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ORIGINAL ARTICLE

Indicators of adolescents' preference to receive oral health information using social media

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ABSTRACT

Objectives: To assess (1) adolescents' preference to use social media (SM) to receive oral health information (OHI) and (2) factors associated with this preference.

Materials and methods: A cross-sectional survey was conducted in 2016, Eastern Province, Saudi Arabia including male middle school students. A questionnaire assessed explanatory variables including background, previous OHI seeking practices, internet use purposes, convenience of using SM for OHI and perceived usefulness of obtained OHI. The outcome variable was respondents' preference to use SM to receive OHI. Simple and multiple logistic regression models were used for statistical analysis.

Results: The response rate was 91.2% (456/500). Of those, 57.5% preferred using SM to receive OHI. The odds for this were significantly associated with being Saudi (OR = 3.12, 95%CI = 1.36, 7.18), previously using Twitter (OR = 4.59, 95%CI = 1.77, 11.89) and Instagram for OHI (OR = 2.60, 95%CI = 1.51, 4.45), frequent use of the internet to obtain OHI (OR = 1.25, 95%CI = 1.02, 1.54) and ease of obtaining OHI using the Internet (OR = 2.69, 95%CI = 1.5, 4.39).

Conclusion: Most adolescents preferred using SM to receive OHI. This was associated with previous OHI seeking practices and convenience of using SM. These findings have implications for designing SM-based health education campaigns targeting adolescents.

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Social media; adolescents; oral health information; internet; Saudi Arabia

Introduction

Social media (SM) are platforms that allow online interaction among users [1] and help in communication, enhancing creativity and growth of ideas and improving technical skills [2]. Recently, there has been a global increase in the use of SM [3,4] among teenagers and young adults [5].

SM were used to educate patients about HIV and sexual behaviour [6,7] and to obtain health information for people with special needs [8]. Adolescents were reported to use the internet to obtain information about health [9], diet, fitness and sensitive topics such as depression or drug use [5]. SM also helped in better self-management for diabetic adolescents, improving the completion of vaccination and reducing indoor tanning [10–12].

Several factors were related to adolescents' preferences to use SM [13]. Using SM among teens was significantly associated with having cell phones although computers remained the most popular tool to go online [5]. Differences by education and income in using SM were also reported [14]. Others reported that people may continue to use SM if they think that they are useful to them [15]. SM are surfed for information, to self- educate, seek entertainment and because users find it convenient to do so [16].

The widespread use of SM by adolescents calls for the utilization of these platforms in delivering oral health information (OHI). Compared to traditional media (newspaper, radio and television), SM could be more cost-effective in reaching this population and providing them with information to improve their health practices [17–19]. Planning SM-based health education campaigns would benefit from understanding if SM users also prefer using SM to receive OHI. The prospect is attractive since data about SM users are readily available and the media are usually available at no cost [16]. However, investing resources in SM-based oral health education campaigns must be supported by evidence to avoid waste of resources and unrealistic expectations. Little is known about teen's preferences to use SM to receive OHI.

Saudi Arabia has a high level of internet penetration with 65% of the population using the Internet and 53% using SM daily [20,21]. Previous reports demonstrated that Saudis use SM to search for health information [22] with available resources in Arabic about medication [23] women's health issues [24], breastfeeding [25] and oral health [26]. Health information on Arabic twitter is presented by religious accounts, traditional media, health accounts, political figures and others [27] with unclear quality of information [28].

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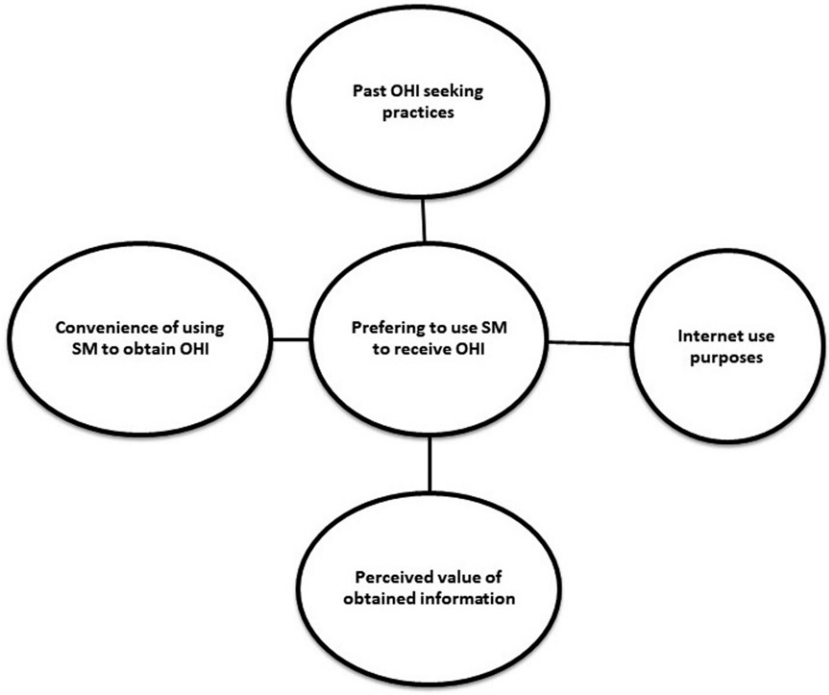

