Tropical Journal of Pharmaceutical Research February 2023; 22 (2): 407-414
ISSN: 1596-5996 (print); 1596-9827 (electronic)

Available online at http://www.tjpr.org
http://dx.doi.org/10.4314/tjpr.v22i2.25

Original Research Article

Social media use for medicine information-seeking behaviour among undergraduate students via the prism of the innovation-decision process

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Sent for review: 5 August 2022 *Revised accepted: 27 January 2023*

Abstract

Purpose: *To assess the level of adoption of social media for medical information-seeking behaviour (MISB) among students of Obafemi Awolowo University, Nigeria based on the prism of Roger's innovation-decision process theory.*

Methods: *The study was a cross-sectional survey of 429 students. Primary data were collected with a set of questionnaires comprising two main sections which sought to elicit information, first, on the adoption level of social media for medicine information employing a Likert-type scale with five alternative responses and weighting scores of 1 - 5, and second, on use of social media for MISB on a dichotomous (yes/no) scale. Collected data were analysed with descriptive and inferential statistics at 5 % level of significance.*

Results: *The results show that adoption of social media tools for sourcing medicine information among the students was at a persuasion level (MWA 2.10) and correlates with the finding on the dichotomous scale that they were barely (28.7 %) using the tools.*

Conclusion: *Social media for medicine information-seeking among students of OAU have not been effectively adopted and their use is infrequent. Furthermore, studies on the use of social media may be better assessed using the innovation-decision theory process model rather than a simple dichotomous scale.*

Keywords: *Medicine information, Social media, Innovation, Undergraduate students, Behaviour, Education, Pharmacy*

Tropical Journal of Pharmaceutical Research is indexed by Science Citation Index (SciSearch), Scopus, Web of Science, Chemical Abstracts, Embase, Index Copernicus, EBSCO, African Index Medicus, JournalSeek, Journal Citation Reports/Science Edition, Directory of Open Access Journals (DOAJ), African Journal Online, Bioline International, Open-J-Gate and Pharmacy Abstracts

INTRODUCTION

Social media have revolutionized the way people generally interact with one another and expectedly, the way users seek or receive medical information. The term social media represents forms of interactive computer-mediated online technologies (such as websites and applications) through which users interact with one another by creating and sharing information, ideas, personal messages, and other content in virtual communities and

networks [1,2]. There are many types of social media and they have been categorized generally into six groups [3]. They include 1. Social networking sites such as Facebook; 2. Professional networking sites such as LinkedIn and ResearchGate; 3. Media sharing platforms such as YouTube; 4. Content production platforms including blogs such as Blogger and microblogs like Twitter; 5. Collaborative projects such as Wikipedia and 6. Virtual social worlds and gaming environments such as Second Life and World of Warcraft. Their content can be text, chart, photo, podcast, and/or videocast [4]. Their uses have been extensively reported in health as well as in pharmacy [5,6].

Young people are particularly apt to use social media than the elderly with both positive and negative consequences [7,8]. Their liability includes potentially misleading drug-related messages or false claims [8]. They have become popular generally and especially among university students who use them for sharing learning experiences and for social networking [1,2,4,9,10]. Medication information-seeking behaviour on Internet has become common and social media are on the frontline [11]. Females are generally more active information seekers than males and appear to use social media more than males [12]. In their use for medical information, some social media are more accessible than others [6]. Reasons for medicine information-seeking may include self-treatment and the use of over-the-counter medicines [13]. The type of medical information for which social media may be used include the use of medicines, the effectiveness of medicines, the safety of medicines, dosage, dosing frequency, duration of treatment, possible interaction, and additional use of medicines, among others [10]. Studies have shown that students' health information seeking takes place primarily online [14].

In a study to determine the sources of online information about prescription drugs, it was found that Wikipedia and the National Library of Medicine rank highly in online drug searches [5]. A study of Health professions students' use of social media found that the students prefer online media as their primary source of information and the majority of students were using Facebook, Twitter, and LinkedIn among other social networking sites [2]. Pharmacists have an important role to both patients and the general public in the use of social media for medicine information-seeking [5,8].

Everest Rogers identified five stages in the innovation-decision process (IDP) theory (also called adoption theory) which include awareness, persuasion, decision, implementation, and confirmation [11]. The IDP theory is a useful tool in determining, not only the extent of use of innovation within a population but also the amount of potential uptake of the innovation by those not currently using it. There have been reports on the use of social media for seeking medical information but none has looked into the use of social media for medicine information-seeking behaviour (MISB) among university undergraduates through the prism of IDP theory.

