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The pattern of social media use and its association with academic performance among medical students

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ABSTRACT

Background: There are concerns that the use of social media (SM) among medical students could affect academic performance. The objectives of the study were to investigate the pattern and reasons for SM use and their association with academic performance.

Methods: A stratified random sample, frequency distribution and comparison of categorical variables with Chi-square and Fisher exact tests were used.

Results: Of the 97% who responded, 98% used SM. The most popular were Whatsapp (87.8%), You tube (60.8%) and Twitter (51.8%) for general use; while You tube (83.5%), Whatsapp (35.5%) and Twitter (35.3%) for learning. For general use, there was a significant higher number of visits to You tube and Facebook among male students, while the reverse was true for Instagram and Path. Around 71% visited SM >4 times/day and 55% spent 1–4 hours/day. The main reasons for SM use were entertainment (95.8%), staying up-to-date with news (88.3%), and socializing (85.5%); for academic studies (40%). There was no significant association between Grade Point Average and the frequency of daily SM use or use during lectures.

Conclusions: While almost all the students used SM, only a minority used them for academic purposes. SM use was not associated with academic performance.

Background

Social media are tools that support electronic conversation. “There is no single recognized definition of social media” (Scott and Jacka 2012). Kaplan and Haenlein (2012) suggested, social media are “a group of internet-based applications that build on the ideological and technological foundations of Web 2.0, that allow the creation and exchange of User Generated Content”.

Around 2.31 billion persons are social media users, delivering 31% global penetration (We are social 2016); for example, if Facebook was a country it would be considered as the third largest country in the world, based on population, beside China and India (The Economist 2010). The use of social media is evolving rapidly. For instance, by looking at the Twitter's short history, one can see the number of tweets per day went from 5,000 tweets per day in 2007 to 35 million tweets per day in 2010 and 500 million tweets per day in 2013 (Twitter 2016).

University students find social media convenient as they can use them at their preferred time and place and they fulfill different needs. Most students, nowadays, keep themselves socially active by using social media (Lenhart et al. 2007; Knight-McCord et al. 2016). According to a Pew Research Center study (2015), 90% of college students use social media. A study in Massachusetts have found that

Practice points

- The majority (55%) of the students spent 1–4 hours daily on social media and checked one of the social media while at a lecture (72%).
- The main reasons for use were entertainment, for staying up-to-date with news, and for socializing, while only 40% used them for academic purposes.
- There is no significant association between frequency of daily use or time spent on social media with academic performance.
- While at lectures, 72% of students checked the social media sites many times; this is probably a reflection of dissatisfaction with lectures.

almost all college and university students are now using some form of social media (Rios-Aguilar et al. 2012), 72% of them have a social media profile, with 45% of college students using a social media site at least once a day (Sponcil and Gitimu 2013).

Their wide use of social media is a cause of concern, particularly when considering the gradually increasing time people spend online (The Nielsen Company 2010). Two-thirds of the students use social media while they are

studying; e.g. doing homework or in the class (Wade and Renata 2011). Therefore, many educational institutions prevent their use throughout the learning hours to avoid distraction of learning and lower cognitive performance (Wade and Renata 2011; Rios-Aguilar 2012). This is in line with the time displacement theory of Kirschner and Karpinski (2010) that explained why Facebook usage was associated with lower GPA.

Social media use has some advantages too, when used as a tool to engage students, the learning is much more positive due to engagement, "accessibility" of and "communication" within social media (Weber 2012). Researchers have encouraged teachers to use social networking sites to promote teaching and learning (Camilia et al. 2013). For example, a study on first year pharmacy students in the Nova Southeastern University in Florida showed that "social media would impact their ability to learn in a positive manner (75%) and make them feel connected/very connected (68%)" (Wiid et al. 2013). One study has found that social media provide shy students a chance to discuss and write (Carol 2007), while others found a positive effect of Twitter on student engagement and grades (Junco et al. 2010).

