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**HEALTH INFORMATION BEHAVIOUR OF GRADUATE STUDENTS ON THE
INTERNET: SOURCES, TRUST AND RELIABILITY OF INFORMATION**

By

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Abstract

The study sought to investigate the health information behaviour of graduate students on the internet. A quantitative method using a cross-sectional survey was used to solicit information from 256 graduate students studying courses related to health in the Arts, Social, and applied Sciences. The results showed that most of the respondents preferred the Internet because it is timely, fast and provides information from different sources simultaneously. The type(s) of health information mostly sought for were general information on healthy lifestyle, specific disease or treatment, side effects of medications, new development in the medical field among others. Majority (90.9 %) of the respondents trusted the health information on the Internet but most (56.6 %) did not verify the information obtained online with medical practitioners although they had some forms of concern. The findings offer health practitioners knowledge about university students' health information seeking behaviour on the Internet in relation to other sources of health information.

Keywords: Health information, Online communication, Graduate students, Ghana

Introduction

In recent years, health information seeking behaviour (HISB) on the Internet has seen some significant increase worldwide, hence a vital subject for research. Research studies conducted in the United States according to Fox and Duggan (2013) found that about 81 % of Internet users were health-related information seekers. Several studies conducted in Europe showed an increase with Tatara, Kjøllesdal, Mirkovic and Andreassen (2016) and Hansberry et al. (2017) reporting about 79% of health information seekers among internet users. In Nigeria, 61 % of young educated adults use the Internet for self-care and are aware of the availability of health information on the Internet (Oyelami, Okuboyejo & Ebiye, 2013). Borzekowski, Fobil and Asante (2006) report that 53 % of both adolescents in and out of school go online for health information in Ghana.

To encourage Ghanaian students to make proper use of the abundant health information available on the Internet, the factors associated with health information seeking behaviours on the Internet (HISBI) among this group need to be identified. Possible factors (predictors) that influence health information seeking behaviour on the Internet among young adults have already been identified to include demographic (e.g. gender and age) characteristics, Internet experience and perceived characteristics of the Internet (Ansah-koi, 2013; Alkhalaf, 2013). However, the complex relationships among these factors are not well understood in the Ghanaian student population.

In order to fill this gap, this study sought to explore the type(s) of health information, sources of health information, and the potential factors (predictors) that influence graduate students' health information seeking behaviour on the Internet. The causal or influential factors (predictors) were selected based on the review of literature on Johnsons' Comprehensive Model of Information Seeking (CMIS). A better understanding of these factors could help identify the health needs of users and find ways to increase an individual's participation in disease prevention, health education and promotion in Ghana.

The study sought to find out sources graduate students consult for health information on the Internet, identify the type(s) of health-related information students search for on the Internet, identify perceived factors that influence preference for the Internet health information sources, and also find out if graduate students verify the reliability of health-related information they find on the Internet. Conclusions drawn from this study offer health practitioners some idea about

university students' health information seeking behaviour on the Internet in relation to other sources of health information.

Literature Review

Searching the Internet for health related information is one of the most common and popular online activities. Among the top three health topics searched online are; specific diseases or medical problem, medical treatment or procedure, and exercise or fitness (Fox, 2011). Research indicates that individuals with health queries believe that they can find information on the Internet even though they may not know much about the health related topic.

The Johnson's (1997) Comprehensive Model of Information Seeking (CMIS) has three primary classes of variables. These are: antecedents, information carrier factors, and information seeking actions. Antecedent to health information seeking for the purpose of this study are essentials that motivate people to seek answers to questions and shape their views about the usefulness of information sources.