METHODS

The study is a cross-sectional survey of 429 of the 22,318 students of the thirteen faculties of the Obafemi Awolowo University, Ile-Ife campus, Osun State, Nigeria. Primary data were used with the aid of a set of semi-structured questionnaires. The student population was stratified on a faculty basis and the sample size was computed using Taro Yamane's formula for finite population [15]. The questionnaire comprised three main sections. The first section was designed to elicit information about the adoption level of social media by adapting the five stages of Everett Rogers' innovation-decision process theory [11].

The response scale used comprises non-awareness (0) for those who did not know the technology at all; awareness (1) for those that were aware of the technology, persuasion (2) for those who have been aware of the technology and were considering whether to use it, decision (3) for those who had decided to obtain and use the technology at the next opportunity; implementation (4) for those who had used the technology before, and confirmation (5) for those who had been using the technology routinely. Adoption was taken to be effective from the implementation stage. The second and third sections comprised nine and eight items on a dichotomous (yes/no) scale that sought to elicit information on the social media tools used by the participants and the types of medical information sought, respectively. The validity of the instrument was assured through judgments of senior faculties who are experts in the field and by employing models from previous studies [4].

Ethical approval was obtained from the Institute of Public Health, Obafemi Awolowo University Ile-Ife with Certificate Number IPH/O.A.U/12/577. Proportionate sizes of the population from each of the faculties were conveniently administered with the questionnaire by visiting and addressing respondents in their lecture rooms immediately after lecture sessions. The students were

informed that participation was voluntary and those who consented to participate were given a questionnaire to fill which was then collected immediately after. The average time taken by participants was approximately 20 minutes.

Data analysis

The retrieved questionnaire was sorted and edited. Filled data were coded and loaded into the computer with the aid of Statistical Package for the Social Sciences (SPSS 21) software. The data were screened and then organized and summarised using descriptive statistics including frequencies, percentages, medians, weighted averages (WA), and means of weighted averages (MWA). For comparison of results on the two scales, the ordinal scale was collapsed to dichotomous during analysis with those from levels 0 – 3 denoting "not used" for social media tools not used and those on levels 4 and 5 denoting "used" for social media tools being used. Questions about relationships between variables and differences between means were subsequently answered using inferential statistics at 5 % level of significance.

RESULTS

Demographic profile of participants

This study has provided information on the participants' demographics, purposes of using social media generally among the undergraduate students, types of social media employed for medicine information sourcing by the students, and types of medical information sought. Out of the 527 copies of the questionnaire administered, 429 copies were retrieved yielding a return rate of 81.4 %.

Table 1 presents the demographic profile of the participants. The age group with a modal value (241, 56.2 %) was 21 – 25 years whereas the lowest proportion (14, 3.3 %) came from the 31 – 35 age group. The males (345, 80.4 %) were about four times the proportion of the female participants (84, 19.6 %). Most of the participants belong to the 300, 200, and 400 levels having 29.1, 28.9, and 26.6 % respectively with the least proportion (23, 5.4 %) coming from the 500 level.

Table 1: Demographic profile of participants

Characteristic	Frequency	%
Age of participants in years		
16-20	135	31.47
21-25	241	56.18
26-30	39	9.09
31-35	14	3.26
Gender of participants		
Male	345	80.42
Female	84	19.58
The academic level of participants		
100	43	10.02
200	124	28.90
300	125	29.14
400	114	26.57
500	23	5.36

Table 2 presents the level of adoption of social media tools by the students for medicine information-seeking. It shows that overall, the participants were at the persuasion (MWA 2) level of the adoption process. The three social media tools at the forefront for medicine information-seeking behaviour in the adoption process were Wikipedia (Mdn 4, WA 3), Blog (Mdn 3, WA 2.5), and YouTube (Mdn 2, WA 2.3).

Table 2: Level of adoption of social media for medicine information-seeking based on Roger's innovation-decision process theory

Social media tool	x	NA 0	Awar 1	Pers 2	Dec 3	Impl 4	Conf 5	Mdn	WA
Wikipedia	f	62	107	5	18	72	165	4	2.99
	%	14.45	24.94	1.17	4.20	16.78	38.46		
Blogs	f	62	116	36	38	103	74	3	2.53
	%	14.45	27.04	8.39	8.86	24.01	17.25		
YouTube	f	71	117	33	66	86	56	2	2.34
	%	16.55	27.27	7.69	15.38	20.05	13.05		
Facebook	f	105	189	11	10	71	43	1	1.72
	%	24.48	44.06	2.56	2.33	16.55	10.02		
Twitter	f	88	193	57	18	54	19	1	1.57
	%	20.51	44.99	13.29	4.20	12.59	4.43		
Instagram	f	132	156	40	41	49	11	1	1.42
	%	30.77	36.36	9.32	9.56	11.42	2.56		
Mean of Weighted Averages (MWA)									**2.10**

