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**MOBILE PHONES FACILITATION OF HEALTH PROMOTION AND DISEASE
PREVENTION INITIATIVES: HEALTH STUDENTS INITIAL PERSPECTIVES**

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Abstract

Students are regarded as frequent users of mobile phones which has proven to be a convenient and acceptable method to promote healthy lifestyle. Students usually engage in relatively high levels of risky behavior and make unhealthy lifestyle choices, a study that investigates how health students access health information is necessary. The study adopted a descriptive cross-sectional study which was undertaken among third-year nursing students from three nurses training institutions in Ghana. A total of 270 students participated in the study. Most of the respondents who were currently subscribers of the health messages reported that they usually received health information on reproductive health issues, nutrition, and practicing safe sex. Most of the health students revealed that they needed more information on safe sex, diet, managing weight, and stress management. The results also show that health students are likely to remember and share short messages with friends. The findings serve as an ‘eye-opener’ for

health educators and mobile service providers concerning factors that should be taken into consideration when framing health text messages that will attract health students.

Keywords: mobile phones; health promotions; short message service; health students

Introduction

The world has witnessed tremendous proliferation, and innovation of mobile devices (Apăvăloaie, 2014). Mobile phones are increasingly dominant in developing countries (Pew Research Center, 2019) and their ownership is therefore increasing rapidly. It has been revealed that most adults aged between 25 to 29 live-in households with mobile phones, but no traditional landlines (Boulos, Wheeler, Tavares & Jones, 2011). Health educators and healthcare providers are curious whether mobile phones can facilitate the implementation of health promotion and disease prevention initiatives, especially among students.

Indeed, it has been found that mobile phones offer unprecedented coverage to people who would otherwise not have access to health care information and promotions (Matheny, Thadaney, Ahmed & Whicher, 2019; Zhuang, Xiang, Han, Yang & Zhang, 2016). The continuous use of mobile phone has resulted in a growing interest in the use for promotion services. Interventions via a short message service (SMS) are beneficial for tool for students (Ybarra, Prescott & Holtrop, 2014).

The portability and ‘always-on’ features of the mobile phone, in addition to its ability to distribute information widely to its users (van Steen & Tanenbaum, 2016; Wilmer, Sherman & Chein, 2017) is unprecedented. Mobile phones have become a key communication medium in most developing countries (Lim, Lozano, Naghavi, Foreman, Shibuya, Aboyans & AlMazroa, 2012). Mobile phones have become one of the popular used devices, with 3.9 billion unique mobile subscribers and 7.8 billion connections in the world (GSMA, 2018).

Mobile phones have had a profound impact in all aspects of life, including education (Anderson & Rainie, 2018). Developments on use of mobile phones to deliver information have led to the wide promotion for its use, thereby becoming a powerful tool for health promotion (Gilliland, Gauderman, Urman, Avol, Berhane, McConnell & Rappaport, 2015). The use of SMS for information dissemination is one of the major approaches employed by telecommunication companies for health promotion and interventions (Arps, Friesen & Overall 2018). Mobile-phone SMS has been employed for the provision of preventive health services (Free, Phillips, Watson, Galli, Felix, Edwards & Haines, 2013). Therefore, mobile phone applications, such as SMS offer a convenient and cost-effective way to support health care education (Vodopivec-Jamsek, de Jongh, Gurol-Urganci, Atun & Car, 2012). Also, the ubiquitous nature of mobile phones, ease to use by students, makes mobile phones and SMS more relevant for educating students on healthy lifestyles (Dégliseet, Suggs & Odermatt, 2012).

Again, compared with email, SMS are more conversational in approach that can occur quicker, and therefore students may feel obliged to respond faster than if the information was communicated via mobile phones (Buhi, Trudnak, Martinasek, Oberne, Fuhrmann & McDermott, 2013, Mbuagbaw, Mursleen, Lytvyn, Smieja, Dolovich & Thabane, 2015). Students aged between 18 and 29 years are more likely to use SMS than older adults (Perrin, 2015).

Reports from the National Communications Authority (NCA) in Ghana indicates that the total number of mobile phone subscriptions stood at 41,193,072 in 2019 (NCA, 2019). In Ghana, both MTN and Vodafone are networking companies that provide SMS services that allow customers to received messages and read them. Among the category of messages disseminated by the service providers in Ghana are general health tips information sent to subscribers as a medium for health education and disease prevention using SMS. These networking companies provide m-health tips that are subscribed to for a fee and are accessed daily (De Tolly, Skinner, Nembaware & Benjamin, 2012).

