

Oral health of children in association with gender and mothers' education: A comparative cross-sectional study

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Abstract

Objective To evaluate the association between gender and mothers' education, and the oral hygiene of their children.

Methods This comparative cross-sectional study included 531 children in Jeddah, Saudi Arabia. Arabic was chosen for this survey to avoid possibilities of language barriers, followed by data analysis and segregation from the survey. Students were stratified according to gender and their mother's education. Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 25.

Results Brushing twice daily, using the dental floss, using fluoridated toothpaste, using mouthwash regularly, and bruxism were higher among females than males (58% vs. 28%, 28.2% vs. 10.9%, 71% vs. 30%, 55% vs. 35% and 16.5% vs. 9.8%, respectively) with a significant difference ($p < 0.001$, < 0.001 , < 0.001 , < 0.001 and < 0.001 , respectively). Meanwhile, using toothpick, clenching, and biting on hard objects were higher among males than females (49.3% vs. 34.9%, 21.7% vs. 7.1% and 46.7% vs. 34.9%, respectively) with a significant difference (< 0.001 and < 0.001 , respectively). Going to dentists during the last 3 months was significantly higher among females than males (47% vs. 33%), with a significant difference ($p < 0.001$). On the other hand, going to dentists every 6 months was notably higher among males than females (22% vs. 17%) ($p < 0.001$). Regular check-ups were higher among females (27.8% vs. 16.7%), with a significant difference ($p = 0.007$). In accordance with the mothers' education, brushing more than twice daily, manual toothbrush, electrical toothbrush, dental floss, and using toothpaste were significantly higher among those who received a university and post-graduate education ($p < 0.001$, < 0.001 , < 0.001 , and 0.049, respectively). Going to dentists during the previous 3 and 6 months was higher among those who received a university and post-graduate education ($p = 0.001$).

Conclusions Girls and children whose mothers had a university and post-graduate education had better attitudes toward oral hygiene. Therefore, we highly recommend more oral hygiene health education programs, especially for mothers with less education.

Keywords Oral health, Oral hygiene, Mothers education

Introduction

The World Health Organization (WHO) states that oral health is considered a part of the general well-being and is an essential element for good quality of life.¹ Good oral health helps us speak, smile, taste, chew, swallow, and express ourselves confidently.^{2,3} Besides, it affects appearance, by allowing people to perform their daily activities without psychological or social limitations (Shah and ElHaddad, 2015) not many people are aware of the relationship of smoking with potential oral diseases. Therefore, the aims of this study were to analyze oral hygiene behavior, smoking habits, and perceived oral health problems among a sample of university students in Al-Kharj, Saudi Arabia. **Materials and Methods:** A self-administered questionnaire about oral hygiene behavior, smoking, and perceived oral health problems was developed. The questionnaires were mainly distributed in Medical, Dental, and Pharmacy colleges of the university. Questionnaires completed at other colleges were included under the term "other colleges." **Results:** Overall, 380 questionnaires were returned. Majority of the students (92.4%). This depends on several factors, such as personal attitudes, behaviors, and knowledge. In the literature, the focus was mainly on the cure for oral diseases rather than prevention.⁴

Several behavioral models, such as the health belief model and reasoned action theory, established the significant role of knowledge in behavioral changes explanation.⁵ Parents' knowledge and attitudes play an essential role in raising the

awareness in their children and encouraging them to have a healthy life.⁶ Additionally, parents' involvement in health promotion programs can improve children's health, and further, the mothers' higher education elevated their children's oral health.⁷ Moreover, the lack of the mothers' knowledge about oral hygiene may be one of the contributing factors for the dental caries' high prevalence among children.⁸ Therefore, poor parenting may be one of the etiological factors for dental caries.⁹ It was reported that children of mothers with positive oral attitudes were more likely to brush their teeth twice daily (Z, Virtanen, Ghofranipour, & Murtomaa, 2008).

So far, no studies have been conducted in Saudi Arabia to assess the effect of mothers' education on the oral hygiene of children. The study aimed to evaluate the association between gender and the mothers' education, and the oral hygiene of their children.