Key: Response points comprise: NA = No awareness; Awar = Awareness; Pers = Persuasion; Dec = Decision; Impl = Implementation; Conf = Confirmation; x = weighting score; f = frequency; % = percentage of respondents; Mdn = Median; WA = Weighted average/mean

More than 20 % of the participants were not aware of the last three social media tools namely Instagram (132, 30.8 %), Facebook (105, 24.5 %), and Twitter (88, 20.5 %). Only Wikipedia adoption had reached to implementation (Mdn 4) level of the adoption process and only Blog's adoption had reached the decision (Mdn 3) level. YouTube adoption was at the persuasion (Mdn 2) level whereas Facebook, Twitter, and Instagram were all at the awareness (Mdn 1) level.

Table 3 shows the social media tools being used for medicine information-seeking reported on a dichotomous (yes/no) scale. The results show that less than a third of the respondents (739, 28.7 %) were using the tools.

Table 4 presents a comparative assessment of the use of social media tools for medicine information-seeking by the participants, measured on the two different response scales. The first on innovation-decision process (adoption) theory collapsed into two and the second, on a simple dichotomous scale. The results show that the order of the level of use of social media tools remained the same on both scales with the highest level recorded for Wikipedia, Blogs, and YouTube respectively, with minor differences in the actual figures. For instance, while 208 (48.5 %) of the participants claimed to use Wikipedia for medicine information-seeking on the adoption process scale, 221 (51.5 %) claimed to use it on the dichotomous scale giving a trifling difference of 3.0 %. The differences in percentages of those using social media tools, on the two scales, for each of the items were generally less than ten units. The highest differences of 9.6, 9.1, and 7.5 % were recorded for YouTube, Twitter, and Facebook, respectively, while the least difference of 1.17 % was obtained for Instagram. A statistical analysis of the results shows that although the means (98.50, 123.17) of the rating of the social media tools on the two scales were significantly different ($t = -4.086$, $p = 0.009$), the ranking of the social media tools on the two scales were strongly correlated ($R = .972$, $p = .001$).

Table 3: Social media used for medicine information-seeking by the undergraduates of Obafemi Awolowo University reported on a dichotomous scale

Social media tools	Using		Not using	
	Frequency	***Percentage***	***Frequency***	***Percentage***
Wikipedia	221	51.52	208	48.48
Blogs	144	33.57	285	66.43
YouTube	132	30.77	297	69.23
Facebook	116	27.04	313	72.96
Twitter	92	21.45	337	78.55
Instagram	34	7.93	395	92.07
Total	739	28.71	1835	71.29

Table 4: Comparative assessment of social media use for medicine information-seeking behaviour (MISB) measured on Roger's innovation-decision process (collapsed) and dichotomous scales

Position	Social media tool		Use of SM for MISB measured on adoption process scale		Use of SM for MISB measured on a dichotomous scale		The difference in % using SM tool on the two scales
			Not using	***Using***	***Not using***	***Using***	
1st	Wikipedia	f	221	208	208	221	-3.03
		%	51.52	48.48	48.48	51.52	
2nd	Blogs	f	303	126	285	144	-4.20
		%	70.63	29.37	66.43	33.57	
3rd	YouTube	f	338	91	297	132	-9.56
		%	78.79	21.21	69.23	30.77	
4th	Facebook	f	345	84	313	116	-7.46
		%	80.42	19.58	72.96	27.04	
5th	Twitter	f	376	53	337	92	-9.09
		%	87.65	12.35	78.55	21.45	
6th	Instagram	f	400	29	395	34	-1.17
		%	93.24	6.76	92.07	7.93	

Key: f = frequency; % = percentage; SM = social media; MISB = medicine information-seeking behaviour

Figure 1 presents the types of medicine information sought by the OAU students which shows that the three types of medicine information mostly sought by the students were use of medicines (285, 66.7 %), the effectiveness of medicines (203, 47.4 %) and safety of medicines (196, 45.7 %). whereas, dosing (72, 16.8 %), duration of action (101, 23.5 %), and side effects of medicines (156, 36.4 %) were the medicine information types least frequently sought by the respondents. A chi-square test of independence performed to examine the relation between the variables showed that there was a significant association between respondents' faculties and their use of social media for medicine information, χ^2 (12, N = 489) = 136.24, p = 0. Respondents were more likely across the faculties to be using social media for medicine information-seeking than not.