Personal observations from the researchers revealed that health students in tertiary institutions in Ghana, usually engage themselves in relatively high levels of risky health behavior and unhealthy lifestyle choices are consistently using mobile phones even at lecture theatres, it seems reasonable that research that explores how students access health information is warranted. Moreover, to the best of the researchers' knowledge, there is a paucity of studies examining the use of mobile phones to access health information, health topics, and topics that health students would find more useful. Thus, this study addresses the following issues.

1. To find out the reasons that influence health students to subscribe to and receive health information messages.
2. To identify the types of short message service health students usually receive information on.
3. To find out the type of short message service health students are likely to share with their peers.
4. To know the type of language health students prefer in the dissemination of health information.

Theoretical framework

The study is underpinned by the social learning theory. The social learning theory was formulated in 1977 by Albert Bandura (Brauer & Tittle, 2012). The implication of the theory is that, interaction among humans gives rise to the adoption of certain behavior. The consequence of such behavior dictates whether or not people will be much indulged in such behavior. If the reward is high, then the possibility of indulging in such behavior will also be high. On the other hand, if the reward is low, then people will ordinarily not indulge in such behavior.

The social learning theory has been widely used in various disciplines from health, to education. However, in the current paper, the theory is adopted due to how the theory places premium on interactions. The assumptions of the social learning theory lay down premise which enable learners to interact with others using technology (Järvelä & Järvenoja, 2011). With the adoption of technology, such interaction by learners is interfaced by technology. With the use of such technologies like SMS, students are able to have real-time interactions with friends and also among their peers to share ideas.

Methods

Research Design and Study Participants

This was a descriptive cross-sectional study. The study population was third-year nursing students in Ghana. Purposive sampling was used to select all the health students. Purposive sampling, according to Teddie and Tashakkori (2003), involves selecting certain units or cases based on specific purposes rather than randomly. Teddie and Tashakkori (2003) further argued that purposive sampling is used in inductive studies to gather detail and in-depth information or data with a small number of participants to represent the target population to yield detailed

information about the issue. The selected nursing institutions are Nursing and Midwifery Training College at Sekondi, Nursing and Midwifery Training College at Cape Coast, and Nursing and Midwifery Training College at Kete Krachi. The technique affords easy responses from the participants. The researchers chose this sampling method because the cases were available and easy to study to get the expected responses.

The study participant was made of 328 third-year nursing students. Out of the total students, 270 (82.3%) gave their consent to participate in the study. These health students were given a questionnaire to complete. The health students who agreed to participate in the study were given three days to complete and return the questionnaire.

Research Instrument and Data Collection

The researchers administered the questionnaire to the students who gave their consent to participate in the study. The questionnaire was pilot tested at Nursing and Midwifery Training College at Sunyani and a reliability coefficient value of 0.76 was obtained using Cronbach's alpha coefficient of reliability. The first section of the questionnaire included questions to assess demographic data, subscription for SMS health tips, and the use of such messages. In the second section of the questionnaire, their views concerning their satisfaction with the messages received, the usefulness, and easiness in understanding the SMS and future use of such messages were obtained. Also, information was obtained about the type of health SMS that they usually receive and what they shared with their peers. The third section of the questionnaire sought to assess the opinions of students concerning health issues that they usually receive information on and health-related issues that they would wish to receive more information on through SMS.

Data Analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) software application (version 21.0). Descriptive statistics were presented in the form of frequencies and percentages presented in frequency distribution tables for background information on participants, and responses given to the questions.

Results

The study was conducted to assess the experiences of nursing students concerning subscribing to SMS health information from telecommunication and mobile service providers such as MTN and Vodafone companies in Ghana. The study sought to obtain the views of the different categories of nursing students in Ghana. At the time of collecting data, 30.7% were currently receiving health information SMS messages, whereas 25.6% had subscribed in the past but terminated their subscription later. Most of the subscribers (95.2%) indicated that they had subscribed to MTN for these health SMS messages whilst the remaining (4.8%) had subscribed to Vodafone. Most (57.8%) of the students indicated that they subscribed to the health messages because they wanted to improve their knowledge and be well informed about health issues. A higher proportion (96.4%) of the current subscribers reported that the SMS health tips had been beneficial to them. Concerning how they had benefited from the SMS health tips, about 51.2% stated that receiving this health information enabled them to live a healthy lifestyle. Also, 27.5% indicated that health messages enabled them to prevent common health problems.

