



INDIVIDUALS' BEHAVIOR TOWARDS INTERNET AND SOCIAL MEDIA MEDICAL INFORMATION IN DAMMAM AND KHOBAR PRIMARY HEALTH CARE CENTERS

Medicine

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ABSTRACT

Nowadays, internet and social media are being used widely. They affect individuals who seek medical information, as a result, inaccurate information lead individuals to misdiagnose themselves and change their treatment plan. The purpose of this study is to determine the behavior of individuals regarding using internet and social media to obtain medical information, sociodemographic factors and reasons for seeking medical information. This study employed a cross-sectional analytical design in primary health care centers in Dammam and Khobar cities. A total of 439 participants were invited to complete a structured, self-administered questionnaire. The results of the study revealed that 87.7% used internet and social media to obtain medical information. The most common reason for searching was symptoms participants had 42.9%. Eighty five percent were influenced and 15% were rarely influenced by the information obtained. More than half of individuals had a positive behavioral change. Majority of individuals had verified the information they obtained, mostly with a physician 83.6%.

KEYWORDS

Internet, Social media, Medical information, Influence.

INTRODUCTION

Internet is defined as: "an electronic communications network that connects computer networks and organizational computer facilities around the world." (Definition of INTERNET, 2019). Whereas social media is defined as: "forms of electronic communication (such as websites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (such as videos)." (Definition of SOCIAL MEDIA, 2019). Examples of social media platforms include: WhatsApp, Twitter, Snapchat, Instagram and Facebook. Nowadays, both the Internet and social media are used on a daily basis and the usage has grown in the past few years by a large number of individuals worldwide. In 2009, it was estimated that 25.35% of world's population used the internet. Over the years, the number has gradually increased and reached 45.79%. Furthermore, in 2017, the percentage of internet users in Bahrain, United Arab Emirates and Kuwait was 95.88%, 94.82% and 98.00% respectively ("Individuals using the Internet (% of population) | Data", 2019). The number in Saudi Arabia has changed from 63.70% in 2014 to 82.12% in 2017 (Annual Report 2017 [Internet]. Communication and Information Technology Commission, 2017). Individuals use the internet and social media for different purposes, such as gain and share medical information and personal experiences regarding their health. In 2013, it was found that 35% of adults in the united states accessed the internet to obtain medical information ("Health Online 2013", 2021). While in Saudi Arabia the percentage of seeking online medical information reached 68.3% in 2016 (Bahkali et al., 2016). When compared to the past, the internet has become more accessible, making the users capable to search for online medical information despite the accuracy and validity of the information (Chen, Li, Liang & Tsai, 2018). In addition, with the rapid spread of information, patients tend to access the internet as their first source for medical information (Tan & Goonawardene, 2017). As a result, concerns are raised regarding the quality of the information obtained from the internet and social media since they contain user-created-content (Van De Belt, Engelen, Berben & Schoonhoven, 2010). Consequently, false information leads to misdiagnosis, mismanagement of the patient's medical condition and also affects the decision of the patient's medical care (Ahmad, Hudak, Bercovitz, Hollenberg & Levinson, 2006). Up to this time, people still access the internet and social media to obtain medical information regardless of its quality, as people are still not able to differentiate between what is accurate and what is not, since they are not aware of the reliable sources. For this reason, we conducted this study to assess the prevalence, behavior towards online medical information obtained from internet and social media and to raise the individuals' awareness regarding the information. Although there are studies done previously on this topic, only few were conducted in Saudi Arabia. Moreover, our

research differs from previous studies done in Saudi Arabia in that took place in primary health care centers of ministry of health in Dammam and Khobar cities as well as identify the factors that lead to search for medical Information on the Internet and social media.

METHODS

A descriptive cross-sectional study was conducted to explore the behavior of individuals using internet and social media as sources of medical information among primary health care center attendees in Dammam and Khobar cities in Saudi Arabia in 2019/2020. The primary health care centers were selected using a multistage sampling. Stage 1 included Dammam and Khobar cities by cluster sampling technique. In stage 2, selection of primary health care centers of ministry of health from Dammam and Khobar cities according to the proportion between the two cities. There were 30 primary health care centers in Dammam, whereas 13 primary health care centers in Khobar. The proportion of the centers in Dammam and Khobar was (60%, 40%) respectively, which is 18:5. Simple random technique was used to select primary health care centers. In stage 3, primary health care center attendees were selected using a systematic sample technique. Inclusion criteria included anyone who attends primary health care center, uses either internet or social media or both and older than 15 years of age. Illiterate people and non-Arabic speakers were excluded since the study is based on medical information obtained from Arabic websites on Internet and social media platforms.

