MOBILE HEALTH APPLICATION UTILIZATION AND E-HEALTH LITERACY AMONG MEDICAL AND HEALTH STUDENTS

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ABSTRACT

Fast changing technology application in industry 4.0 technology era implicated on teaching and health services face to face paradigm to virtual services. Excellence health services influenced by good health literacy. The propose of this study is to evaluation knowledge, attitude, and practice medical and health students toward mobile health application and e-health literacy. The study adopted a descriptive cross sectional survey design was conducted in medical and health students in Indonesia during March-July 2020. An Indonesian Electronic Health Literacy Scale (IEHLS) was developed to evaluate Knowledge, Attitude, and Practice (KAP) about e-health literacy and mobile health apps among medical and health students. The full response rate was 99% (n=301). Half of respondents are mobile health apps active user (52.6%). Hallodoc apps was the most mobile health apps used (60.5%), followed by Medscape (41.5%) and MIMS (23.6%). Diseases information, side effect, indication, and regimen dose of drugs were the most favourite information accessed among medical and health students. Around 80% of medical and health students agree that mobile health apps improve patient's knowledge on their own disease and medication and helped healthcare professionals on giving education and counseling. In other hand, only 60% medical and health students agree mobile health apps might be use full in learning process and healthcare services. Knowledge, attitude, and practice medical and health students toward mobile health application will be elevated with improving level of health literacy.

Keywords: Mobile health applications, health literacy, Indonesian Elecronic Health Literacy Scale

INTRODUCTION

Electronic health as known ehealth has been favourite topic in the field health education and health service since industry 4.0 era (Hanik and Stellefson, 2011). Mobile health application is one of e-health category for supporting health professional on their clinical practice. iTunes and Google Play stores now involve more than 20,000 medical and health apps (Frith and Hoy, 2017). In COVID-19 outbreak, mobile device (handphone) help full in healthcare services. The health service providers have to assurance and appraise the health information sources appropriately (Metzger and Flanagin, 2011). The advantage Internet usage including affordable prices, high speed in browsing and the ability to access information anonymously, have made the Internet preferential choice for searching health information (Dashti et al., 2017).

Healthcare professional's interest on mobile health application increased with the Internet use widely (Briones, 2015). Health literacy is a fundamental factor that could influence on individual's health information search and perception, the type of information collected from his/her search and individual's assurance about the information acquired (Sørensen et al., 2012). Health literacy is defined as "the degree to which individuals have the capability to obtain, process and comprehend the basic health information and services required to make correct health decisions" (Ratzan and Parker, 2000). E-health

literacy is assessed within the scope of health literacy. E-health literacy is identified as "the capability to access, understand. assess and utilize information acquired to solve or resolve a health problem from electronic sources" (Dashti et al., 2017). Based on the Ministry of Education and Culture studies, the literacy index among Indonesian were 37.32, low literacy index (Ministry of Education and Culture). Nine provinces from 34 provinces in Indonesia have 40.01-60.00. moderate literacy index (Ministry of Education and Culture, 2019).

Medical and health students will become health professional in the future. Where it is important for them to build a skill to search health information, and to appraise properly and use it to support their health related decision (Tubaishat and Habiballah, 2016). Considering above, and rarely studies in the evaluation of mobile health application usage and health literacy among Indonesian students. This study propose to assess e-health literacy and mobile health application usage among medical and health students in Indonesia.

METHOD

The research adopted a descriptive cross-sectional survey design to evaluate e-health literacy and mobile health apps utilization related knowledge, attitude, and practice among Indonesian medical and health undergraduate students. The study conducted between March and July 2020 from more than ten universities institutes and in Indonesia. Due to the universities were closed at the time of data collection, it was not feasible to conduct population-based survey. The main researchers opted to use WhatsApp Messenger for enrolling potential participants.

An Indonesian Electronic Health Literacy Scale (IEHS) was designed and executed using google forms and link generated was shared on WhatsApp groups of faculties. Link was also shared personally to other faculties. This questionnaire was written in Indonesia language. The delivered link (https://bit.ly/2Vg1REq) to medical and health students using the combination of purposive and snowball techniques helped to select the respondents (Saefi et al., 2020). The inclusion criteria were (1) medical and health students, (2) accepting to participate in the survey, and (3) being 18 age years or older. Respondents were included only after they signed the informed consent by click "agree to participate". A total 304 responses received with 99% (301 respondents) complete response.

The items of the Questionnaire were generated from the results of literature reviews according to previous study towards health literacy mobile health application and (Norman and Skinner, 2006; Payne et al., 2012; Crilly et al., 2019; Ustün et al., 2020; Ming et al., 2016; Stewart 2019). The Knowledge, et al., Attitude, and Practice (KAP) toward e-health literacy and mobile application questionnaire consists of 21 item questions. The questionnaire was sent to linguist and two lecturer in medical and health major to get their opinions regarding its simplicity, relevance, clarity, and comprehensive (Rodrigues et al., 2017). The validity test (n=50) using Pearson Correlation analysis and reliability test using cronbach's alpha analysis. The

questionnaire showed having acceptable reliability and validity, with high reliability co-efficient (0.739) and the internal consistency values of the items varied between 0.699-0.742. The correlation values each items were moderate (0.375-0.662). Descriptive analysis was performed for sociodemographic characteristics, knowledge, practice, and attitude toward e-health literacy and mobile health application usage.