Table 1: Information on Background and Subscription for SMS among Study Participants

Abbreviated Question	Frequency	Percent
Program of study		
Midwifery	132	48.9
General nursing	138	51.1
Subscribed for health SMS tips on phone		
Yes	83	30.7
Subscribed before but now unsubscribed	69	25.6
No	118	43.7
Network subscribed to (n=83)		
MTN	79	95.2
Vodafone	4	4.8
Reasons why subscribed for health messages/tips (n=83)		
Improve my knowledge and be well informed about health issues	48	57.8
Curious about health issues	14	16.9
With such messages, I can prevent some health conditions	11	13.3
Critical about my health	10	12.0
Has the SMS health tips been beneficial to you (n=83)		
Yes	80	96.4

No	3	3.6
How beneficial has SMS health tips been to you(n=80), The health information received:		
Enables me to live a healthy lifestyle	41	51.2
Enables me to prevent common health problems	22	27.5
Informs me better about a health problem faced by a family member	11	13.8
Informs me better about a health problem I am facing	6	7.5

Table 1 Cont.

Health issues respondents usually receive text messages on, (multiple responses allowed) (n=83)		
Eating well/healthy nutrition	78	94.0
Reproductive and sexual health issues and practicing safe sex	75	90.4
Exercising/fitness	66	79.5
Dental/oral health care	40	48.2
Substance and alcohol abuse prevention messages	34	41.0
Mental health messages	33	39.8
Prenatal care messages	30	36.1
Emergency first aid messages	29	35.0
Child health care for parents	28	33.7
Types of checkups and screening	27	32.5
Stress management	24	28.9
Why have you not subscribed to any health SMS alerts, (multiple responses allowed) (n=187)		
It is expensive to subscribe to receive health text messages	125	66.8
Messages are often repeated	89	47.6
I have subscribed before but unsubscribed	69	36.9

Messages are not practical	39	20.9
Messages are difficult to understand	36	19.3
Messages are not appropriate considering my needs	35	18.7
Because I know all that there is to know, nothing is new	31	16.6
In my opinion, they are not useful	19	10.2

Source: Field data, 2019.

More than 75% of the respondents who were currently subscribers of these health messages reported that they usually receive health information on reproductive/sexual health issues, eating well/good nutrition, and practicing safe sex and exercising/fitness. For students who had not subscribed for any health SMS alerts, they reported that it was expensive to subscribe for such messages (66.8%) and the messages were usually repeated (47.6%).

Responses to questions assessing the perceptions of students toward health SMS messages received were obtained from both previous and current subscribers, a total of 152, 56.3% of all the study participants. The responses assessed their level of satisfaction, the usefulness of the messages, ability to understand and use it easily, future use of such messages, and willingness to recommend to others to also subscribe are presented in Table 2. More than 80% of the 152 who had previously and currently subscribed for health SMS messages reported that the messages were useful, easy to understand, and apply. They also indicated that they would use this kind of text message system in the future and would encourage others to subscribe to SMS health. However, 32.2% indicated that they have not been satisfied with most of the health text messages received.

Table 2. Perceptions of Students' toward Health text messages received (n=152)

Abbreviated Question	Frequency	Percent
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Have you been satisfied with most of the health text messages received	103	67.8
Were the health text messages useful	150	98.7
Were the health text messages easy to understand and use/apply	115	75.7
Did the text messages cause any harm to you	28	18.4
Would you use this kind of text message system in the future	127	83.6
Would you encourage someone else to subscribe to SMS health tips	135	88.8

Source: Field data, 2019.

Some suggestions were made by the study participants concerning measures that can be taken to improve SMS health tips tailored to meet the needs of the youth and young adults as depicted in Table 3. Most (74.1%) indicated that it will be appropriate to receive health SMS information in the local Ghanaian dialects, of which 57% stated that it will be helpful to those who cannot read English. The majority (63.3%) of the study participants reported that they will prefer a balanced use of both casual and non-casual languages in disseminating health information. More than 70% of the study participants indicated that they are more likely to easily remember and share with their friends SMS messages that are short, straight-forward, personally relevant, come in the form of pictorial presentation, include interactive features such as videos, reflects real-life stories and are aligned with upcoming events. For both previous and current subscribers, more than 60% reported that they usually received health SMS messages that were centered on general preventive health messages, nutrition, and healthy eating habits, and exercises/physical activity.