Apart from demographic factors, another background factor that the CMIS proposes to have an effect on perception and use of information sources is the individual's degree of experience. The CMIS identifies different stages of experience with a disease that would inform the nature of information seeking (Alkhalaf, 2013). An individual's knowledge or experience is considered by different researchers as one of the elements that determine one's ability to search for information. Users' knowledge of a resource or a service has the tendency to lead them to more use of the service or the resource (Chou, Wang, & Tang, 2015). It is a reason, according to Gowin et al. (2015), college students use the Internet more than any other group of population. Johnson (1997) affirms that an individual's motivation to seek information and its purpose are affected by salience and beliefs. These two factors are related to the relevancy of the disease to the individual. That is, the degree to which the information being sought for is related to ones' need is very important to an individual, also the individual's belief about the effects of the information, indicates how far he or she will be motivated to seek for the information.

Johnson's CMIS considers salience, perceived significance or importance of health information, as one of the personal relevance factors that motivates a person to seek for information. Johnson (1997) also believes that salience is equivalent to the concept of motivation as it "provides the

underlying motive force to seek information”. Johnson’s CMIS suggests that, information seeking is determined by information carrier factors aside the earlier antecedent factors which are initial incentives for individuals to look for information. However, Johnson’s CMIS suggests two aspects of the factors that may impact on the nature of a person’s information seeking actions: perceived characteristics and perceived utility of information carriers. According to (Eysenbach, Powell, Kuss, & Sa, 2014), the quality of consumer health information on the World Wide Web is an important issue for medicine. They revealed that, the most frequently quality criteria used include accuracy, completeness, readability, design, disclosures, and references provided.

In the Ghanaian situation, Ansah-koi (2013) explored the health seeking behaviour on the Internet by graduate students of the University of Ghana. Grounded in the tradition of human health and information seeking literature, the research was underpinned by two theories: Health Belief Model and the Information Intents Theory. The results revealed that most of the respondents searched for health information using search engines among others. The iHub Research on Mobile Internet Usage in Ghana in 2012 also revealed that 19% of sample of the Ghanaian populace from Accra and Sunyani, use their mobile phones to browse the Internet. Ansah-koi further recommended that more research should be conducted on health information seeking behaviour of the youth in developing countries. This study therefore offers exciting data on the potential to deliver health information via the Internet to the Ghanaian populace by studying the health information seeking behaviour of graduate students on the Internet in KNUST Ghana. The concerns of Internet health information seekers and their level of trust in the information sourced online must be of concern to all stakeholders including medical librarians across the globe.

Methodology

A cross-sectional survey strategy was employed in achieving the research objectives. The entire population totalling two hundred and fifty-six (256) was considered for the study.

The questionnaire had twenty- nine (29) close-ended questions with multiple choice answers which allowed the respondents to tick one or more answer(s) relevant or applicable to them. The questionnaire for this survey was live-administered by the researchers at the various lecture halls and or laboratories and was assisted by trained research assistants and course presidents who also took part in the survey. This research used both descriptive (frequency tables, charts and graphs) and confirmatory data analysis (CDA) known as inferential statistics. The inferential statistics used

for the study were Means and Standard deviation (SD). Data were analysed using the Statistical Package for Social Sciences (SPSS) version 17.0. Lastly, mean and standard deviation were used to ascertain the average value and variation of responses for each variable or item on the Likert scale. This was used to establish the usefulness of health information channels and factors that are considered whilst visiting health related website.

Out of 256 copies of questionnaire administered, 198 were completed and returned. This corresponds to a response rate of 77.3 percent. The high response rate could be attributed to the importance respondents attach to health information seeking on the Internet as a means to enhance health education, preventive medicine and maintenance of a healthy lifestyle.

Results

Sources of Health-related Information on the Internet

Responses on source(s) from which graduate students accessed health information on the Internet are indicated in Table 1.

