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Association between Education level and Oral Health Behaviors in Qatari Adults

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Received: February 12, 2020; **Published:** February 28, 2020

Abstract

Background: Oral health behaviors are culturally influenced. By focusing on several specific educational levels this study elaborates how persons from various educational backgrounds think, behave, or perceive information.

Objectives: To evaluate the association between education level and oral health behaviors among Qatari adults.

Materials and Methods: A cross-sectional questionnaire study was conducted among 859 Qatari adults, aged between 18 and 72 years to evaluate their oral health behaviors. The data was analyzed using frequencies, percentages, Chi-square test and analysis of residual test.

Results: 61.8% of the Qatari adults cleaned their teeth more than one time in a day. The majority of respondents were willingly to accept oral hygiene instructions given at each dental visit and cooperate for their oral hygiene assessment at each dental appointment. Qatari adults with higher levels of education adopted the oral hygiene instructions, which is viewed as an explicitly positive oral health behavior. Qatari adults with no formal education however, are more likely to avoid brushing completely, while interestingly, the graduate degree holders were more likely to clean their teeth before special occasions like parties or gatherings for better social acceptability.

Conclusion: In order to organize effective community oriented oral health promotion programs systematic analysis of the oral health status of the people of Qatar would be essential, including information on their Oral health Behaviors and oral hygiene practices.

Keywords: *Oral Health Behavior; Education Level; Qatari Adults*

Introduction

Oral diseases are a global public health challenge, due to their prevalence, impact on general health, economic burdens, in addition to greatly reducing quality of life for those affected [1]. The Global Burden of Disease Study 2016 estimated that oral diseases affected at least 3.58 billion people worldwide, with caries of the permanent teeth being the most prevalent of all conditions assessed [2].

The promotion of good oral hygiene at the population level is advocated and supported by the World Health Organization and the International Federation of Dentists [3,4]. The adoption of preventive strategies both at the individual and population level helps reduce the negative impact of oral diseases including improving quality of life. One critical tool identified for achieving good oral health is the institution of effective and efficient oral hygiene practices [3]. Progression of dental disorders is influenced by modifying factors like oral health behaviors [5].

Qatar is a peninsula, situated halfway along the west coast of the Arabian Gulf with an estimated population of 2,857,083 [6]. Qatar has experienced rapid socioeconomic development and associated lifestyle changes in the past decade. While this has brought about tremendous development in the healthcare sector with excellent access to medical and dental care, certain lifestyle changes such as dietary habits and tobacco use could be negatively impacting the oral health in the country [7]. Oral diseases remain a significant public health problem in the State of Qatar [8].

With the increasing population, prevention of oral diseases should be a key priority in the mission to improve the oral health of the people in Qatar and globally. Oral health behavior refers to the actions carried out or practiced by an individual or group to prevent dental diseases. Tooth brushing and interdental cleaning have proved to be the most significant factors in preventing oral infection diseases. Observing regular dental visits for preventive treatments, prophylaxis and professional reinforcement in oral hygiene instruction seems to be the key behavior for preventing these diseases [9].

Reports from United States of America, Australia, and Africa show that oral heath behaviors are influenced by socio-demographic characteristics. People with higher education and higher socio-economic status have been reported to exhibit better oral hygiene habits and utilization of dental services [10-13].

Oral health behaviors are culturally influenced. Epidemiological data regarding oral health behavior of Qatari adults is scarce. Such information is critical to help policy makers and healthcare professionals identify subgroups of the Qatari population and design programs to improve their oral health. This study was conducted to evaluate the association between education level and oral health behaviors among Qatari adults. By focusing on several specific educational levels this study recognizes how persons from various educational backgrounds think, perceive and behave regarding their oral health.

Methods

Study design: This descriptive, cross-sectional study was conducted to evaluate oral health behavior of Qatari adults.

Ethical approval: The study protocol followed the World Medical Association Declaration of Helsinki (version 2008) and was evaluated and approved by Institutional Review Board of University of Old Dominion. Subjects who agreed to participate were informed of the study's purpose and contents of the questionnaire in a covering letter and they voluntarily signed the consent form.