Figure 1. Conceptual framework explaining preference of using SM to receive OHI.

These factors make Saudi Arabia a suitable setting to investigate if teenagers prefer using SM to receive OHI. Therefore, the aims of the present study were to assess (1) adolescents' preference regarding receiving OHI through SM and (2) factors associated with this preference.

Materials and methods

Study design and setting

A cross-sectional, questionnaire-based study was conducted in middle schools in the Eastern Province, Saudi Arabia from 7th February to 14th April 2016; which coincides with the second semester of the school year so that students can be approached in schools. The Eastern Province was selected because of its economic wealth and developed infrastructure including the Internet. It is one of the most densely populated and urbanized areas in the country [29,30])

Ethical approval and cultural considerations

Ethical approval was obtained from the Institutional Review Board of the University of Dammam (IRB-2015- 02- 188). Due to cultural considerations, the Directorate of Education provided permission to access only schools of male students.

Participants and sample size

The sample size was calculated based on the following assumptions: margin of error = 5%, confidence level = 95%, percentage of adolescents preferring using SM for OHI = 50%. The required sample size = 380. The targeted sample size was increased by 30% to compensate for non-response so we targeted 500 adolescents. Adolescents were included if they went to school in Dammam or Khobar (two biggest cities in the Eastern Province) and if their parents consented. The Directorate of Education randomly selected three public schools for the study. Students were randomly selected from schools using schools' roosters.

Questionnaire development

We developed a conceptual framework to guide the assessment of adolescents' preference to use SM for OHI based on previous studies [15,16] (Figure 1). We posited that they are likely to prefer using SM if (1) their past OHI seeking practices were similar, (2) they used the Internet for related purposes such as education or seeking information, (3) they found using SM for OHI convenient and (4) they considered the obtained OHI useful. We developed a questionnaire to assess the relationship between the outcome variable (preferring to use SM for OHI) and exposures (factors in Figure 1). The questionnaire was developed in Arabic and checked by two dental public health experts not involved in the study. Pilot testing among 20 adolescents, whose responses were not later included, yielded minor rephrasing.

Questionnaire items

The questionnaire included 15 questions in six sections. The first section had five questions regarding background variables (age, nationality, parents' education and mother's occupation). The second section included four questions

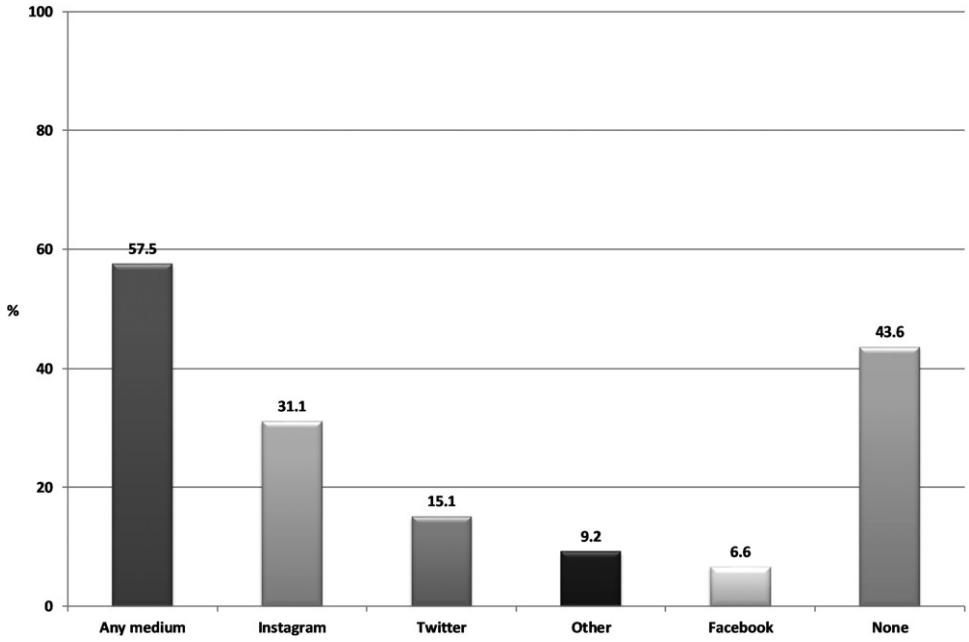

Figure 2. Distribution of adolescents' preferences' to use SM to receive OHI.