Table 1: Source(s) of Health Information on the Internet

Source(s) of Health Information on the Internet	Responses		
	N	Percent	Percent of Cases
Search Engines and directories (e.g. Google, Yahoo)	180	38.1%	90.9%
Specific/Authorised health Web sites	80	16.9%	40.4%
Online social network group (e.g. Facebook, WhatsApp)	70	14.8%	35.4%
Online Scientific Journal	51	10.8%	25.8%
E-mails	46	9.7%	23.2%
Online advertisements	27	5.7%	13.6%
Text messages from service providers	18	3.8%	9.1%
Total	472	100.0%	238.4%

Source: Field data, 2016

The findings revealed that 180 (90.9 %) respondents used search engines to obtain health information (Table 3). This was followed by 80 (40.4 %) respondents who used specific or authorised health websites. Seventy (35.4 %) of the respondents however used online social

networks. Fifty-one (25.8 %) of the respondents used science journals, 46 (23.2 %) relied on emails with 27 (13.6 %) and 18 (9.1%) relying on online advertisement and text messages from service providers respectively

Type(s) of Health Related Information Sourced on the Internet

The results in Table 2 reveal that 157 (79.3 %) respondents used the Internet to obtain information on healthy lifestyle. Also, 154 (77.8 %) respondents used the Internet to enquire about specific diseases. A total of 128 (64.6 %) respondents used the Internet for information on the side effect of medication; 106 (53.5 %) respondents used it for information about new developments in the health/medical field. Lastly, 86 (43.4 %) and 9 (4.5 %) respondents used the Internet to obtain information about new or alternative treatments and information to assist in selecting a specialist respectively.

Table 2: Types of Health Information Sourced Online

Types of Health Information	Responses		Percent of Cases
	N	Percent	
General information on healthy lifestyle (e.g. Diet/nutrition, fitness/exercise etc.)	157	24.5%	79.3%
Specific information about a specific disease or treatment (e.g. Ebola, Heart diseases)	154	24.1%	77.8%
Information on the side effects of medications	128	20.0%	64.6%
Information about new developments in the health/medical field	106	16.6%	53.5%
Information about new or alternative treatments	86	13.4%	43.4%
information to assist in selecting specialist (e.g. Doctors)	9	1.4%	4.5%
Total	640	100.0%	323.2%

Source: Field data, 2016

Preference for Health Information on the Internet

Majority, 165 (83.3 %) respondents preferred using the Internet because it is accessible every day. One hundred and forty-five (73.2 %) respondents also preferred the Internet because it is fast and required minimum effort to obtain information. Also, 137 (69.2 %) respondents chose the Internet because it provides information from different sources simultaneously. Ninety-nine (50.0 %) respondents affirmed it because lots of very useful information on preventive medicine is available on it. Ninety (45.5 %) preferred the Internet as the main source because it costs less to source information from the Internet and 82 (41.4 %) respondents indicated that because confidentiality and anonymity are assured. Details of these preferences are shown in Table 3

Table 3: Features that Influence preference for Health Information on the Internet

Characteristics	Responses		Percent of Cases
	N	Percent	
Source is available any time I need it (provides 24/7 accessibility)	165	23.0%	83.3%
It is fast and requires minimum efforts to obtain information from	145	20.2%	73.2%
It provides information from different sources simultaneously	137	19.1%	69.2%
Lots of very useful information on preventive medicine is available	99	13.8%	50.0%
the source does not involve high cost to obtain needed information	90	12.5%	45.5%
Confidentiality and anonymity assured	82	11.4%	41.4%
Total	718	100.0%	362.6%

Source: Field data, 2016

Reliability of Health Information on the Internet

Table 4 reveals 112 (56.6 %) of the respondents did not verify the information sourced online with medical practitioners. An equal number 112 (56.6 %) of the respondents searched for health information on the Internet before visiting a medical practitioner. This suggests that majority of students preferred acquiring information about their conditions before visiting the doctor. Perhaps they doubted the information acquired online or wanted a confirmation from the doctor. However, 131 (66.2 %) of the respondents verified health information on the Internet after visiting a medical practitioner.

A majority of 127 (64.1 %) of the respondent indicated that there was no difference between the health information sourced online and their prescription. A huge majority, 180 (90.9%) of the respondents indicated they trust the information sourced from the Internet.