The total population of Dammam and Khobar cities was 1482157. By using Raosoft, a sample size calculator ("Sample Size Calculator by Raosoft, Inc.", 2019), The sample size was 385 subjects, with a 95% confidence interval, 5% accepted margin of error and estimated prevalence of 50%. More than ten percent was added to the sample size to overcome any rejected or uncompleted questionnaire. The Final total sample size is 439 subjects.

The data was collected by a modification of a previously validated self-administered questionnaire taken from 2 studies: Health-Seeking Influence Reflected by Online Health-Related Messages Received on Social Media: Cross-Sectional Survey and Sociodemographic and HealthCare Related Characteristics of Online Health Information Seekers: A Cross-Sectional German Study (Nölke, Mensing, Krämer & Hornberg, 2015; Iftikhar & Abaalkhail, 2017).

The questionnaire contained 4 parts: Part A: Demographic characteristics of the sample (age, gender, marital status, number of children, income, educational level and health status). Part B: Usage and type of social media used among the respondents. Part C: Factors

that lead to search for medical information on internet and social media
Part D: Behavior of Internet and social media users regarding information received on internet and social media platforms.

The validity and reliability were verified after approval of 7 consultants, conducting a pilot study and calculating Cronbach's alpha using Statistical Package for Social Science (SPSS) Version 23. The questionnaire was translated to Arabic.

Social Package for science software (SPSS) 23 version was used for data entry and data analysis. Each variable will be coded before entry and checked before analysis.

Study results

Sociodemographic Characteristics

The questionnaire was distributed to a total of 439 person. Three-hundred and eighty-five participants (87.7%) used the internet and social media to obtain medical information and they were our study group from thereafter.

More than half of the studied sample (57.9%) were aged between 20 and 40. Most of the studied sample were Saudi, female, married, have children, job and do not have a chronic illness. About 42% had a bachelor's degree and (35%) had an income range of 10000-20000 SR (Table 1).

Frequency of internet and social media usage to obtain medical information

Most of the study participants (60%) reported that sometimes they used the internet and social media to obtain medical information (Figure 1). It was found that (40%) of the studied participant always used internet and social media to obtain medical information.

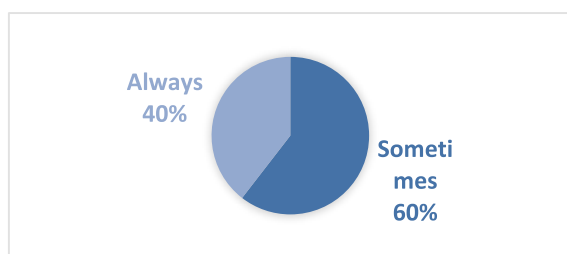


Figure (1): Frequency of Internet and social media usage to obtain medical information

	Frequency (N=385)	Percentage (%)
Age in years:		
<20	40	10.4
20-40	223	57.9
>40	122	31.7
Mean ± SD	34.6±11.0	
Range	15-69	
Gender:		
Male	156	40.5
Female	229	59.5
Nationality:		
Saudi	366	95.1
Non-Saudi	19	4.9
Marital status:		
Single	111	28.8
Married	255	66.2
Divorced/ Widowed	19	4.9
Presence of Children:		
Yes	241	62.6
No	144	37.4
Education:		
Elementary	2	0.5
Intermediate/ Secondary	138	35.8
Diploma	60	15.6
Bachelor	163	42.3
Master's/ PhD	22	5.7
Employment:		
No	153	39.7
Yes	232	60.3

Income		
<2000	50	13.0
2000 – 5000	49	12.7
5000 – 10,000	105	27.3
10,000 – 20,000	136	35.3
>20,000	45	11.7
Presence of chronic illness		
No	296	76.9
Yes	89	23.1

Table (1): Sociodemographic characteristics of study participants.

Sources used to obtain medical information

The most commonly reported source to obtain medical information was internet websites (84.4%), followed by YouTube (31.7%) (figure 2). Facebook was the least frequently used among all the resources to obtain medical information.