Methods

This comparative cross-sectional study included 531 children in Jeddah, Saudi Arabia. An electronic database search was performed using Google Scholar and PubMed to gather background information and data related to the research question and to determine the knowledge gap. Arabic was chosen for this survey to avoid possibilities of language barriers, followed by data analysis and segregation from the survey. Students were stratified according to their gender and their mother's education.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 25. Categorical variables are presented as numbers and percentages. Results were compared using the Chi-square test and the Monto Carlo test. All the tests were 2-tailed, and a p-value <0.05 was considered statistically significant.

Ethical considerations: The study was approved by the Research Ethics Committee of the Faculty of Dentistry (REC-FD), and consent was approved by the parents before any data collection.

Results

Out of the 531 students, the mothers of 250 (47.1%) students had a university and post-graduate education, whereas the number of students with fathers having a university or post-graduate education were 353 (66.5%) (Table 1).

According to oral hygiene habits, when comparing both genders, brushing twice daily, using the dental floss, fluoridated toothpaste, and mouthwash regularly, and bruxism were higher among females than males (58% vs. 28%, 28.2% vs. 10.9%, 71% vs. 30%, 55% vs. 35% and 16.5% vs. 9.8%, respectively) with a significant difference ($p < .001$, $< .001$, $< .001$, $< .001$, and $< .001$, respectively). However, using toothpick, clenching, and biting on hard objects were higher among males than females (49.3% vs. 34.9%, 21.7% vs. 7.1%, and 46.7% vs. 34.9% respectively) with a significant difference ($< .001$ and $< .001$, respectively) (Table 2, Figs 1, 2, 3, 4, and 5).

When comparing dental history between both sexes, going to dentists during the last 3 months was higher among females than males (47% vs. 33%), with a significant difference ($p < .001$). Contrarily, going to dentists every 6 months was significantly higher among males than females (22% vs. 17%) ($p < .001$). Additionally, regular check-ups were higher among females (27.8% vs. 16.7%), with a significant difference ($p = .007$) (Table 3, Figs 6 and 7).

While evaluating the oral hygiene habits with regard to the mothers' education, brushing more than twice daily, using a manual/electrical toothbrush, using dental floss, and using toothpaste were significantly higher among those with a university and post-graduate education ($p < .001$, $< .001$, $< .001$, and $< .01$, respectively) (Table 4, Figs 8 and 9).

When comparing dental history according to the mothers' education, going to the dentist during the previous 3 and 6 months was higher among those with a university and post-graduate education ($p = .001$) (Table 5).

Table 1. Family education of the sample (n=531).

		N	Percent
1. What education does your mother have?	University and postgraduate	250	47.1
	Secondary and preparatory	75	14.1
	Others	206	38.8
2. What education does your father have?	University and postgraduate	353	66.5
	Secondary and preparatory	31	5.8
	Others	147	27.7

Note. All variables are summarized as percentage

Discussion

This comparative cross-sectional study was conducted at King Abdul-Aziz University and included 531 children. It assessed the association between mothers' education and gender and oral health practices among their children.

The outline suggests that females and children of mothers with a university and post-graduate education showed better attitudes toward oral hygiene habits and dentist visits.

In the gender-based oral health comparison in our sample, brushing twice daily, using the dental floss, fluoridated toothpaste, and mouthwash regularly, and bruxism was higher among females than males. However, using toothpick, clenching, biting on hard objects was higher among males than females. Therefore, we can conclude that females are more committed to oral health and hygiene. This could be due to their aesthetic concerns and the presentation of their smile. This finding is similar to a study by Singh et al¹⁰, who found that the male gender was significantly related to dental caries. Additionally, a study by Kumar et al¹¹ found that females had better knowledge and oral health practices than males.¹¹ Similarly, a study by Jaber et al found that males had good knowledge but poor practice toward oral health.¹²

When comparing the dental history and commitment to visits between both genders, females showed more commitment than males, which is similar to a study by McDonald,¹³ who also reported similar results.

Regarding the oral hygiene habits, in association with the mothers' education, brushing twice daily, using the manual toothbrush and electrical toothbrush, was higher among those with a university and post-graduate education. This is on par with a study by Hallas et al⁸, who found that lack of knowledge of mothers regarding oral hygiene might be one of the contributing factors for the high dental caries prevalence in children. Additionally, a study by Z, Virtanen, Ghofranipour, and Murtomaa (2008) found that children of mothers with positive attitudes were more likely to brush their teeth twice daily.