Table 3. Suggestions from Study Participants on measures that can be taken to improve SMS health tips tailored to meet their needs

Suggestion	Frequency	Percent
Will it be appropriate to receive such health information in local Ghanaian dialects (n= 270)		
Yes	200	74.1
No	70	25.9
If yes and appropriate, why? (n= 200)		
Will be helpful to those who cannot read English	114	57.0
Can help me educate people who cannot read and understand English	86	43.0
What type of language do you prefer in disseminating health information by SMS (n= 270)		
Only casual/informal	43	16.0
Only non-casual /formal	40	14.8
Balance use of both casual and non-casual	171	63.3
No response	16	5.9
Type of messages that health students are likely to share with their peers and will easily remember, (multiple responses allowed) (n=270)		
Text messages that are short, straight-forward and personally relevant		

for young people	217	80.4
Text messages that include/reflect real-life stories	204	75.5
Text messages that come in the form of pictorial presentation such as cartoons	199	73.3
Text messages that include interactive features such as videos	196	72.6
Text messages that are aligned with upcoming events	191	70.7
Text messages that are enthusiastic	172	63.7
Text messages that rhyme	51	18.9

Table 3 Cont.

Which messages do you usually receive SMS on, (multiple responses allowed) (n = 152)		
General preventive health messages	109	71.7
Nutrition and healthy eating habits	103	67.7
Reproductive and sexual health issues	92	60.5
Exercises and physical activity	79	52.0
Infectious diseases	70	46.1
Mental health issues	56	36.8
Chronic diseases (e.g. diabetes, hypertension)	54	35.5
Health issues respondents need more information on, (multiple responses allowed) (n=270)		
Reproductive /sexual health issues and engaging in safe sex	174	64.4
Eating well/nutrition	162	60.0
Stress management	158	58.5
Managing weight	150	55.6
Exercising/fitness	145	53.7
Emergency first aid messages	92	34.1
Substance and alcohol abuse prevention messages	83	30.7
Dental/oral health care	80	29.6

Prenatal care messages	74	27.4
Types of checkups and screening services available	70	25.9
Suicide prevention messages	45	16.7
Suggestions to improve the health messages they receive (multiple responses allowed) (n=270)		
Subscription charges must be reduced	178	65.9
There should be public education on the relevance of these messages	171	63.3
Messages should be simple, practical, and straight- forward	167	61.8
Add other forms of media like audio, video, and pictures	163	60.4
Include more dietary-related messages	158	58.5
Include more reproductive and sexual health issues	151	55.9
Messages should be conveyed in other local dialects	74	27.4
Improve network connection	71	26.3
Subscription must be free	68	25.2

As shown in Table 3, more than 50% of the study participants indicated that they need more information on reproductive or sexual health issues and engaging in safe sex, eating well, exercising/fitness, managing weight, and stress management. Responses concerning suggestions that can be used to improve health messages that are sent to subscribers are summarized in Table 3. Fifty percent of the respondents included reducing subscription charges, educating the public on the relevance of these messages, the need for messages to be simple, practical, and straight forward, adding other forms of media like audio, video, and pictures to health SMS messages, including more dietary-related messages and include more reproductive and sexual health issues.

Discussion

The study sought to investigate how health students access health information via SMS. The study was also intended to gain information from the students regarding health topics that

they prefer to receive text messages on and suggestions on how healthy text messages should be framed and presented to students.

In this study, the two main reasons that emerged as reasons why nursing students subscribe to health SMS are to improve their knowledge, be well informed about health issues, and because they were curious about health issues. Findings from this study acknowledge that health information conveyed to the students using SMS is beneficial. In other related studies, the use of SMS to enhance patient care, patient education, and public health programs were highlighted (Abaza & Marschollek, 2017). It has been highlighted that SMS can be a potentially cost-effective and rapid way of conveying health-related messages to students (Free et al., 2016). In similar studies, it was found that text messaging can deliver content that affects behavioral health changes among young people (Wei, Hollin & Kachnowski, 2011), and receiving health SMS is a means of improving their adherence to healthy lifestyle practices (Woolford, Clark, Strecher & Resnicow, 2010). Similarly, text messaging has been described as a tool for ensuring behavioral changes in disease prevention and management by users (Cole-Lewis & Kershaw, 2010).