Table 4: Verification of Reliability

Response	Frequency (%)		
	Yes	No	No Response
Verify with medical practitioner	86 (43.4)	112 (56.6)	-
Search before visit to medical practitioner	112 (56.6)	86 (43.4)	-
Search after seeing a medical practitioner	131 (66.2)	67 (33.8)	-
Difference in online and Doctors health information	35 (17.7)	127 (64.1)	36 (18.2)
Trust	180 (90.9)	18 (9.1)	-
N (Total frequency) =198			

Source: Field data, 2016

Assessing credibility of Health Information Online

To find how respondents' assessed the credibility of the health information they accessed online, the respondents were asked to rate the importance (1= Very important, 2= Somewhat important and 3= Not important) of a number of factors or criteria which they would consider if they were to access health information on the Internet (Table 5).

Table 5: Rating Criteria for Health Web Site

Factor/ Statement	Mean	Std. Deviation
Bias	2.22	.718
Interactivity	2.10	.680
Use of multimedia	2.01	.583
Appearance	1.99	.672
Quality of links	1.85	.708
Ease of navigation of web site	1.74	.699
Citation for information	1.66	.706
Personal relevance	1.59	.637
Currency of information	1.53	.635
Confidentiality of personal information	1.45	.680
Credibility of author	1.42	.572
Accuracy	1.40	.521
Comprehensiveness	1.40	.531
Readability	1.34	.536
Ease of understanding	1.32	.520

Source: Field data, 2016

From the values of the means generated, the results in Table 5 reveal that ‘Bias’ scored the highest mean (2.22) as the criteria that can be used to assess health information websites. This is followed by ‘interactivity’ (mean = 2.10), ‘Use of multimedia’ (2.01), appearance (1.99), ‘Quality of links’ (1.85), ‘Ease of navigation of web sites’ (1.74), ‘Citation for information’ (1.66), ‘Personal relevance’ (1.59), ‘Currency of information’ (1.53), ‘Confidentiality of personal information’ (1.45), ‘Credibility of author’ (1.42), ‘Accuracy’ (1.40), ‘Comprehensiveness’ (1.40), ‘Readability’ (1.34) and ‘Ease of understanding’ (1.32). The overall findings suggest that ‘Bias’ with the highest standard deviation (SD=.718) was the most important factor which was differently used to rate the health information websites by the respondents.

Discussion

Sources Graduate Students use for Health-related Information on the Internet

The study discovered that majority of graduate students sourced online health information via search engines and directories like Google and Yahoo. This is consistent with the literature which reports that search engines constitute the first port of call for health information seekers on the Internet as found among 86.7 % Chinese students in the USA (Cleveland, 2012).

The Pew Internet Report (2013) indicates that 77 % of online health seekers used search engines such as Google, Bing, or Yahoo. The research finding supports previous research that suggested that others started their search from specialised health web sites such as WebMD, social network sites like Facebook (Gavgani, Qeisari & Jafarabadi, 2013; Fox & Duggan, 2013; Sadasivam et al., 2013), online scientific journals (databases), Emails and online advertisement. The web 2.0 application (social networks, blogs, and discussion groups) were the least used (Gavgani et al., 2013). The research findings are also similar to that of Ansah-koi (2013) which reports that, 92 (92 %) of health information seekers search for health information for themselves while less than one tenth (8 %) search for health information for others. The findings are also reflective of the study conducted in the University of Ghana where more than 50 % of the respondents indicated their preference for use of search engines (Ansah-koi, 2013). This result brings to fore the reality of an urgent need for health education with regard to the appropriate, reliable and credible sources of health information on the Internet. The research outcome throws a challenge to stakeholders (e.g. health professionals) in Ghana for instance to come up with credible websites to address health information needs of the Ghanaian populace as their contribution to global hub of knowledge in health. The results also attest to the gradual awareness and growing trends in the health information seeking behaviour on the Internet among young adults in the university.