This study showed the difference in oral health and attitudes among girls and boys, children of mothers with a university or post-graduate education, and with secondary or primary education. Thus, we highly recommend more oral hygiene health education programs, especially for mothers with less education.

Data were collected via an online survey that had some restrictions, such as the likelihood of inaccurate information, as the survey is in the form of multiple-choice questions. Respondents may not feel comfortable providing answers that present themselves in an unfavorable manner.

Conclusion

Females had a better attitude toward oral hygiene than males. Moreover, children whose mothers had a university and post-graduate education also had better attitudes toward oral hygiene habits and dentist visits. Thus, we highly recommend more oral hygiene health education programs, especially for mothers with less education. The literature review suggests that no studies have been conducted in Saudi Arabia to assess the effects of the mothers' education on oral hygiene of children. Further research is needed to determine oral health problems based on clinical examination and comprehensive

Table 2. Oral hygiene habits according to gender.

		boys		girls		P-value
		N	%	N	%	
1. How often do you brush your teeth?	Never	2	1%	0	0%	<0.001*
	Once or a few times a week	43	16%	4	2%	
	Once a day	119	43%	30	12%	
	Twice a day	78	28%	149	58%	
	More than twice a day	23	8%	61	24%	
	Other	11	4%	11	4%	
2. What do you use to brush your teeth?	Manual toothbrush	233	84.4%	217	85.1%	0.003*
	Manual and electrical toothbrush	6	2.2%	2	0.8%	
	Manual toothbrush and miswak	12	4.3%	2	0.8%	
	Electrical toothbrush	20	7.2%	26	10.2%	
	Miswak	0	0.0%	5	2.0%	
	None	2	0.7%	3	1.2%	
	Other	3	1.1%	0	0.0%	
3. Which of the following product do you use to clean between your teeth?	Dental floss	30	10.9%	72	28.2%	<0.001*
	Dental floss and Interdental brush	5	1.8%	7	2.7%	
	Dental floss and Toothpick	5	1.8%	2	0.8%	
	Interdental brush	26	9.4%	21	8.2%	
	Interdental brush and Toothpick	6	2.2%	0	0.0%	
	Toothpick	136	49.3%	89	34.9%	
	None	65	23.6%	60	23.5%	
	Other	3	1.1%	4	1.6%	
4. Do you use any toothpaste while brushing?	Yes	269	97%	236	93%	0.009**
	No	7	3%	19	7%	
5. What kind of toothpaste do you use?	Fluoridated	82	30%	182	71%	<0.001*
	Non-fluoridated	8	3%	0	0%	
	Do not know	184	67%	73	29%	
6. Do you use any mouthwash regularly?	Yes	96	35%	141	55%	<0.001**
	No	178	65%	114	45%	
7. Do you have any of the following oral habits?	Bruxism	27	9.8%	42	16.5%	<0.001**
	Clenching	60	21.7%	18	7.1%	
	Biting on a hard object	129	46.7%	89	34.9%	
	Other	60	21.7%	106	41.6%	

Note. All variables are summarized as percentage.
 The test of significance was carried out at 0.05 level.
 *Monte Carlo test was used.
 **Chi-Square test was used.
 Significant results are in bold.

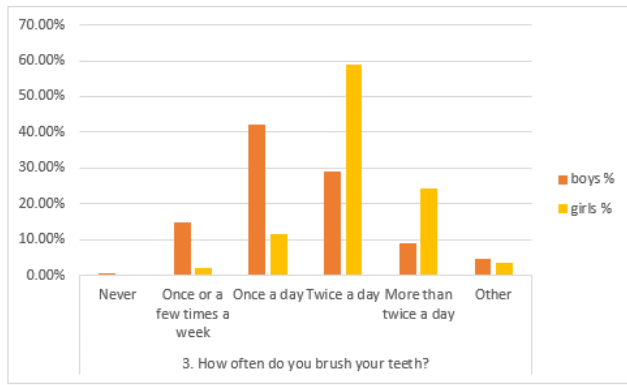


Fig. 1 Toothbrushing according to gender.2017 (n=8665).