assessing past OHI seeking practices (OHI information sources, websites and frequency of internet search for OHI). The third section explored the purposes of using the internet (communication, entertainment, news, information, education or shopping) and the time in hours spent daily on the internet. The fourth section assessed the convenience of using SM for OHI (how participants accessed SM and whether they considered using the internet to obtain OHI easy). The fifth section asked about how useful was the OHI obtained on the internet (1 (not useful) to 10 (most useful)). The last section asked whether the participant preferred using SM to obtain OHI), including Facebook, Twitter, Instagram and others (Snapchat, Pinterest).

Procedure

After obtaining approval from the school principals, liaison persons secured parents' written consent. The investigators visited the schools, recalled the randomly selected students and interviewed them after explaining the study purpose then recorded their responses.

Data analysis

Descriptive statistics about participants' characteristics were calculated as mean (SD), frequencies and percentages. Univariate logistic regression models were fitted. Factors with significant associations in univariate models have entered a multivariable model. IBM SPSS for Windows version 22.0 (IBM Corp., Armonk, N.Y., USA) was used for statistical analysis at 5% significance level.

Table 1. Adolescents' preference of using SM to receive OHI with personal and background factors.

		The use of SM for OHI	
Background factors	N (%)/ mean (SD)	UOR (95%CI)	*p* value
Age	13.7 (0.9)	1.07 (0.88, 1.30)	.48
Saudi	395 (88.2)	2.24 (1.25, 4.02)	.007*
University educated father	241 (56.3)	0.78 (0.53, 1.15)	.21
University educated mother	207 (49.3)	0.85 (0.58, 1.25)	.40
Mothers works outside home	144 (32.7)	0.98 (0.66, 1.47)	.92

Total may not add up to sample size due to item non-response; UOR: unadjusted odds ratio in univariate regression; CI: confidence interval; *statistically significant at $p < .05$.

Results

Participant's characteristics

Out of 500 students recruited for the study, 456 participated (participation rate = 91.2%). Table 1 shows that the majority of participants were Saudis (88.2%) with a mean age = 13.7 years. About half the fathers and mothers were university educated (56.3% and 49.3%) with 32.7% of mothers working outside the home.

Adolescents' preference regarding receiving OHI through SM

Of all respondents, 57.5% reported preferring to use one type of SM or the other to receive OHI, while 43.6% indicated that they do not prefer to use SM to obtain OHI. The most preferred medium was Instagram (31.1%) followed by Twitter (15.1%, Figure 2).

Saudi adolescents had significantly twice the odds of preferring to use SM to receive OHI compared to non-Saudis (OR = 2.24, 95%CI = 1.25, 4.02). None of the other

Table 2. Adolescents' preference of using SM to receive OHI by their past OHI seeking practices, internet use purposes, convenience of using SM to obtain OHI and perceived usefulness of retrieved information.