Survey instrument: The data collection tool was a self-administered, structured, anonymous questionnaire. It was used assess to the oral health behavior of participants. The questionnaire consisted of two sections: Demographic characteristics and Oral health behaviors. The content validity of the questionnaire was established by a panel of dental experts at Old Dominion University. Since Arabic is the official language of Qatar, the covering letter, consent form and questionnaires were translated into Arabic.

Pilot study: Prior to the main study a pilot study was conducted on 20 Arab college students at University of Old Dominion. It was noted that the questionnaire could be completed in 10 minutes duration. The test-retest correlation value was 0.85 indicating acceptable reliability.

Sampling design: Non probability sampling technique was used. A convenience sample of 900 Qatari adults were included in the study, with 300 adults drawn from each of the selected Government hospital, Health center and private dental clinic. This multicenter based cross-sectional study was conducted by distributing 20-25 questionnaires to the Qatari adults scheduled for their dental appointments during the working hours in these centers. The data collection was completed in a duration of 2 months.

Statistical analysis: The recorded data was compiled and entered in a spreadsheet computer program and then exported to data editor page of SPSS version 25 (SPSS Inc., Chicago, Illinois, USA). The data was analyzed using frequencies, percentages, Chi-square test and the analysis of residual test. The analysis of residuals procedure, which tests the discrepancies between the observed and expected values, was used to determine which values were larger than what might be expected by chance.

Results

900 Qatari adults were invited to participate in the study. 4.5% participants' responses were excluded from analysis due of incomplete/ missing data. The total study population comprised of 859 Qatari adults, aged 18-72 years, comprising of 358 males and 501 females.

Demographic characteristics of the participants are presented in table 1. Regarding highest level of education attained, 5% of the respondents reported no formal education, 10.8% reported elementary school, 29.6% reported high school diploma, 49.2% were baccalaureate graduates and 5.4% of the respondents had graduate degrees.

		Number	Percentage (%)
Age	18 - 25	356	41.4
	26 - 32	262	30.5
	33 - 40	128	14.9
	41 - 48	66	7.7
	49 - 56	28	3.3
	57 - 64	10	1.2
	65 - 72	9	1.0
Gender	Male	358	41.7
	Female	501	58.3
Education level	No formal education	43	5.0
	Elementary school	93	10.8
	High school	254	29.6
	Baccalaureate	423	49.2
	Graduate degree	46	5.4

Table 1: *Demographic characteristics of the study population.*

Table 2 summarizes the Oral Health Behaviors of the Qatari adults. Great majority of the Qatari adults (n= 756) used tooth brush and tooth paste to clean their teeth. Alternate cleaning methods like miswak (twig made from Salvadora Persica tree) and use of salt and charcoal were also reported. Many adults used more than one method to clean their teeth. Only 27.9% practiced tooth brushing technique learnt from the dental clinic. 26.4% used dental floss for interdental cleaning and 24.2% used professionally recommended mouth wash. 75% Qatari adults had visited a dental clinic for professional tooth cleaning.

Frequency of cleaning the teeth with tooth brush, use of dental floss, visit to dental clinic, arriving late for dental appointment and behavior towards oral hygiene assessment during each dental visit were significantly associated with the education (Table 3).

Analysis of residual tests are indicated in table 4. In regard to the level of education, 4 Qatari adults who reported no formal education were more likely to not brush their teeth and less likely to brush more than once in a day. 62 Qatari adults with elementary education and 275 with baccalaureate degrees were more likely to brush their teeth more than once a day. 83 Qatari adults with high school education were more likely to brush their teeth once a day. 10 Qatari adults with graduate degrees were more likely on special occasions.