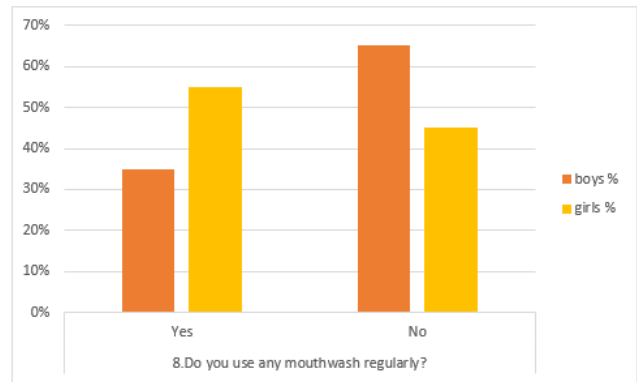


Fig. 4 Mouthwash use according to gender.

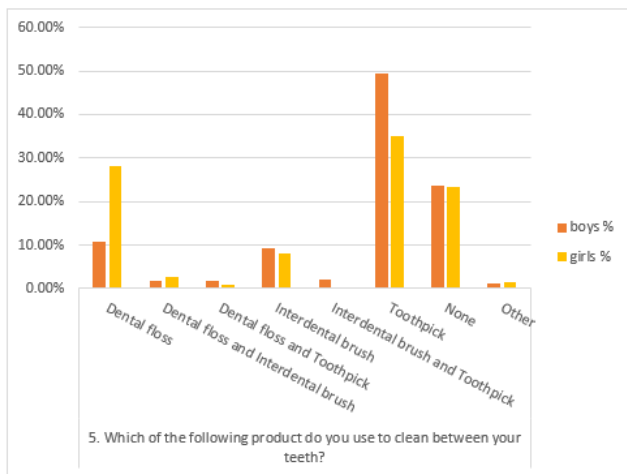


Fig. 2 Cleaning product use according to gender.

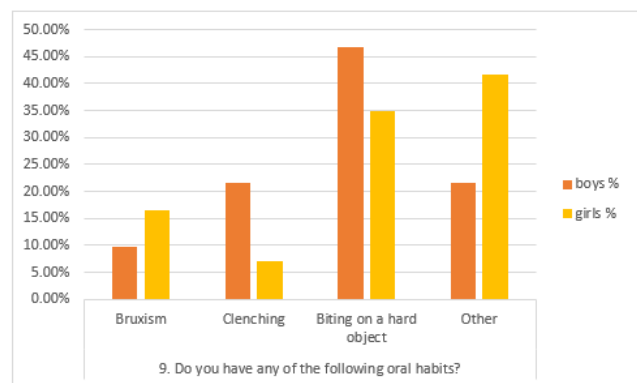


Fig. 5 Oral habits according to gender.

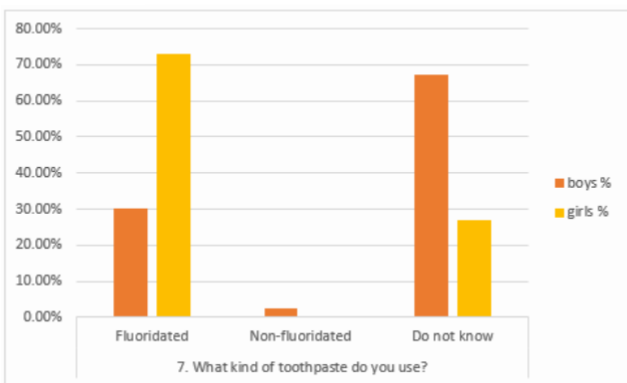


Fig. 3 Toothpaste type according to gender.

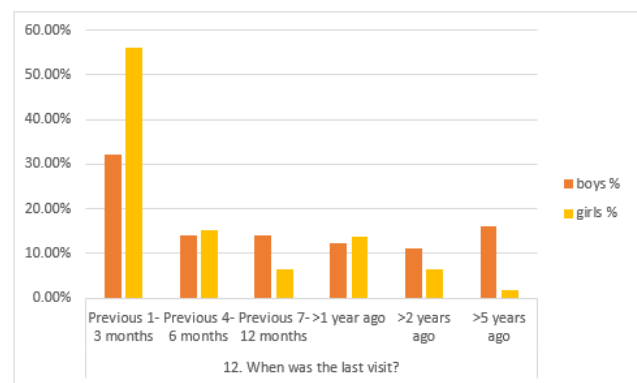


Fig. 6 Dentist last visit according to gender.