Types of Health-related Information Students Searched on the Internet

The most common type of health information graduate students seek on the internet pertains to general healthy lifestyle, treatment for specific disease, side effects of medications and information on new development in the medical field. The findings are consistent with Fox and Duggan, (2013) who reported that more than 50 % of young adults between the ages 18-29 sought for specific disease or medical problem with less than 50% also sourcing for medical treatment or procedure, food safety, drug safety, how to lose or control weight, and other health related issues.

It was also revealed that out of the six different types or options of health information provided, majority of the students relied on four main types of health information. The result therefore suggests that students relied on different types of health information. The dependence on many types or sources of health information contradicts the findings of Huh, (Huh et al., 2013; Synnot et al., 2016) who reported that the dependency on few types of health information may reflect a reaction to information overload. It points to limitations in human information processing capacity (Alkhalaf, 2013). The choice of many types of health information in this study may be attributed to the health related academic disciplines of the respondents. The information sourced may be for personal use as well as academic work.

Perceived Factors that Influence Preference for Internet Health Information Sources

Majority of graduate students prefer the Internet because it is timely, fast and provides information from different sources simultaneously. The findings corroborate the studies by Cline and Haynes as cited in Neter, Brainin and Baron-Epel (2018) who gave the reasons for the growth of online health information seeking by consumers to include the cost-containment efforts that reduce physicians' time with patients as well as convenience, anonymity and diversity of information sources as a form of attraction (Holtgrafe & Zentes, 2012).

The research findings were also supported by Oyelami, Okuboyejo and Ebiye (2013) and Ansah-koi (2013). In these studies, respondents went for medical practitioners, books/magazines, friends and family as their options in the order of decreasing proportions. The options could be attributed to the phenomenon that they went online for health information before consulting the medical practitioner in order to verify the health information. Perhaps, this was to enable the respondents be double sure of the information provided by the medical practitioner. It could also be attributed to the overwhelming trust the respondents had in the Internet as a source for health information notwithstanding the risk associated with sourcing health information online.

The findings support Johnson's CMIS, which posits that individuals who possess specific background and personal relevance factors and have positive perception of information source characteristics perceives it to have greater utility which in turn will increase the scope and depth

of use of such a source under investigation. The preference of the medium is concerned with what the individuals associate the sources in terms of usefulness (Alkhalaf, 2013).

The inferential statistics (mean and standard deviation) results of this study revealed that both 'Non-advertising Internet sources' (SD=71.183) and 'Internet advertising sources' (SD=70.845) (online) were the resources respondents found useful most differently. These findings suggest that the usefulness of a source depends on whether the source would be able to satisfy the health information needs of the individual. The result is consistent with Johnson's (1997) CMIS, which postulates that there are influential differences between the perceived usefulness of sources and information seeking actions (Johnson, 1997). Sbaffi and Rowley, (2017), also reported that perceived usefulness of the Internet as a preferred source for health information has been found as a major factor associated with the use of specific websites. The results of the research may be attributed to the variations in the individual's experience in a disease or health information need. The CMIS considers the individuals' experience in a disease as being one of the influential factors (drawn from health belief model) that could influence the graduate students' perception of usefulness of sources (information carrier factor) for seeking health related information to satisfy health needs (Alkhalaf, 2013).

Verifying reliability of Health information on the Internet

Graduate students applied different methods or tactics to verify the health information sourced online. Majority of the students were aware of the risks involved in accessing potentially misleading health information online. However, the research findings show that only 43.4 % of the students mentioned that they verified the information sourced online with medical practitioner while the majority (56.6 %) did not bother to do so. This may stem from the students overwhelming indication of trust in online health information. However, more than half of the respondents mentioned that they search for health information on the Internet before (56.6 %) and after (66.2 %) visiting the medical practitioner perhaps to find out or verify if what they sourced online is different from what they sourced from the health practitioner's information. The findings indicate that minority (46.2 %) of those who have concerns tend to verify reliability of online health related information, while the majority (53.8 %) surprisingly do not bother to do so.