A systematic review of the published literature in medical education found that blogs were the most commonly assessed social media tool, and undergraduate medical students were the most commonly targeted population. The most commonly reported learning opportunities related to incorporating social media tools were promoting learner engagement (71% of studies), feedback (57%), and collaboration and professional development (both 36%) (Cheston et al. 2013). A more recent international study (Byrne-Davis et al. 2016) showed that the most popular application was Facebook. Social communication and entertainment were the most reported purpose of using social media among medical students. A recent meta-analysis and systematic review (Guraya 2016) analyzed 10 previous studies, which showed that overall 75% of medical students used social networking sites, whereas average of 20% reported use of social media for academic and education purposes. No single study examined the educational impact of using social media on the medical students' performance. A recent study found that 72.2% of medical students at King Saud University expressed the importance of social media in everyday life and expressed positive attitude toward their use in medical education (Sattar et al. 2016). However, the study did not evaluate students' practice and its impact in their performance.

Better understanding of the association between academic performance and the use of social media could help informing the students and the academic community about their impact on students' learning, while providing an empirical insight into the emerging phenomenon of social media usage.

Hence, this study aimed to assess the pattern and extent of social media use among medical students with regard to the socio-demographic variables. The second aim was to identify the reasons for using social media among the study population. Finally, the study aimed to investigate the association of the overall academic grade (Grade Point Average [GPA] score) with the pattern of and reasons for social media use.

Methods

A descriptive cross-sectional study using a questionnaire was conducted among the students of all the five academic years at King Saud University, College of Medicine, Saudi Arabia. The total number of the students in the school is 1,720 (1,160 male and 560 female students).

A stratified random sampling technique was adopted to recruit participants, proportionate to the number of students in year of study and both sexes. Students identification numbers were generated randomly through excel program.

With 95% confidence level and 5% margin of error, the sample size was estimated to be 306 students. With an expected non-response rate of 30%, 400 students were invited to participate. In February 2014, the survey instrument was uploaded on SurveyMonkey.com and the link was sent to the selected students by email. After three reminders, the non-respondent students were approached to fill a hard copy of the form. Those students who did not respond were replaced with a similar number using the same randomization process. The questionnaire was answered anonymously as no student ID was requested while filling out the questionnaire. The participation was on a voluntary basis.

Questionnaire development

Three experts in the field of education did a thorough literature search and assessed the previously used studies and questionnaires. Items from three well-known previous questionnaires were selected as the starting point for the development of the current questionnaire. When considering the categories, the group identified several attributes that corresponded with the literature and provided important areas on which to base the questionnaire. The statements were ordered in a manner that flows in a logical sequence so that the questionnaire would be easy to work through. Furthermore, the wording of all statements were kept as simple as possible to ensure that the focus of the statement is clear.

The three experts in the field reviewed the first draft of the questionnaire thorough discussion and careful revision. Questions were written in order to serve the study objectives and to cover the essential areas of this topic (content validity). Items with similar meaning were deleted and those with difficult language for comprehension were rewritten for better understanding. It was later pilot tested for the clarity of the tool among 20 students, and to estimate the time needed for data collection.

The questionnaire in Arabic and English consisted of 36 questions (items) in the following six categories: (A) basic characteristics of the study population, including student GPA; (B) types of social media used; (C) patterns of social media use; (D) reasons for social media use; and (E) perceptions about social media use; (F) practice of social media use (Supplementary Appendix I). The students answered the items from D onwards on a 5-point's Likert scale separated into; strongly agree, agree, do not know, disagree, strongly disagree.

Survey Monkey premium program was the tool used for the data analysis. Frequency distribution statistics such as frequency and percentages were calculated. The

Table 1. Types of social media used by students in general and for learning purposes.