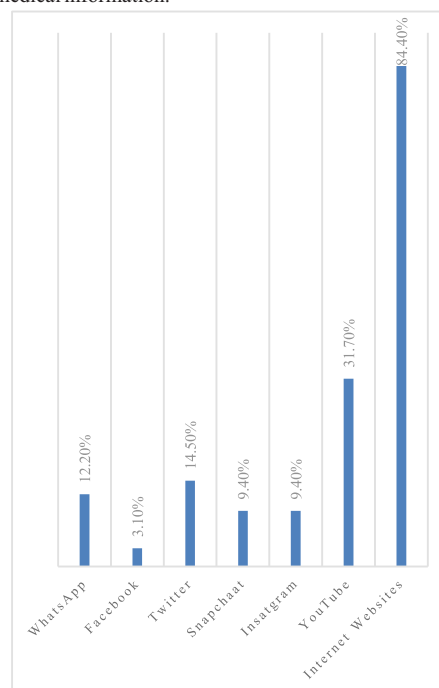


Figure (2): Sources of medical information.

Reasons for obtaining medical information from internet and social media

Different factors lead individuals to search the internet and social media for medical information, with the highest factor being for symptoms participants had (42.9%) followed by they or another person is sick and looking for information on illness and treatment (39%, 33.8%) respectively. Less frequently the cause was due to difficulty getting medical appointments, doctor did not solve their problem or having transportation difficulties (11.4%, 10.6%, 2.1%) respectively (Table 2).

Table (2): Factors that lead to search for medical information on internet and social media

Factors	Frequency	Percentage (%)
I am sick and looking for information on illness and treatment options.	150	39.0
Another person is sick and looking for information on illness and treatment options.	130	33.8
Causes of symptoms I am having.	165	42.9
Looking for alternative treatments.	89	23.1
Health-related topics discussed in the media.	112	29.1
Second medical opinion from medical consultation websites or social media.	76	19.7

Difficulty getting medical appointments.	44	11.4
I am busy to go to the doctor.	63	16.4
I have transportation difficulties.	8	2.1
Doctor did not solve my problem.	41	10.6

Behavior of participants regarding information obtained from internet and social media

Most of individuals (85%) were influenced by medical information found on internet websites and social media. In contrast, only (15%) were rarely influenced by the information obtained. (figure 3).

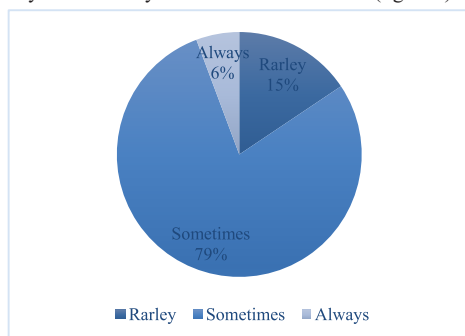


Figure (3): Extent of influence of medical information found on internet websites and social media on the decisions of individuals.

Most decisions made by individuals based on medical information found on the internet and social media were to adopt healthier lifestyle, or to act upon health awareness advised on internet and social media (66%, 51.2%) respectively. Other decision-making behavior such as to self-diagnose, start or stop medication as advised on internet and social media were noted (46.5%, 30.1%, and 28.8%) respectively. (figure 4).

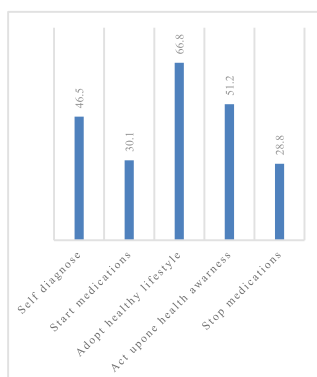


Figure (4): behavior of individuals regarding using internet and social media to obtain medical information.

The study also examined whether the individuals verify the credibility of the medical information obtained from internet and social media. The analysis showed that the vast majority of individuals (89%) had verified the information they obtained (Figure 4). mostly with a physician (83.6%). Other sources for verification can be found in (table 3).

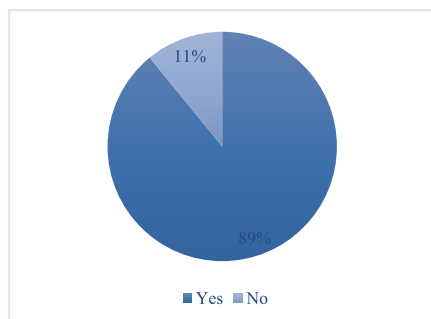


Figure (4): Verifying the credibility of the medical information.

Table (3): Sources used to verify the credibility.