		N	%
Method of cleaning the teeth	Tooth brush and tooth paste	756	
	Charcoal and salt	51	
	Miswak	180	
Frequency of cleaning the teeth with tooth brush	No cleaning	22	2.6
	Cleaning on special occasions	17	2.0
	Once a month	7	0.8
	Once a week	31	3.6
	Once a day	251	29.2
	More than once a day	531	61.8
Time when the teeth are cleaned	After waking up	641	
	After breakfast	158	
	After dinner	270	
	Before going out	201	
	Before going to bed	485	
	Prior to special occasions (parties etc.)	228	
	Others	57	
Time spent in cleaning the teeth	Less than one minute	151	17.6
	More than one but less than 2 minutes	358	41.7
	More than 2 but less than 3 minutes	180	20.9
	More than 3 but less than 4 minutes	86	10.0
	More than 4 but less than 5 minutes	50	5.8
	More than 5 minutes	34	4.0
Technique used for brushing teeth	Their own technique	449	52.3
	Technique taught in dental clinic	240	27.9
	No special technique	141	16.4
	Other	29	3.4
Use of dental floss	Yes	227	26.4
	No	632	73.6
Use of mouthwash	No	419	48.8
	Salt + water	134	15.6
	Mouthwash recommended by dentist/ dental hygienist	208	24.2
	Any commercial mouthwash	79	9.2
	Others	19	2.2
Visit to dental clinic for professional cleaning	Yes	639	74.4
	No	220	25.6

Table 2: *Oral health behavior of Qatari adults.*

		N	%	χ^2	df	p value
Frequency of cleaning the teeth with tooth brush	No cleaning	22	2.6	37.889	20	.009**
	Cleaning on special occasions	17	2.0			
	Once a month	7	0.8			
	Once a week	31	3.6			
	Once a day	251	29.2			
	More than once a day	531	61.8			
Time spent in cleaning the teeth	Less than one minute	151	17.6	24.399	20	.225
	More than one but less than 2 minutes	358	41.7			
	More than 2 but less than 3 minutes	180	20.9			
	More than 3 but less than 4 minutes	86	10.0			
	More than 4 but less than 5 minutes	50	5.8			
	More than 5 minutes	34	4.0			
Use of dental floss	Yes	227	26.4	54.036	4	.000**
	No	632	73.6			
Frequency of dental visits	Never	81	9.4	41.983	16	.000**
	Once a year	91	10.6			
	Twice a year	106	12.3			
	Only for tooth ache	419	48.8			
	Only when cosmetically desired	162	18.9			
Reason for late arrival for the dental appointment	To avoid oral care instructions	96	11.2	24.467	12	.018**
	Due to other commitments	511	59.5			
	Due to scheduling conflict	131	15.3			
	Others	121	14.0			
Behavior towards receiving oral health instructions during each dental visit	Refuse listening to the instructions	65	7.6	13.196	12	.355
	Change to another dental clinic	33	3.8			
	Accept the instructions as it will improve my health	701	81.6			
	Other reactions	60	7.0			
Behavior towards oral hygiene assessment on each visit	Refusal	29	3.4	20.441	12	.059**
	Insist on having teeth cleaned only	67	7.8			
	Accept only if time permits	160	18.6			
	Always accept, to monitor my progress	603	70.2			
Behavior towards multiple appointments for professional tooth cleaning	Do not like it, want cleaning in one visit	167	19.4	11.859	8	.158
	Will not return	67	7.8			
	Will comply	625	72.8			