			The use of SM for OHI	
		N (%)/mean (SD)	UOR (95%CI)	*p* value
Sources of OHI: yes vs no	Dentist	344 (75.4)	0.92 (0.60, 1.42)	.72
	Pharmacist	27 (5.9)	2.21 (0.91, 5.33)	.08
	Family, friends or teacher	88 (19.3)	1.15 (0.72, 1.85)	.56
	Internet	77 (16.9)	2.08 (1.22, 3.54)	.007*
	Radio/ TV/ printed media	76 (16.7)	1.02 (0.62, 1.68)	.93
Websites used to search for OHI: yes vs no	Google	248 (54.4)	1.46 (1.01, 2.13)	.05*
	Instagram	142 (31.1)	3.66 (2.33, 5.76)	<.0001*
	Twitter	58 (12.7)	7.76 (3.26, 18.48)	<.0001*
	Facebook:	25 (5.5)	3.12 (1.15, 8.48)	.03*
Frequency of Internet use for OHI (1 to 5)		2.5 (1.2)	1.55 (1.31, 1.83)	<.0001*
Purpose of using the Internet: yes vs no	For entertainment	379 (83.1)	0.89 (0.54, 1.47)	.66
	For communication	325 (71.3)	1.26 (0.84, 1.89)	.27
	For information	209 (45.8)	1.07 (0.74, 1.56)	.72
	For news	140 (30.7)	2.49 (1.62, 3.83)	<.0001*
	For shopping	111 (24.3)	1.86 (1.18, 2.92)	.007*
	For education	102 (22.4)	1.13 (0.72, 1.77)	.59
Time spent using the Internet (hrs): mean (SD)		4.4 (3.6)	1.02 (0.96, 1.08)	.53
Mode of accessing the Internet: yes vs no	Mobile phone	368 (80.7)	1.93 (1.21, 3.09)	.006*
	Tablet/ iPad	123 (27)	0.97 (0.64, 1.47)	.89
	Own laptop/ computer	118 (25.9)	1.06 (0.69, 1.62)	.80
	Family laptop/ computer	50 (11)	1.03 (0.57, 1.86)	.93
Easy to obtain OHI from the Internet: yes vs no		261 (57.4)	2.28 (1.56, 3.34)	<.0001*
Perceived usefulness of retrieved OHI (1 to 10)		5.1 (3.5)	1.10 (1.04, 1.16)	.001*

Total may not add up to sample size due to item non-response; UOR: unadjusted odds ratio in univariate regression; CI: confidence interval; *statistically significant at $p < .05$.

Table 3. Factors associated with adolescents' preference to use SM to receive OHI in multivariable logistic regression model.

Factors	AOR (95%CI)	*p* value
Saudi vs non-Saudi	3.12 (1.36, 7.18)	.007*
Using the internet for news	1.53 (0.91, 2.58)	.11
Using the internet for shopping	1.05 (0.60, 1.84)	.87
Obtaining OHI using the internet	1.22 (0.63, 2.38)	.56
Using Google to search for OHI	0.99 (0.61, 1.63)	.98
Using Twitter to search for OHI	4.59 (1.77, 11.89)	.002*
Using Instagram to search for OHI	2.60 (1.51, 4.45)	.001*
Using Facebook to search for OHI	2.29 (0.58, 9.01)	.24
Increasing frequency of using internet to obtain OHI	1.25 (1.02, 1.54)	.03*
Accessing the internet using mobile phone	1.79 (0.99, 3.24)	.05
Ease of obtaining OHI from the internet	2.69 (1.65, 4.39)	<.0001*
Perceived usefulness of retrieved OHI	0.98 (0.92, 1.06)	.67

AOR: adjusted odds ratio in multiple regression; CI: confidence interval; *statistically significant at $p < .05$.

background variables showed significant association with the outcome variable in univariate models (Table 1).

Table 2 shows that the majority of respondents sought OHI from their dentists (75.4%), with minor proportion reporting seeking information from their family, friends or teachers (19.3%), the internet (16.9%) and media (16.7%). Seeking OHI using the internet was associated with significantly higher odds of adolescents' preference to use SM to receive OHI (OR = 2.08, 95%CI = 1.22, 3.54). Google was the most frequently used website to search for OHI (54.4%), while SM were less commonly used to obtain OHI (Instagram = 31.1%, Twitter = 12.7% and Facebook = 5.5%). Reported use of any of these SM was associated with significantly higher odds of preferring to use SM to receive OHI, with the greatest association observed with using Twitter (OR = 7.76, 95%CI = 3.26, 18.48) followed by Instagram (OR = 3.66, 95%CI = 2.33, 5.76). On average, the respondents occasionally used the internet to obtain OHI (mean = 2.5/ max of 5 = always). More frequent internet use was significantly associated with higher odds of preferring to use SM for OHI (OR = 1.55, 95%CI = 1.31, 1.83).

The majority of respondents reported using the internet for entertainment (83.1%) and communication (71.3%). On average, they spent 4 h daily surfing the internet. Respondents who reported using the internet to check the news and for online shopping were significantly more likely to prefer using SM to receive OHI (OR = 2.49, 95%CI = 1.62, 3.83), OR = 1.86, 95%CI = 1.18, 2.92).

Mobile phones were the most commonly used tool to access the internet (80.7%) and this was significantly associated with higher odds of preferring to use SM to receive OHI (OR = 1.93, 95%CI = 1.21, 3.09). Most respondents considered obtaining OHI from the internet easy (57.4%) with this being associated with significantly higher odds of the outcome variable (OR = 2.28, 95%CI = 1.56, 3.34). The participants perceived the obtained OHI to be of moderate usefulness (mean=5.1/10). Greater perception of usefulness was associated with significantly higher odds of preferring to use SM to receive OHI (OR = 1.10, 95%CI = 1.04, 1.16).