Source of verification	Frequency	Percentage (%)
Physician	322	83.6
Nurses	28	7.3
Pharmacists	116	30.1
Internet websites	86	22.3
Ministry of Health website	100	26.0
PubMed	36	9.4
World Health Organization	45	11.7
Friends	41	10.6

Association between demographic data and the use of internet and social media to obtain medical information

This study showed that there was significant association between age, gender and nationality and frequency of obtaining medical information among internet and social media users ($p < 0.05$). Saudis, females, and young adults (20-40) participants were always searched the internet and social media to obtain medical information (38.7%, 26%, and 26.2%) respectively (Table 4).

Table (4): Association between sociodemographic characteristic and frequency of using internet and social media.

	frequency of obtaining medical information among internet and social media users				P-value
	Sometimes		Always		
	Frequency	%	Frequency	%	
Extent of influence	43	11.2	17	4.4	0.000*
Rarely					
Sometimes	186	48.3	117	30.4	
Always	5	1.3	17	4.4	

*Statistically significant ($p < 0.05$).

Moreover, the analysis revealed that there was a statistically significant difference between the frequency of using internet and social media to obtain medical information and influence of medical information found on internet and social media on the individuals' decisions ($p < 0.05$). Participants who always use internet and social media to obtain medical information are found to be sometimes influenced on their decisions (30.4%) (Table 5).

Table (5): Association between frequency of obtaining medical information among internet and social media users and the extent of influence on the individuals' decisions

	frequency of obtaining medical information among internet and social media users				P-value	
	Sometimes		Always			
	Frequency	%	Frequency	%		
Age:					0.002*	
<20	33	8.6	7	1.8		
20-40	122	31.7	101	26.2		
>40	79	20.5	43	11.2		
Gender:					0.03*	
Male	105	27.3	51	13.2		
Female	129	33.5	100	26.0		
Nationality:					0.009*	
Saudi	217	56.4	149	38.7		
Non-Saudi	17	4.4	2	0.5		
Marital status:					0.427	
Single	70	18.2	36	9.4		
Married	153	39.7	107	27.8		
Divorced/ Widowed	11	2.9	8	2.1		
Children:					0.453	
No	91	23.6	53	13.8		
Yes	143	37.1	98	25.5		
Education:					0.828	
Elementary	2	0.5	0	0		
Intermediate/						
Secondary	84	21.8	54	14		
Diploma	35	9.1	25	6.5		
Bachelor	100	26.0	63	16.4		
Master's/ PhD	13	3.4	9	2.3		
Employment:					0.088	
No	101	26.2	52	13.5		
Yes	133	34.5	99	25.7		

Income:					
<2000	32	8.3	18	4.7	0.788
2000 – 5000	28	7.3	21	5.5	
5000–10,000	62	16.1	43	11.2	
10,000–20,000	87	22.6	49	12.7	
>20,000	25	6.5	20	5.2	
Presence of chronic Illness:					
No	179	46.5	117	30.4	0.822
Yes	55	14.3	34	8.8	

DISCUSSION

This study sheds some light on the effect the internet and social media platforms have on individuals seeking medical information. To do that, the study explores the sociodemographic characteristics of internet and social media users who visit primary health care centers, the factors that lead to searching for medical information and the behavior of such users towards the information sought on the internet and social media. Few other studies have examined this topic in Saudi Arabia, and the majority were conducted internationally.

The aim of this study is to determine the behavior of individuals regarding the use of the internet and social media to obtain medical information. In order to do so, the study investigated the association between the demographic characteristics and the obtainment of medical information from the internet and social media outlets. The research revealed that those who more frequently searched the Internet and social media to obtain medical information, were of the following sociodemographic: young adults between 20 and 40 of age, females and Saudis. These results are similar to other studies done in the same scope (Bahkali et al., 2016; Iftikhar & Abaalkhail, 2017; Jamal et al., 2015; Beck et al., 2014). This similarity of outcomes between the studies is due to the fact that the majority of respondents were young and female. As can be expected, the study has found that internet websites were the most frequent source used to seek medical information. The reason being is its ease of access to both knowledge sharing platforms and materials such as images, videos, and the latest news. This finding coincides with the results of other studies (Bahkali et al., 2016; Jamal et al., 2015). However, there is a difference between the results of our study and that of Jeddah's in terms of the use of WhatsApp. WhatsApp was considered the main source of obtaining information in the study done in Jeddah (around 90%) (Iftikhar & Abaalkhail, 2017), whereas in our study, it was nearly 12%. This is because several sources to obtain medical information were included in our investigation. Furthermore, the study has shown that the main factors that lead individuals to search the internet for medical information are to look for the underlying causes of symptoms they are having and to seek more information and treatment options, which is similar to the study done by Nölke, Mensing, Krämer & Hornberg, 2015. Another factor, albeit to a lesser degree, is searching the internet for alternative treatment methods (23.1%) which is almost near triple the finding of the study done by Nölke, Mensing, Krämer & Hornberg, 2015. This can be explained by the fact that about 75% of Saudi Arabia's population have the tendency to use complementary and traditional medicine (Aboushanab, Khalil & Al Ahmari, 2019). Also, information on health-related topics that are discussed in the media (29.1%) and use of Internet to get a second medical opinion (19.7%) were from the most unlikely factors that lead individuals to search the internet for medical information but still with a higher percentage than the study of Nölke, Mensing, Krämer & Hornberg, 2015. This variation in results can be explained by the fact that the majority of this study's participants tend to verify the medical information they find by reading more into the topic or consulting a specialist online.