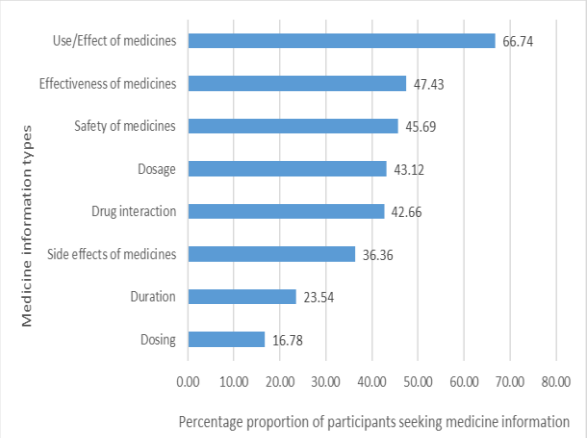

Figure 1: Types of medicine information sought by OAU students

DISCUSSION

This study has sought to assess the use of social media for medicine information seeking among undergraduate students of Obafemi Awolowo University, Ile-Ife (OAU), through the prism of the adoption process. Consumers of medicines often seek medicine information possibly for self-treatment and use of over-the-counter medicines and most of them nowadays use the internet [12].

As the social media environment continues to evolve, social media tools are now employed in virtually all areas of information and communication including for seeking medical information. The use of social media for seeking health information has been extensively reported in literature whereas there is only a limited report on their use for seeking medical information [4,14].

Most of the respondents in the study were adolescents and young adults who are known to have a predilection for use of the social media [3]. The respondents engaged in the use of all forms of social media such as texts, charts, photos, podcasts, and videocasts, for different purposes including communicating, collaborating, connecting, completing, combining, and knowledge-sharing with both positive and negative consequences including potentially misleading drug-related messages or false claims [3,8,9]. The fact that the sample is male-dominated may be due to their relative distribution in the student population as females have been reported to be usually more active information seekers than males with differences in sources of information consulted, information desired, and degree of engagement in information seeking [7].

Females have also been reported to use social media more so any bias of sampling more males may have resulted from under-reporting of social media use among the population [7]. Gaining a better understanding of how males and females differ in the way in which they find and use medical information may help to enhance patient-healthcare provider communication and the information that they receive [7]. The fact that almost all of the respondents were using social media for social networking, academic, and entertainment confirms their predilection for social media use as a way of life [16,17].

Social media may have become popular for medicine information-seeking among undergraduates as a result of its suitable features such as user-friendliness, interactiveness, real-timeliness, knowledge-sharing, and accountability, among others [14,15]. However, only a little over half of the respondents used social media to seek medicine information. This may signify the use of other medicine information sources such as physician, community pharmacists, or a low level of need for medicine information-seeking as adolescence is generally thought to be a time of good health when disease burden is low [2]. The IDP theory is a useful tool in determining, not only the extent of use of innovation within a population but also, the amount of potential uptake of the innovation by those not currently using it [11]. Adoption covers not only use but also potential use and becomes a reality from the level of actual implementation and it is those at that level and above that are using the innovation or technology while those at the decision level and below have not effectively implemented the technology and cannot be said to be using it.

The fact that in this study, the ranking of all the social media tools investigated were similar on the two different scales employed namely, one based on IDP theory and the other on a dichotomous scale, shows that measurement of the use of social media on the two scales is comparatively the same. Adoption studies enable us to know the likelihood of an increase in uptake of innovation in the foreseeable future. Thus, this comparative examination of the use and adoption of social media among the participants has enabled us to see that the adoption model provides comparable information about actual use in the study of the use of social media tools among the participants. However, it has the added advantage of providing information about the potential use and may be a better model for examining the use of social media among a group of adopters.

Wikipedia, Blogs, YouTube, and Facebook were the four most adopted social media tools for medicine information-seeking behaviour among OAU undergraduates. This may be because of the appealing features of the tools. [14]. Wikipedia is popular not only for lighter topics such as entertainment but also for more serious topics such as health and legal information [5]. Wikipedia has been ranked in this study as the most used social media tool for medicine information-seeking possibly because as a collaborative knowledge-building project, it allows for a quick check of facts and for finding background information thereby providing accessible real-time answers and probably also because it has many varied sources for information [13]. It has been documented to be a favourable tool for searching for information among students [13]. Wikipedia may have been ranked before Blogs because it is often more broad-based in its source but that is also its downside [14]. Its free-editing concept has been criticized as dubious for allowing individuals from varying backgrounds and viewpoints to edit its content and offer opinions on everything [15].

