	0.282
	Yes	144	85.21%	20	76.92%	164	84.10%	

¥ Chi-Square, * P-value < 0.05