Table 3: *Association of Oral Health Behaviors of Qatari adults with education.*

		No formal education			Elementary			High school			Baccalaureate			Graduate		
1.	Tooth brushing frequency	n	%	R	n	%	R	n	%	R	n	%	R	n	%	R
	No cleaning	4	9.3	2.9	4	4.3	1.6	6	2.4	-0.5	6	1.4	-4.8	2	4.3	0.8
	Cleaning on special occasions	3	7.0	2.1	1	1.1	-0.8	4	1.6	-1.0	7	1.7	-1.4	2	4.3	1.1
	Once a month	0	0	-0.4	2	2.1	1.2	3	1.1	0.9	1	0.2	-2.4	1	2.3	0.6
	Once a week	3	7.0	1.4	3	3.2	-0.4	14	5.5	4.8	9	2.1	-6.3	2	4.3	0.3
	Once a day	12	27.9	-0.6	21	22.6	-6.2	83	32.7	8.8	125	29.6	1.4	10	21.8	-3.4
	More than once a day	21	48.8	-5.6	62	66.7	4.5	144	56.7	-13.0	275	65.0	13.5	29	63.0	0.6
2.	Frequency of dental visits	n	%	R	n	%	R	n	%	R	n	%	R	n	%	R
	Never	10	23.3	5.9	13	14.0	4.2	31	12.2	7.0	25	5.9	-14.9	2	4.3	-2.3
	Once a year	1	2.3	-3.6	14	15.1	4.1	11	4.3	-15.9	59	13.9	14.2	6	13.0	1.1
	Twice a year	6	14.0	0.7	12	12.8	0.5	29	11.4	-2.3	52	12.3	-0.2	7	15.2	1.3
	Only for tooth ache	19	44.1	-2.0	40	43.0	-5.4	128	50.4	4.1	210	49.6	3.7	22	47.8	-0.4
	Only when cosmetically desired	7	16.3	-1.1	14	15.1	-3.5	55	21.7	7.1	77	18.3	-2.8	9	19.7	-0.3
3.	Reason for late arrival for dental appointments	n	%	R	n	%	R	n	%	R	n	%	R	n	%	R
	To avoid oral care instructions	6	13.9	1.2	17	18.3	6.6	30	11.8	1.6	34	8.0	-13.3	9	19.6	3.9
	Due to other commitments	26	60.5	0.4	57	61.3	1.7	141	55.5	-10.1	267	63.1	15.4	20	43.5	-7.4
	Due to scheduling conflict	4	9.3	-2.6	14	15.1	-0.2	45	17.7	6.3	58	13.7	-6.5	10	21.7	3.0
	Others	7	16.3	0.9	5	5.3	-8.1	38	15.0	2.2	64	15.2	4.4	7	15.2	0.5
4.	Behavior towards oral hygiene assessment on each visit	n	%	R	n	%	R	n	%	R	n	%	R	n	%	R
	Refusal	3	7	1.5	7	7.5	3.9	5	2.0	-3.9	12	2.8	-2.3	2	4.3	0.4
	Insist on having teeth cleaned only	5	11.6	1.6	11	11.9	3.7	26	10.2	6.2	22	5.2	-11.0	3	6.6	-0.6
	Accept only if time permits	10	23.3	2.0	15	16.1	-2.3	47	18.5	-0.3	82	19.4	3.2	6	13.0	-2.6
	Always accept, to monitor my progress	25	58.1	-5.2	60	64.5	-5.3	176	69.3	-2.3	307	72.6	10.1	35	76.1	2.7

Table 4: *Cross-tabulations with analysis of residual test between Oral Health Behavior and education level: (R= Residual analysis test).*

Residual test results also showed that Qatari adults who had no formal education and elementary level education would likely never visit the dental hygienist/dentist. High school educated Qatari adults were more likely to visit the dental professionals for cosmetic reasons. Qatari adults holding baccalaureate degrees were more likely to visit the dental hygienist/dentist once a year, while Qatari adults with graduate degrees were less likely to avoid visiting the dental hygienist/dentist, and more likely to visit the dental clinic once or twice a year.

Regarding the level of education and the reason Qatari adults arrive late for dental appointments, Qatari adults who had no formal education were more likely to arrive late to avoid oral care instructions and less likely to arrive late because of scheduling conflict. Qatari adults with elementary education and those holding graduate degrees were also more likely to arrive late to avoid oral care instructions. 45 of the Qatari adults with high school education were more likely to arrive late because of scheduling conflict and 267 with baccalaureate degrees were more likely to arrive late due to other commitments.

Qatari adults who had no formal education were more likely to accept their oral hygiene examined only if time permitted. 7 respondents with elementary school education were more likely to refuse their oral hygiene assessment at each visit. 26 of the Qatari adults with high school education were more likely to insist on only having their teeth cleaned. 307 with baccalaureate degrees and 35 with graduate degrees were more likely to accept their oral hygiene assessment at each visit to monitor their progress.