Regarding the behavior of participants towards obtaining medical information from internet websites and social media outlets, the results of our study has shown that 79% of participants were found to have been sometimes influenced by such information and 6% of them have been always influenced regardless of the source of information. This finding is consistent with a local study conducted by Amr Jamal et al., 2015, in which 93% were influenced by the information they seek. However, other studies reported influence rates of 40% or less (Salwa Bahkali et al., 2016; Iftikhar & Abaalkhail, 2017; Beck et al., 2014). In addition, the study explored whether the participants verify the validity and accuracy of information they obtain on internet and social media. The study has found that approximately 89% of participants who were influenced by medical information verify the information sought on internet websites and social media and nearly 84% of them chose physicians as their source to verify the credibility. A local study has

investigated this issue (Iftikhar & Abaalkhail, 2017), which showed a similar finding, in that 80% of participants verify health-related information obtained from internet and social media. However, the majority of participants in the local study used Google to verify the accuracy of health-related information obtained from internet websites and social media outlets rather than consulting with an actual physician. The difference in the source of verification between studies might be because of the availability and accessibility to physicians in primary health care centers and the regularity of follow-ups.

Another aspect of this study looks at the influence of medical information found on internet websites and social media on the decisions of individuals. The study shows that the majority of participants had a positive attitude towards adopting a healthier lifestyle such as smoking cessation, exercising and maintaining a healthy diet (66%). In addition, they tend to act upon health awareness (51.2%). Very close results were obtained in a study done by Salwa Bahkali et al., 2016, which found that 71.5% of participants searched for exercise and diet information and 39.6% sought out smoking cessation information. However, negative decision-making behaviors such as self-diagnosis and whether to start or stop medication as advised on the internet and social media had the following percentages (46.5%, 30.1%, and 28.8%) respectively. In comparison to a study done by Iftikhar & Abaalkhail, 2017 which found a large percentage of participants (46.6%) started medications as advised on social media without any physician consultation, and (42.6%) of patients stopped taking their medication after reading messages on social media platforms. The reason behind these results is because the majority of our participants tend to verify information from physicians rather than unreliable sources.

The present study has some limitations. The reason being is that it was conducted at primary health care centers in Dammam and Alkhobar, and therefore, results cannot be generalized to all individuals in Saudi Arabia.

CONCLUSION

In conclusion, our findings indicate that individuals use the internet and social media widely to search for health-related topics. The most common factors that lead individuals to seek online medical information were: to look for symptoms for themselves or for another person, information about their illness and treatment options. In addition, a greater number of participants had positive influence on their decision such as adopting a healthier lifestyle.

Moreover, the majority of participants were influenced by the information obtained. As a result, they sometimes get inaccurate information which is not evidence based or they might misunderstand and have difficulties in comprehending the information. This is why it is important to educate individuals about evidence based medical information sources.

In addition, further studies are needed that focus on the barriers that confine individuals from consulting with their physicians. To follow this further, it is important to raise awareness of the negative impact of the internet and social media platforms on individuals' behavioral changes. Furthermore, it is crucial to reinforce positive behavior changes such as adopting a healthy lifestyle. This can be done through campaigns, TV ads, the Ministry of Health SMS, reliable websites and social media sources and Sehha Application.

Lastly, further research should be conducted to explore more factors that drive patients to search the internet and social media rather than consulting a physician, such factors include, but are not limited to, patient-physician trust and the new MOH appointment system.