Table 3. **Dental history according to gender.**

		Boys		Girls		P-value
		N	%	N	%	
1. Have you ever been to a dentist?	Yes	266	96%	250	98%	0.248**
	No	10	4%	5	2%	
2. If yes, how often do you visit a dentist?	Every 6 months	61	22%	43	17%	0.001*
	Every year	5	2%	16	6%	
	Irregularly	61	22%	39	15%	
	Only when in pain	119	43%	109	43%	
	Other	30	11%	45	18%	
3. When was the last visit?	Previous 1–3 months	90	33%	121	47%	<0.001**
	Previous 4–6 months	39	14%	44	17%	
	Previous 7–12 months	41	15%	19	7%	
	>1 year ago	33	12%	38	15%	
	>2 years ago	31	11%	23	9%	
4. What was the purpose of the visit?	>5 years ago	42	15%	10	4%	0.007**
	Regular check-up (dental examination)	46	16.7%	71	27.8%	
	Cleaning the teeth	40	14.5%	35	13.7%	
	Filling	68	24.6%	46	18.0%	
	Extraction	33	12.0%	18	7.1%	
Orthodontic treatment	63	22.8%	51	20.0%		
Other	26	9.4%	34	13.3%		

Note. All variables are summarized as percentage.
The test of significance was carried out at 0.05 level.
*Monto Carlo test was used.
**Chi- Square test was used.
Significant results are in bold.

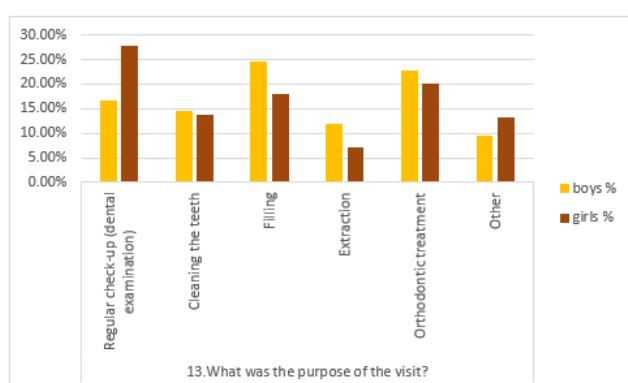
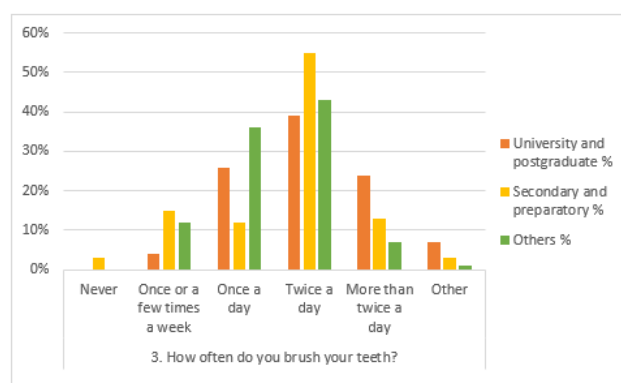
Fig. 7 **Purpose of the visit according to gender.**Fig. 8 **Toothbrushing according to mothers' education.**

Table 4. Oral hygiene habits according to mother's education.