Discussion

Across the world there is a realization that healthcare systems need to do more than simply treat the disease, rather they must focus their efforts on sustaining health and preventing disease. As a nation, Qatar has come a long way in terms of healthcare. The pace of change over the past few decades within its health system have been tremendous. It has developed several health strategies that have delivered real and sustainable improvements in public health [14]. Qatar has laid the essential foundation for the National Oral Health Strategy, realizing that oral health is an important tool for achieving good general health and is prioritizing oral health promotion activities.

The oral health behavior of Qataris is influenced by their cultural norms, values, lifestyles and preferences running down from ancestors [15]. This study describes the Oral Health Behavior and its association with education level among Qatari adults. It helps in better understanding of the oral health needs of the people in Qatar and serves as an integral aid for implementing oral health promotion programs.

Greater diversity in educational levels is evaluated in this research compared to others, where people have been categorized as having greater/lesser than either 12 years of education or primary/secondary school education levels [8,9]. Focusing on several specific educational levels study has enabled us to determine how people from various educational backgrounds think, perceive and behave regarding their oral health.

Previous studies have reported oral hygiene practices being significantly related to education, although data reveals great variability among countries [16,17,20,21]. This study aimed to explore the association between their education level and Oral Health Behaviors among Qatari adults.

We found that 61.8% of the Qatari adults clean their teeth more than one time in a day. Only 2.6% of Qatari adults reported not cleaning their teeth. The proportion of Qatari adults not cleaning their teeth is relatively low compared to the findings in Iran (9.7%) [22] and Africa (35%) [23]. Qatar is a Muslim-majority country with Islam as the state religion. Muslims perform Wuḍū' in preparation for formal prayers 5 times in a day and before handling and reading the Qur'an. Wudu involves gargling the mouth with water and is an important part of ritual purity in Islam. Our findings concur with the study done in Kuwait, where people share a similar culture, and have reported 62% people cleaning their teeth twice daily [17], whereas data from South America shows 84.2% for the same [9]. Results obtained by Thapa., *et al.* showed only 10% of the population reported cleaning their teeth twice a day [18]. Majority of studies have reported higher proportion of people cleaning the teeth once in a day [18,22] compared to our study.

Overall substantial number of Qatari adults used tooth brush and tooth paste to clean their teeth. 180 Qatari adults also reported using miswak to clean their teeth. This number is inclusive of those who used Miswak besides toothbrush and paste as well as those who follow it as a religious belief, adhering to the recommendations of Prophet Mohammed. Some respondents prefer its usage as it possesses antibacterial properties. Another Middle Eastern study has also reported common usage of miswak [17].

Qatari adults with no formal education are more likely to avoid brushing completely, while interestingly, the graduate degree holders were more likely to clean their teeth before special occasions like parties or gatherings for better social acceptability. Although graduate level Qatari adults may qualified in their fields, having knowledge about the value of tooth brushing was not very favorable in this segment of the sampled population as only 63% among them cleaned their teeth more than once in a day.

None of the previous studies had enquired about the technique used for cleaning the teeth. We found that nearly three fourth of the Qatari adults studied did not follow the correct tooth brushing technique recommended the dentist/ dental hygienist. They feel they do not need instructions, but can take care of themselves, provided they are given the right information. These types of people have been referred to as "the internalized preventive patients" by Boyer [24]. This pertinent finding from our study highlights the need for more effective oral health awareness programs to educate the people and empower them to be more cognizant of their responsibilities towards their oral health.

Furthermore, our study revealed that nearly half of the Qatari adults visit the dental clinic when they suffer from tooth ache. Our findings collaborate with others [9,16,17,23], reporting emergency treatment for toothache being the primary reason for dental visit. In our study, 74.4% had undergone a professional dental cleaning, which is higher than 22.9% reported in Kuwait [17]. Dental Services are provided free of charge for Qataris in the government health facilities by State of Qatar.