Categories	Items	Males N (%) 236	Females N (%) 164	Total 400	p value	Chi square χ^2	
Have a social media account	Yes	229 (97)	163 (99.4)	392 (98)	0.18*		
The social media sites that are used by students in general	WhatsApp	205 (86.9)	146 (89)	351 (87.8)	0.51	0.42	
	YouTube	157 (66.5)	86 (52.4)	243 (60.8)	0.004	8.05	
	Twitter	131 (55.5)	76 (46.3)	207 (51.8)	0.07	3.26	
		100 (42.4)					
	Instagram	36 (15.3)	100 (61)	200 (50)	<0.001	13.4	
	Path		47 (28.7)	83 (20.7)	0.001	10.57	
	Facebook	42 (17.8)	14 (8.5)	56 (14)	0.008	6.89	
	Skype	21 (8.9)	10 (6.1)	31 (7.8)	0.302	1.06	
	Google+	11 (4.7)	11 (6.7)	22 (5.5)	0.377	0.78	
	Keek	4 (1.7)	1 (0.6)	5 (1.25)	0.637*		
	Blogger.com	1 (0.4)	1 (0.6)	2 (0.5)	0.99*		
	The social media used by students for learning purpose	YouTube	200 (84.8)	134 (81.7)	334 (83.5)	0.42	0.65
		WhatsApp	68 (28.8)	74 (45.1)	142 (35.5)	0.005	11.6
Twitter		85 (36)	56 (34.2)	141 (35.3)	0.700	0.15	
Facebook		46 (19.5)	29 (17.7)	75 (18.8)	0.648	0.21	
Instagram		15 (6.4)	7 (4.3)	22 (5.5)	0.368	0.81	
Google+		22 (9.3)	27 (16.5)	49 (12.3)	0.032	4.59	
Skype		8 (3.4)	9 (5.5)	17 (4.3)	0.308	1.05	
Blogger.com		3 (1.3)	1 (0.6)	4 (1)	0.915*		
Path		2 (0.9)	1 (0.6)	3 (0.8)	0.99*		
Keek		1 (0.4)	0 (0)	1 (0.3)	0.99 ^a		

*Using Fisher exact test.

researchers compared different categorical variables using chi-square and Fisher exact tests as appropriate. A p value of less than 0.05 was considered significant. The GPA represents the mean of the grades for all the previous courses taken by students. The maximum possible GPA is 5. To compare the academic performance with social media usage, the students' GPA were divided into three categories, namely GPA less than 4, between 4 and 4.5 and finally GPA more than 4.5. Institutional review board's ethics approval was sought (approval number F2 dated 26/11/2013) before administering the questionnaire.

Results

Ninety seven percent of the approached 400 medical students completed the study questionnaire. Male students represented 59.0% of the total sample and female students (41.0%). The majority (65.3%) of the students were in the age group of 20-22 years and were single (98.8%).

Pattern and extent of social media use

Overall, almost all (98%) students had a social media account. WhatsApp was the most frequently used application (87.8%), followed by YouTube (60.8%), and Twitter (51.8%). Blogger.com (0.5%) was the least favorite social media application (Table 1).

There was a statistically significant association between the male sex and the usage of YouTube (67% of the male students and 52% of female students; $p=0.003$), and Facebook (18% of the male students and 9% of female students; $p=0.006$). On the other hand, female students had a statistically significant higher use of Instagram (61% female and 42% male students; $p=0.001$), and Path (29% female and 15% male students; $p=0.001$) compared to their male counterparts (Table 1).

The most frequently used social media for learning purposes were YouTube (84%), WhatsApp (36%), and Twitter (35%). The least frequently used social media for learning purposes were Path and Keek (less than 1%). For learning purposes, there was a statistically significant higher use of

WhatsApp (45% female and 29% male; $p=0.001$) and Google+ (17% female and 9% male; $p=0.02$) among the female students compared with their male counterparts (Table 1).

Two hundred and eighty-two (71%) students checked their social media sites four times or more daily with no statistically significant difference between the two sexes (Table 2). Around 72% of the students checked one of the social media while at a lecture and spent more than one hour per day on social media (78%). The majority (55%) of the students spent 1-4 hours daily on social media and 23% of them more than four hours (Table 2).

Purposes of social media usage

The majority of the students were using social media for entertainment (95.8%), staying up-to-date with news (88.3%), and for socializing (85.5%) (Table 3). On the other hand, a smaller proportion (40%) used it to be more productive in their studies. A significantly higher proportion of female students (43.6%) used social media for shopping when compared with their male counterparts (30.1%) ($p=0.006$).

Social media usage and GPA

No statistically significant association was found between the students' GPA and the patterns of social media use such as frequency of daily use, reasons for use, time spent and how many times the students checked their social media during lectures (Table 4).

Though not statistically significant, 14% of the low performing students checked their social media more than four times during a lecture, while only 6% of the top-performing students did so.

Discussion

This study is an attempt to contribute to our understanding of college students' use of social media and its effects. In line with the current study findings, recent studies have

Table 2. Patterns of social media usage by male and female students.