The findings from this research tend to reinforce earlier research that university students have weak propensity to verify the accuracy of the information they retrieve from online sources and that the quality of information provided by those sources are not necessarily important to them (Biddix, Chung & Park, 2011; Overbaugh & Nickel, 2011 ; Gowin et al., 2015). The finding also raises a disturbing issue that urgently needs action. That is, student's weak tendency together with the proliferation of considerable amounts of poor quality information on the Internet makes students susceptible to more harms and negative health behaviours and outcomes. This may put students or their relatives in a critical situation as a result of taking any misleading or low quality health information for granted.

Moreover, the weak tendency to verify information and the proliferation of poor quality information brings to fore the need to increase awareness about searching skills among university students as was indicated by over 56 % of the respondents who did not know the appropriate sources for seeking health information. There is therefore the need for awareness campaigns and educational interventions that alert students about the low quality of some online information. Students must be encouraged and advised to verify the reliability and credibility of information they find online by sourcing from sites like Health on the net (HON) foundation (www.hon.ch). This site is an example of sites that monitor and rate the reliability and usefulness of medical sites (Stoyanov et al., 2015). They are therefore essential to combat and correct this risky situation.

Conclusion

The use of Internet sources for health related information was common among students despite the risk of accessing from unreliable sources. Therefore, any institution or nation that ignores education and policies to ensure the health information sourced by the citizenry via the Internet is credible and reliable could be endangering the health and life of its own survival. It adds to literature on our understanding of the role the Internet plays in public health matters and also informs policy makers and stakeholders about current data on health information seeking behaviour on the Internet in Ghana. The study has demonstrated that most students frequently sourced for health related information on the Internet from various sources via their computers and mobile phones notwithstanding the risk, for themselves and other people.

Most of the students from the various disciplines sought health information using search engines, non-advertising Internet sources, for example, WebMD, and social media. They preferred the Internet because it was timely, fast and provided information from different sources simultaneously. They also indicated that it provided a lot of very useful information on preventive medicine; did not involve high cost to obtain needed information; and also ensures the confidentiality and anonymity of the health information seekers.

The type(s) of HI mostly sought for were general information on healthy lifestyle, specific information about a specific disease or treatment, information on the side effects of medications and information about new developments in the health/medical field among others. Majority of the respondents trusted the online information. Though they had concerns with online health information yet they do did not bother to verify with a medical practitioner.

Recommendations

It is recommended that academic librarians use the findings of the study to design instructional, information, and outreach services in collaboration with University Health Services targeted at students, particularly graduate students. Information professionals should recommend credible websites to students to aid in accessing reliable information on the Internet. Professionals should also promote more effective search and evaluation techniques to graduate students.

Health information systems that target health consumers or general public will bridge the gap between healthcare services and health consumers. This is because understanding information needs and information behaviours of a targeted population is the first step in designing a health information system.

Strategies to mitigate concerns about credibility of information should include standardising information sources with appropriate citation to prevent misinformation; users must consult other specialist for clarification; information must be authenticated by medical practitioners before they are published online; information must be made simple for the understanding of laymen by adding illustrations; and also information must be comprehensive. Health information seekers should be given consumer education, asking professional interpersonal sources (e.g. doctors, pharmacists) about online information, checking sponsors of a site to see if there are any competing interests, consulting only trusted and credible non-advertising websites.

Suggestion for future research

The sample of this study was selected from students who study health related courses and use the Internet for seeking information to meet their health information needs. However; to generalise the result, there is the need to conduct similar studies in other strata of the Ghanaian society.

Secondly, more universities could also be investigated to do a comparative study among the various disciplines in the academic institutions. Further research into the HISB of other disciplines with no health related background and the specific online applications used to manage health issues would be a vital venture. This study adopted a survey approach. It would be an interesting venture to subject this study to a case study approach to compare the findings.

Lastly, research on using the Internet as a tool for disseminating health related information in Ghana would be a useful study. This is because the Internet provides an effective avenue for health information promotion which supports development.

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