Low frequency of visit to dental clinic by Qatari adults is significantly associated with the level of education which may be attributed to lack of knowledge about prevention of oral diseases or lack of awareness about contemporary dental care and treatments. When the Qatari adults with lower levels of education experience pain, they probably have their own traditional treatments like use herbs to relieve pain or they may avoid visiting dental clinic out of fear of unknown.

Data suggest that Qatari adults with no formal education and elementary school education were more likely to avoid the visiting the dental hygienist/dentist, those with high school education were more likely to visit for cosmetic reasons. Perhaps less educated Qatari people adhere to the traditional philosophy that healthcare is sought only when absolutely necessary. People with higher levels of education have the knowledge to seek regular dental care and understand how it could benefit them. They probably have learnt the oral health concepts from their schools or through the media.

People who are less educated tend to have external loci of control and would therefore perceive dental diseases in fatalistic terms. In contrast, people with higher levels of education tend to have internal loci of control and therefore embrace preventive dental concepts.

Majority (81.6%) of the respondents in this study would accept the oral hygiene instructions, which is viewed as a positive dental health behavior by the Qatari people.

Responses revealed that 11.2% of the Qatari adults arrive late to avoid oral care instructions. This behavior is considered a variation of noncompliance. When noncompliance is intended, it may be a well-informed patient choice. When noncompliance is unintentional, it may be from ignorance or lack of information [25].

70.2% of the Qatari adults had a favorable behavior towards their oral hygiene assessment at each dental visit, however 30% were unwilling. These findings reveal that Qatari adults need to be educated about the importance of regular oral health assessment during each visit to monitor their compliance to oral hygiene instruction and for early diagnosis of oral diseases. Qatar is in need of Dental Hygiene Programs, to train dental hygienists who would contribute towards improving the oral health of the people of Qatar by providing preventive, therapeutic and educational services.

Our findings reflect that adults with no formal education were more likely to want their oral hygiene assessed only if time permitted, whereas Qatari adults with baccalaureate or graduate degrees were more likely to accept their dental hygiene check at each visit. These findings imply that Qatari adults with lower levels of education give low priority given to oral health problems as they are not life threatening. Other reasons for refusal may include embarrassment on having their teeth examined and their tendency to arrive late for dental appointments.

With regard to behavior towards multiple appointments, although some of the respondents (19.4%) wanted their teeth cleaned at one appointment, majority of the Qatari adults (72.8%) would comply with multiple appointments for oral prophylaxis.

Qatari adults with lower levels of education thought that professional teeth cleaning was a simple cosmetic procedure that may be completed at one appointment. In contrast well-educated Qatari adults were more proactive and committed to adopt good oral health behaviors. They were also more likely to care about their teeth and trust the dental professional for treatments necessitating several visits. Since the dental services are provided free of cost for Qatari citizens within the governmental dental clinics, there is no economic barrier preventing Qatari adults from returning for professional care. Evidence from our study reflects that the level of education has a major influence on an individual's perceptions and consequently affects their oral health-promotive behaviors.

Conclusion

Qatar is in the process of developing National Oral Health Strategy and the Government has given utmost priority to Oral Health Promotion and Disease Prevention. In order to organize effective community oriented oral health promotion programs systematic analysis of the oral health status of the people of Qatar would be essential, including information on their Oral health Behaviors and oral hygiene practices. The present study showed that lower levels of education were found to be associated with some Oral Health Behaviors among Qatari adults, like decreased usage tooth brush to clean their teeth, less frequent dental visits, incorrect tooth brushing technique, unfavorable behavior towards receiving oral hygiene instructions, oral hygiene assessment during dental visits and compliance towards multiple appointments. These factors consequently would lead to deterioration of oral health. Conversely, increased exposure to education leads to better Oral Health Behaviors. Such a detailed analysis of the oral health behavior with regards to the level of education is critical to help policy makers and dental professionals identify subgroups of the Qatari population and design programs to deliver effective oral health education and behavior modification strategies relevant to Qatar.

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Volume 19 Issue 3 March 2020