Categories	Males N (%) 236	Females N (%) 164	Total N (%) 400	p value	Chi square
On a daily basis, how many times do you check social media?				$p = 0.14$	$\chi^2 = 6.87$
○ One time	13 (5.5)	2 (1.2)	15 (3.8)		
○ 2 times	26 (11)	16 (9.8)	42 (10.5)		
○ 3 times	24 (10.2)	12 (7.3)	36 (9)		
○ 4 times	13 (5.5)	12 (7.3)	25 (6.2)		
○ More than 4 times	160 (67.8)	122 (74.4)	282 (70.5)		
While at lecture how many times do you check social media?				$p = 0.09$	$\chi^2 = 9.54$
○ Not at all	79 (33.5)	33 (20.1)	112 (28)		
○ One time	55 (23.3)	49 (29.9)	104 (26)		
○ 2 times	41 (17.4)	31 (18.9)	72 (18)		
○ 3 times	29 (12.3)	26 (15.9)	55 (13.8)		
○ 4 times	11 (4.7)	11 (6.7)	22 (5.5)		
○ >4 times	21 (8.9)	14 (8.5)	35 (8.8)		
Time spent per day				$p = 0.44$	$\chi^2 = 4.78$
* Less than 30 mints	16 (6.8)	12 (7.3)	28 (7)		
* 30 mints to 1 hour	39 (16.5)	21 (12.8)	60 (15)		
* 1–2 hours	72 (30.5)	40 (24.4)	112 (28)		
* 2–4 hours	61 (25.9)	47 (28.7)	108 (27)		
* 4–6 hours	26 (11)	27 (16.5)	53 (13.3)		
* More than 6 hours	22 (9.3)	17 (10.4)	39 (9.8)		

Table 3. Reasons for social media usage among male and female students.

Criteria	Sex		Total of agree	p value	Chi square χ^2
	Male (%) N = 236 Agree	Female (%) N = 164 Agree			
1. Entertaining.	225 (95.7)	158 (96.3)	383 (95.8)	0.625	0.23
2. Staying up to date with current news.	212 (90.2)	141 (86)	353 (88.3)	0.239	1.38
3. Socializing with people.	200 (85.1)	142 (87.1)	342 (85.5)	0.607	0.26
4. Sharing experiences.	137 (58.3)	110 (61.1)	283 (70.8)	0.14	3.33
5. Obtaining opinions of others.	161 (68.8)	106 (64.6)	267 (66.8)	0.454	0.56
6. As a distraction from schoolwork.	127 (54.1)	95 (58.3)	222 (55.5)	0.415	0.66
7. To be more productive in studying.	86 (36.4)	74 (45.1)	160 (40)	0.081	3.04
8. Shopping online.	71 (30.1)	71 (43.6)	142 (35.5)	0.006	7.37
9. Helping to manage my time more effectively.	50 (21.3)	30 (18.4)	80 (20)	0.476	0.50

Table 4. The associations of the students' GPA and the pattern of and reasons for using social media.

Categories	GPA				p value (Chi square)
	<4 (%) N = 59	4–4.5 (%) N = 106	4.5–5 (%) N = 235	Total (%) N = 400	
On a daily basis, how many times do you check social media?					$p = 0.157$ $\chi^2 = 11.86$
● One time	4 (6.7)	4 (3.8)	7 (3)	15 (3.8)	
● 2 times	9 (15.25)	7 (6.6)	26 (11.1)	42 (10.5)	
● 3 times	6 (10.1)	9 (8.5)	21 (8.9)	36 (9)	
● 4 times	1 (1.69)	12 (11.3)	12 (5.1)	25 (6.3)	
● More than 4 times	39 (66.1)	74 (69.8)	169 (71.9)	282 (70.5)	
While at lecture, how many times do you check social media?					$p = 0.388$ $\chi^2 = 10.61$
● Not at all	17 (28.8)	31 (29.3)	64 (27.2)	112 (28)	
● One time	14 (23.7)	26 (24.5)	64 (27.2)	104 (26)	
● 2 times	10 (16.94)	16 (15.1)	46 (19.6)	72 (18)	
● 3 times	8 (13.5)	11 (10.4)	36 (15.3)	55 (13.8)	
● 4 times	2 (3.38)	10 (9.4)	10 (4.3)	22 (5.5)	
● >4 times	8 (13.55)	12 (11.3)	15 (6.4)	35 (8.8)	

shown that more than 90% of the young adults are social network users (Perrin 2015) and that there is no difference between male and female use of social media among medical students (Gerlich et al. 2010). However, other studies have found women were using social media more frequently (Hall et al. 2013; Sponcil and Gitimu 2013).