According to the study participants who had subscribed for health text messages, indicated that most of the SMS messages that they received were focused on how to eat well/healthy nutrition, reproductive and sexual health issues, and practicing safe sex and exercising/fitness. The use of SMS to provide nutrition education to college students has been reported in similar studies (Brown, O'Connor & Savaiano, 2014). There is evidence indicating that SMS is an acceptable and effective way to increase nutrition knowledge, promote positive diet-related behavior, and could encourage healthier food choices among students (Brown, O'Connor & Savaiano, 2014). For example, in the study of Thakkar, Karthikeyan, Purohit,

Thakkar, Sharma, Verma and Singh (2016), the use of text messaging as an intervention to educate students on diet and coronary heart disease risk proved to have a positive impact on whole-grain consumption and high-density lipoprotein cholesterol. More than 90% of the study participants also indicated that a large proportion of SMS that they received were centered on reproductive and sexual health issues. This is important because some of the youth might be shy of asking adults about sexual matters because of the African culture, although they have special sexual and reproductive health needs and hence the use of SMS is an effective strategy to enable them to be well-informed (Willoughby & L'Engle, 2015). Most messages address issues on contraceptive methods, sexually transmitted infections, where to find reproductive health services, and issues on unsafe abortion.

Concerning health issues that nursing students would prefer to receive more information on, more than 50% of the students indicated areas on reproductive/sexual health issues, balanced diet or nutrition, stress management, managing weight, and exercising/body fitness in decreasing order of priority. These health issues are of much concern to adolescents, the youth, and health students. Stressing this assertion is the evidence provided in past reviews that have found that SMS-based health promotion approaches that are effective in encouraging a wide range of positive health behavior usually focused on sexual health, smoking cessation, weight-loss, nutrition, and mental health for young students (Hebden, Balestracci, McGeechan, Denney-Wilson, Harris & Allman-Farinelli, 2013). For example, the study of Cullen, Thompson, Boushey, Konzelmann and Chen (2013) which was conducted among adolescents aged between 13 and 17 years revealed that about 84% and 90% of the students assessed health information on how to be physically active and make healthy food selections respectively. Similarly, in a study aimed at investigating the feasibility of mobile phone text messaging to promote healthy

behavior among students, it was found out that most of the participants chose to create personal text messages that focused on tips on healthy eating, physical activity as well as reminders to drink water (Wei, Hollin, Kachnowski, 2011).

The health students also indicated that the type of SMS that they are likely to share with their peers and those that they will also easily remember to include text messages that are short, personally relevant for students, including real-life stories, aligned with upcoming events and come in the form of pictorial presentation such as videos, cartoons. These assertions of the respondents corroborate with those of similar reports made by people concerning the kind of SMS-health-based information that they are likely to remember and share with their peers (Arps, Friesen & Overall, 2018). For example, in a study that was undertaken among young adults to assess factors to consider in designing SMS content for delivery to adults, it was found out that most of the study participants preferred short, and actionable health messages (Gkatzidou, Hone, Sutcliffe, Gibbs, Sadiq, Szczepura & Estcourt, 2015).

Regarding, the type of language that nursing students prefer in the dissemination of health information by SMS, most of the respondents stated that they prefer the use of both casual and non-casual language which must be well-balanced. This is supported by Woolford, Clark, Strecher and Resnicow (2011) findings.

Concerning suggestions on improving health messages that are received which will also encourage students to subscribe, the topmost suggestions given were: subscription charges must be reduced and there should be public education on the relevance of these messages. The other two suggestions were the need to disseminate messages that are simple, practical, and straightforward and adding other forms of media like audio, video, and pictures.

Conclusions and recommendations

Mobile phones may be a useful facilitation for health promotion and disease prevention. Findings from this study offer insights into using mobile phones SMS for health information that will be of much interest to health students. Health students prefer health messages that center on reproductive and sexual health issues, eating well/balanced diet, exercising, bodyweight management, and stress management. Again, these health students prefer the use of casual and non-casual language in text messages.

The findings also show that health students prefer text messages that are short, personally relevant for students, including real-life stories, are aligned with upcoming events and come in the form of pictorial presentations such as videos. Getting explanation via mobile phones SMS can be an effective and appealing method of knowledge acquisition for health students. The findings serve as an ‘eye-opener’ and inform health educators, ICT experts, and mobile service providers concerning factors that should be taken into consideration when framing health text messages that will catch the attention of health students.

Limitations

Ghana has sixty-one nursing and midwifery training schools. However, the research reports the results of only three public institutions in Ghana. The other fifty-eight public and private Nursing and Midwifery were not included in the research work because the researchers were not able to seek permission of those institutions and the sampled techniques employed for the study. By this reason, it can be concluded that the results can be generalized to these selected three institutions.

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