		University and postgraduate		Secondary and preparatory		Others		P-value
		N	%	N	%	N	%	
1. How often do you brush your teeth?	Never	0	0%	2	3%	0	0%	<0.001*
	Once or a few times a week	11	4%	11	15%	25	12%	
	Once a day	65	26%	9	12%	75	36%	
	Twice a day	97	39%	41	55%	89	43%	
	More than twice a day	60	24%	10	13%	14	7%	
	Other	17	7%	2	3%	3	1%	
2. What do you use to brush your teeth?	Manual toothbrush	207	82.8%	66	88.0%	177	85.9%	<0.001*
	Manual and electrical toothbrush	0	0.0%	0	0.0%	8	3.9%	
	Manual toothbrush and miswak	2	0.8%	0	0.0%	12	5.8%	
	Electrical toothbrush	33	13.2%	7	9.3%	6	2.9%	
	Miswak	5	2.0%	0	0.0%	0	0.0%	
	None	0	0.0%	2	2.7%	3	1.5%	
	Other	3	1.2%	0	0.0%	0	0.0%	
3. Which of the following product do you use to clean between your teeth?	Dental floss	69	27.6%	15	20.0%	18	8.7%	<0.001*
	Dental floss and Interdental brush	9	3.6%	0	0.0%	3	1.5%	
	Dental floss and Toothpick	2	0.8%	2	2.7%	3	1.5%	
	Interdental brush	28	11.2%	4	5.3%	15	7.3%	
	Interdental brush and Toothpick	2	0.8%	0	0.0%	4	1.9%	
	Toothpick	89	35.6%	38	50.7%	98	47.6%	
	None	49	19.6%	14	18.7%	62	30.1%	
	Other	2	0.8%	2	2.7%	3	1.5%	
4. Do you use any toothpaste while brushing?	Yes	236	94%	68	91%	201	98%	0.049*
	No	14	6%	7	9%	5	2%	
5. What kind of toothpaste do you use?	Fluoridated	144	58%	45	60%	75	37%	<0.001*
	Non-fluoridated	5	2%	0	0%	3	1%	
	Do not know	101	40%	30	40%	126	62%	
6. Do you use any mouthwash regularly?	Yes	121	49%	29	39%	87	42%	0.193**
	No	127	51%	46	61%	119	58%	
7. Do you have any of the following oral habits?	Bruxism	42	16.8%	9	12.0%	18	8.7%	0.004**
	Clenching	21	8.4%	15	20.0%	42	20.4%	
	Biting on a hard object	103	41.2%	29	38.7%	86	41.7%	
	Other	84	33.6%	22	29.3%	60	29.1%	

Note. All variables are summarized as percentage.
 The test of significance was carried out at 0.05 level.
 *Monte Carlo test was used.
 **Chi-Square test was used.
 Significant results are in bold.

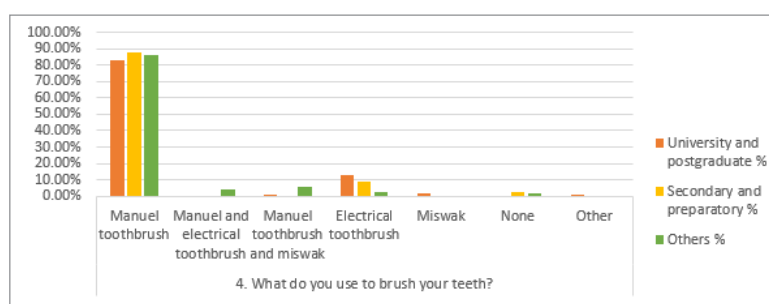


Fig. 9 Toothbrushing way according to mothers' education.

Table 5. Dental history according to mother education.

		University and postgraduate		Secondary and preparatory		Others		P-value
		N	%	N	%	N	%	
1. Have you ever been to a dentist?	Yes	246	98%	72	96%	198	96%	0.275**
	No	4	2%	3	4%	8	4%	
2. If yes, how often do you visit a dentist?	Every 6 months	45	18%	19	25%	40	19%	0.001*
	Every year	7	3%	7	9%	7	3%	
	Irregularly	57	23%	5	7%	38	18%	
	Only when in pain	107	43%	40	53%	81	39%	
	Other	34	14%	4	5%	37	18%	
3. When was the last visit?	Previous 1–3 months	116	46%	34	45%	61	30%	0.001*
	Previous 4–6 months	43	17%	11	15%	29	14%	
	Previous 7–12 months	20	8%	14	19%	26	13%	
	>1 year ago	28	11%	7	9%	36	17%	
	>2 years ago	24	10%	6	8%	24	12%	
	>5 years ago	19	8%	3	4%	30	15%	
4. What was the purpose of the visit?	Regular check-up (dental examination)	57	22.8%	19	25.3%	41	19.9%	0.634**
	Cleaning the teeth	36	14.4%	10	13.3%	29	14.1%	
	Filling	48	19.2%	20	26.7%	46	22.3%	
	Extraction	23	9.2%	3	4.0%	25	12.1%	
	Orthodontic treatment	56	22.4%	13	17.3%	45	21.8%	
	Other	30	12.0%	10	13.3%	20	9.7%	

Note. All variables are summarized as percentage.

The test of significance was carried out at 0.05 level.

*Monte Carlo test was used.

**Chi-Square test was used.

Significant results are in bold.

detailed interviews to overcome internal validity errors that might occur in an electronics-based survey.

Conflict of Interest

None

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