Although WhatsApp was the most popular site in the current study, studies from the United Kingdom, United States, Malaysia, Turkey and Bangladesh found that Facebook is the most popular site among college students (Martin 2011; O'Lea 2011; Rios-Aguilar et al. 2012; Al-Rahmi and Othman 2014; Mondal 2013). The difference could be due to the different time periods in which different studies were conducted. The social media websites and programs are

changing and new features are added continuously that may influence their customer base. Riyanto (2013) found that the students perceived WhatsApp as practical with a combination of almost every medium (Bouman 2013).

YouTube in this study was ranked number one site for the academic and learning purposes, which is consistent with another study from Oman among university students (Mehmood and Taswir 2013). According to Wiid et al. (2013), the reasons for using YouTube as a learning tool could be the free instructional videos, educational information lessons, and PowerPoint presentations from authoritative organizations and universities. The student preference for video, as a medium of instruction could be another explanation.

There can be several reasons, as to why college students use social networking websites. The current study found that students use them mainly for entertainment and social reasons. This, however, is in line with others' findings that students use social media to pass time (Sheldon 2008; Weber 2012), be entertained (Quan-Haase and Young 2010; Mehmood and Taswir 2013), and maintain relationships with others (Sheldon 2008) and relax (Rosen et al. 2013). Similarly, another researcher suggested that health science students are mainly using it to chat with friends than for educational purposes (67%) (El Bialy and Jalali 2015).

It is interesting to note that students spent more time on social media in the current study (55% of student spending 1 to 4 hours) than most of the previous studies that ranged between 52 minutes and 1.5 hours per day (Gruesec 1992; Pempek et al. 2009; Wade and Renata 2011; Shen 2012; Mehmood and Taswir 2013; Sponcil and Gitimu 2013). A plausible explanation for this could be that the current study is more recent and with the advancement of technology, the number of social media apps increased and became more user-friendly and attractive. As a result, the preferences of users changed with time. Several factors can influence the long time spent on social media such as needs' fulfillment, appropriateness to their curiosity and needs and social norms as explained by the gratification theory (Ezumah 2013).

The finding that the majority of students checked the social media sites many times while at a lecture, is an important alert that learners are probably bored in lecture and seek for some change in environment. Probably, what we really need are strategies to strengthen active student learning and foster student engagement. Although, more of the lower performing compared with the top-performing students checked their social media more than four times while at lecture, the difference did not reach statistical significance. Studies have found social media to negatively impact students' GPA (Kirschner and Karpinski 2010; Junco and Cotten 2012; Junco 2012). Yeboah and Ewur (2014), in their study among the college students reported that WhatsApp use was taking much of the students' study time, resulting in lower academic performance. Younger generation tends to multitask; i.e. "simultaneously process multiple channels of information". The use social media by students for non-learning purposes while at lectures is an example of multitasking. Contrary to the findings indicated by this study, controlled experimental research reported that multitasking led to distraction that adversely affected learning; it led to the deterioration of performance from a single task to multi tasks and to increasing the time taken to carry out a learning task (Quan-Haase and Young 2010; Karpinski et al. 2013). This may be the explanation for the finding that more low performing students visit social media during a lecture than top performing students, though the difference was not statistically significant. Multi-tasking of visiting social media while following the lecture may have reduced the learning efficiency among low performing students.

Limitations: The current study was conducted on a sample of students from a single (though large in number) medical school. Hence, these findings cannot be generalized to all medical schools. Furthermore, recall bias for the self-reported GPA and for estimating the pattern of social media use is another limitation. More details about "how" the students are using social media for educational

purposes were not explored as it requires a more in-depth qualitative study.

Conclusions

Social media are very popular among the study participants. YouTube and WhatsApp emerged as the most frequently used for learning and for general purposes, respectively. Although there was no difference in the extent of social media use between the two sexes, there were differences in the selection of social media and the reasons for their use. The majority of the students were using social media for entertainment, news updates and socialization and much less for learning purposes. Social media usage at lectures and in general are found to be not associated with GPA scores. A study exploring more objectively the relationship between students' use of social media with their academic achievements and what sort of social media interventions associated with better learning are probably needed. Such knowledge may be useful to guide medical educators to better utilize social media in their instructional strategies.

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