REFERENCES

1. Aboushanab, T., Khalil, M., & Al Ahmari, Y. (2019). The present state of complementary medicine regulation in Saudi Arabia. *Journal Of Integrative Medicine*, 17(3), 147-149. doi: 10.1016/j.joim.2019.03.010
2. Ahmad, F., Hudak, P., Bercovitz, K., Hollenberg, E., & Levinson, W. (2006). Are Physicians Ready for Patients With Internet-Based Health Information?. *Journal Of Medical Internet Research*, 8(3), e22. doi: 10.2196/jmir.8.3.e22
3. Annual Report 2017 [Internet]. Communication and Information Technology Commission. (2017). [Ebook]. Retrieved from https://www.citc.gov.sa/ar/mediacenter/annualreport/Documents/PR_REP_013A.pdf
4. Bahkali, S., Alfurih, S., Aldremly, M., Alzayyat, M., Alsurimi, K., & Househ, M. (2016). *IOS Press Ebooks - The Prevalence of Internet and Social Media Based Medication Information Seeking Behavior in Saudi Arabia*. Retrieved 14 February 2019, from <http://ebooks.iospress.nl/volumearticle/44218>
5. Bahkali, S., Almairan, R., El-Awad, M., Almohanna, H., Al-Surimi, K., & Househ, M. (2016). *IOS Press Ebooks - Exploring the Impact of Information Seeking Behaviors of*

- Online Health Consumers in the Arab World. Retrieved 16 February 2021, from <http://ebooks.iospress.nl/volumearticle/44219>
6. Beck, F., Richard, J., Nguyen-Thanh, V., Montagni, I., Parizot, I., & Renahy, E. (2014). Use of the Internet as a Health Information Resource Among French Young Adults: Results From a Nationally Representative Survey. *Journal Of Medical Internet Research*, 16(5), e128. doi: 10.2196/jmir.2934
 7. Chen, Y., Li, C., Liang, J., & Tsai, C. (2018). Health Information Obtained From the Internet and Changes in Medical Decision Making: Questionnaire Development and Cross-Sectional Survey. *Journal Of Medical Internet Research*, 20(2), e47. doi: 10.2196/jmir.9370
 8. Definition of INTERNET. (2019). Retrieved 14 February 2019, from <https://www.merriam-webster.com/dictionary/Internet>
 9. Definition of SOCIAL MEDIA. (2019). Retrieved 14 February 2019, from <https://www.merriam-webster.com/dictionary/social%20media>
 10. Health Online 2013. (2019). Retrieved 14 February 2019, from <http://www.pewinternet.org/2013/01/15/health-online-2013/>
 11. Iftikhar, R., & Abaalkhail, B. (2017). Health-Seeking Influence Reflected by Online Health-Related Messages Received on Social Media: Cross-Sectional Survey. *Journal Of Medical Internet Research*, 19(11), e382. doi: 10.2196/jmir.5989
 12. Individuals using the Internet (% of population) | Data. (2019). Retrieved 14 February 2019, from <https://data.worldbank.org/indicator/IT.NET.USER.ZS>
 13. Jamal, A., Khan, S., AlHumud, A., Al-Duhayyim, A., Alrashed, M., & Bin Shabr, F. et al. (2015). Association of Online Health Information-Seeking Behavior and Self-Care Activities Among Type 2 Diabetic Patients in Saudi Arabia. *Journal Of Medical Internet Research*, 17(8), e196. doi: 10.2196/jmir.4312
 14. Nölke, L., Mensing, M., Krämer, A., & Hornberg, C. (2015). Sociodemographic and health-(care-)related characteristics of online health information seekers: a cross-sectional German study. *BMC Public Health*, 15(1). doi: 10.1186/s12889-015-1423-0
 15. Sample Size Calculator by Raosoft, Inc. (2021). Retrieved 14 February 2021, from <http://www.raosoft.com/samplesize.html>
 16. Tan, S., & Goonawardene, N. (2017). Internet Health Information Seeking and the Patient-Physician Relationship: A Systematic Review. *Journal Of Medical Internet Research*, 19(1), e9. doi: 10.2196/jmir.5729
 17. Van De Belt, T., Engelen, L., Berben, S., & Schoonhoven, L. (2010). Definition of Health 2.0 and Medicine 2.0: A Systematic Review. *Journal Of Medical Internet Research*, 12(2), e18. doi: 10.2196/jmir.1350