Factors associated with adolescents' SM preference

Table 3 shows the indicators associated with higher odds of preferring to use SM to receive OHI in multivariable logistic regression. Respondents who preferred using SM to receive OHI were significantly more likely to be Saudis (OR = 3.12, 95%CI = 1.36, 7.18), previous users of Twitter and Instagram to search for OHI (OR = 4.59, 95%CI = 1.77, 11.89, OR = 2.60,

95%CI = 1.51, 4.45, respectively), frequent users of the internet (OR = 1.25, 95%CI = 1.02, 1.54) and to consider using the internet easy for obtaining OHI (OR = 2.69, 95%CI = 1.65, 4.39).

Discussion

The present study found that the majority of adolescents from Eastern Saudi Arabia preferred to use SM to receive OHI. Past OHI seeking practices and convenience were strong indicators of this preference. These findings have implications for planning SM-based health education campaigns by targeting adolescents who are already using SM for OHI so that a more receptive audience is ensured.

Our study showed that 58% of male adolescents in the Eastern Province preferred using SM to receive OHI. This finding is similar to a study by Almaiman et al. who reported that 60% of adult Saudi females following a Twitter health account were further interested in seeking OHI using SM [6]. They reported this similar percentage although their participants were older (>16 years old). The percentage in our study was higher than that in another study reporting that 47% of Australian middle school students believed SM would be helpful in obtaining mental health support [31,32].

In our study, more teenagers preferred Instagram and Twitter than those preferring Facebook (31%, 15% and 7%). Compared to that, Almaiman et al. reported a lower percentage of users preferring Instagram (1.2%), higher percentage for Twitter (20%) and similar percentage for Facebook (7%) to obtain OHI [26]. These differences may be attributed to the older age (>16 years old) of their participants and indicate the need for caution when generalizing preferences across age groups. In contrast, several studies reported that older individuals preferred Facebook than other SM [5,33,34].

About 40% of the respondents in the current study indicated that they did not prefer to use SM to receive OHI and they mostly reported that they used SM for entertainment and communication. Similarly, a previous study among Americans with asthma – including adolescents – reported that some users felt that SM were primarily for connecting with friends rather than for health information [33]. Another American study attributed the low percentage of community health centre visitors who preferred using SM to share health information to the limited understanding they had of the role SM can play in this respect or the small number of providers using SM to deliver health information [34]. The low preference of some users may also be explained by concerns for privacy and reluctance to share health information over the Internet or greater interest to seek information and help from friends [35].

Our results showed that a considerable proportion of adolescents was already using SM and the Internet to obtain OHI. The quality of this OHI is unknown. There is a risk that faulty messages may reach adolescents with detrimental effects to their oral health. There is a need for dental professionals to direct their attention to exploring and assessing these media as dental health education tools.

In our study, adolescents who were frequent users of the internet and those who reported that it was easy for them to obtain OHI from it were more likely to prefer using SM for OHI. This agrees with Hanson et al. study [35] where perceived ability to use SM was significantly associated with more use of SM to search for health information ($p = .003$). It also agrees with previous reports that American adolescents were more likely to use SM if they went online daily [5].

One of the limitations of our study was that we did not include female students due to cultural and administrative constraints. Future studies are needed to assess potential gender differences that might exist regarding SM preferences. Another limitation is that the consent of parents and involvement of teachers would be needed when targeting adolescents in SM-based health education campaigns but we did not assess their perspective. We also did not assess the impact of previous encounters with OHI of different quality and credibility on respondents' preferences. Longitudinal studies are needed to assess if selecting adolescents with the indicators we identified in our study will produce better health education outcomes in terms of behaviour modification and oral health status.

Our results are generalizable to adolescents with an average level of parental education, convenient access to the internet through mobile phones and to those who seem to spend moderate time daily surfing the Internet and easily search for OHI. Other communities with different socioeconomic or cultural profiles affecting access to the internet or internet/SM use patterns may have different preferences.

Conclusion

The majority of adolescents in our study preferred to receive OHI using SM. The indicators of this preference were similar and frequent past OHI seeking practices and convenience of using SM for this purpose. The indicators identified in the present study can be used to target adolescents for SM-based health education campaigns that are promoted by school health authorities to improve oral health. This provides sustainable and low-cost opportunity for health promotion suited to these adolescents. Better quality and credibility of oral health information can be ensured by encouraging dentists to have professional presence on SM so that the audience in general and adolescents, in particular, are not exposed to incorrect information.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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