Blogs have been ranked in this study lower than Wikipedia for students' medicine information-seeking behaviour and have been reported previously as being popular for students' medicine information-seeking behaviour [7]. In one study that examined why students did not blog at the Vienna University of Technology in Austria, it was found that they preferred to communicate online through one-on-one means and that they feared the loss of privacy from open-platform blogging [15]. Thus, it could be inferred that those students would prefer the use of social media that would communicate medical information to them, even if personal, to that which would demand their personal information.

However, blogs have been ranked higher than YouTube, Facebook, Twitter, and Instagram. They prefer blog to those other social media tools probably because it has many varied sources for information which provide an opportunity for comparison and comments from other followers may provide more clarification that answers their questions. The downside of it is that the information may not be rich as it was not written with the user's specific situation in mind [9]. Also, information may not be current and may be biased especially if written by marketers [5]. Furthermore, the information may have been written by an uninformed or partially informed blogger that is not an expert in the field with inaccurate or outrightly wrong information or the blogger may have been deliberately deceptive [16].

YouTube has been ranked below Blog but over and above Facebook, Twitter and Instagram, probably because as a free and popular video-sharing website platform, it is easy to learn from content uploaded, by watching uploaded videos or webinars speaking on important topics that can provide information for the audience [2,5]. Its main pitfall is that its information may be inaccurate or wrong as it lacks peer review and the material may not be available all the time [13].

Facebook, is the fourth tool reported by the participants to be used for medicine information-seeking. It may have been ranked below Wikipedia, blogs, and YouTube because it is mainly about connecting with friends and family and may suffer from privacy issues [9]. However, it has been previously reported to be predominant among some university students [10].

Twitter is a fast-paced and concise platform that has been reported to appeal more to younger customers, allowing users to discover new content and see what's trending in their social world [18]. However, it does not provide detailed information except for people searching for specific information to check for hashtags which may provide links to a suitable file containing desired information [18]. As such, it may not likely meet the need of someone seeking important information as to medicines. While Twitter can be used to get linked to video streams, such videos may as well be obtained directly on YouTube.

Instagram may have been ranked at the rear end of the list by the participants in this study because, Instagram is a superficial platform, mainly for pictures and some of its features are for real-time updates not suitable for any durable information and so not likely to be a destination for medicine information seekers [18]. A marketing or socializing platform of engaging and beautiful images to get the attention of the target audience is not likely to be an attraction for a medicine information seeker [1].

Limitations of the study

The reports of the students about the type of medical information mostly sought as use/effect of medicines, the effectiveness of medicines, and safety of medicines are in line with the literature [8], although this study did not seek information about the type of medicines for which information was sought which has been reported in the literature to be those with the potential for dependence; for stigmatized conditions; that have received media attention; and those for episodic treatments [9]. Another limitation of this study is that it did not seek to elicit information about the target sources of information in using social media for medicine information-seeking, whether it was physician, pharmacist, non-professional, or even drug company. Furthermore, this study has simply looked into the use of social media tools for medicine information-seeking and not the credibility of the tools such as which of them is best or why participants prefer to use one social media tool in preference to the other. Thus, despite the ranking obtained, it cannot be guaranteed which of these social media tools is the most credible because information credibility indicators are unique to each of the social media tools/platforms, and the information itself and its provider are sources of uncertainties [5,6].

CONCLUSION

Social media for medicine information-seeking have not been effectively adopted among students of Obafemi Awolowo University, Ile-Ife, Nigeria (OAU). Thus, there may be a need to equip pharmacy and other undergraduate students with the necessary knowledge and skills to maximize the benefits and avoid the pitfalls associated with the use of social media for seeking medical information. Furthermore, assessment of the use of social media tools for seeking medical information among under-graduate students may be more precisely achieved, using Roger's innovation-decision process model which measures both actual and potential use, than by employing a simple dichotomous scale.

DECLARATIONS

Acknowledgements

The cooperation of the students of Obafemi Awolowo University during the collection of data for this study is highly appreciated by the authors.

Funding

None provided.

Ethical approval

Ethical approval was obtained from the Institute of Public Health, Obafemi Awolowo University Ile-Ife (approval no. IPH/O.A.U/12/577).

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of Interest

No conflict of interest associated with this work.

Contribution of Authors

We declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. The concept of this paper was designed by OJO-O. OJO-O and OJO wrote the definition of intellectual content and did the literature search. Data were collected by OO, and analysed/interpreted with OJO-O. OJO, OBO and AOJ reviewed successive versions of the manuscript. All the authors approved the final version.

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