RESULTS AND DISCUSSION

This study is the first survey to investigate e-health literacy and mobile health application utilization among medical and health students in Indonesia. This findings data add valuable insight to an expanding healthcare services and to create innovative curriculum in medical and health major in universities. The findings of this study attempted to describe the knowledge, attitude, and practice medical and health students toward e-health literacy and mobile health application utilization.

A total of 304 medical and health students participated in this study. Female students more dominant (86.2%) than male students (13.8%). The response rate was 99% (301 participants). more than half level of education participants are undergraduate program (54.6%). Pharmacy undergraduate program was dominant (35.9%). Only 160 participants (52.6%) are actively using mobile health application. This finding inline with another study, who reported mobile health application utilization among pharmacy undergraduate students in Turkey were 55% (Üstün et al., 2020). Another studies reported 97% students actively using mobile health application (Donohoe et al., 2018). Characteristics of participants are shown in table 1.

Table 1. Characteristics of
Respondents (n=304)

(n=50+)			
Characteristics	Freq (n)	%	
Gender			
Female	262	86.2	
Male	42	13.8	
Age			
≤ 20	145	47.7	
> 20	159	52.3	
Level of education			
Diploma	100	32.9	
Undergraduate program	166	54.6	
Professional program	30	9.9	
Postgraduate program	8	2.6	
Spent year in university			
1 year	108	35.5	
2 year	50	16.5	
3 year	65	21.4	

Chanastaristics	Freq	0/	
Characteristics	(n)	70	
4 year	53	17.4	
5 year	28	9.2	
Program of education			
Undergraduate of pharmacy	109	35.9	
Diploma of pharmacy	51	16.8	
Medical program	10	3.3	
Pharmacist program	24	7.9	
Postgraduate of pharmacy	6	2	
Undergraduate of nursing	8	2.6	
Diploma of nursing	43	14	
Diploma of midwifery	6	2	
Undergraduate hospital	35	11.5	
administrative			
Undergraduate health	6	2	
analysis			
Undergraduate of public	6	2	
health			
Are you currently actively using health			
application?	-		
Yes	160	52.6	
No	144	47.4	

Table 2 described medical and health student's knowledge and practice about mobile health application. All of students said the Internet help them to make decision about their health and accessing health resources information from Internet are important. Among of them (45.8%) using mobile health application frequency 1-5 times per week. The most common mobile health applications used by Hallodoc® participants were (60.5%), followed by Medscape® (41.5%) and MIMS® (23.6%).

Diseases information was the most common health information

accessed by participants via mobile health application (80.4%). The most common health promotion topic useful in mobile health application were non communicable disease prevention (42.5%), followed by physical activity (25.9%), and weight management (14.3%). most of participants recommended mobile health application to another medical and health students (83.4%) and family members or society (71.8%).

Table 2. Knowledge and Practice

 About Mobile Health Application

(n=301)		
Item question	n (%)	
Opinion about usefulness th	e internet in	
making decision about their	health	
Helpful	162 (53.3)	
Quite helpful	142 (42.7)	
Not helpful	0	
The important of acces	sing health	
resource on the internet		
Important	195 (64.4)	
Quite important	106 (35.6)	
Not important	0	
The frequency of using m	obile health	
application per week		
< 1 time	169 (43.9)	
1-5 times	138 (45.8)	
> 5 times	31 (10.3)	
The most common mo	bile health	
application use in the last 3	month*	
Medscape	125 (41.5)	
Lexicomp	7 (2.3)	
UpToDate	16 (5.3)	
Hallodoc	182 (60.5)	
MIMS	71 (23.6)	
Swipe X	17 (5.6)	
Alodoc	8 (2.7)	
Others	27 (9)	
The number of mobile health application		
installed		
None	27 (9)	

Item question	n (%)
1 application	138 (45.8)
2 applications	69 (22.9)
3 applications	38 (12.6)
4 applications	15 (5)
> 4 applications	14 (4.7)
The most common health i	nformation
accessed via mobile health ap	plication*
Indication	185 (61.5)
Contraindication	131 (43.5)
Warnings	113 (37.5)
Drug regimen	170 (56.5)
Side effect	187 (62.1)
Disease information	242 (80.4)
The most common health	promotion
topics useful in mobile health	application
Weight management	43 (14.3)
Physical activity	78 (25.9)
Smoking cessation	29 (9.6)
Non communicable disease	128 (42.5)
prevention	
Others	23 (7.6)
Considering recommendin	g mobile
health application to anoth	er medical
and health students	
Yes	251 (83.4)
No	50 (16.6)
The most common reason w	hy they do
not attend recommend mo	bile health
application to another me	edical and
health students*	
I never thought about	50 (16.6)
proposing it	
I do not trust about mobile	5 (1.7)
health application	
I doubt in usefulness mobile	23 (7.6)
health application	
Considering recommendin	g mobile
health application to anot	her family
member or society	
Yes	216 (71.8)
No	85 (28.2)
The most common reason w	hy they do
not attend recommend mo	bile health
application to another family	member or
society*	
I never thought about	67 (22.3)
proposing it	
I do not trust about mobile	8 (2.7)
health application	
I doubt in usefulness mobile	34 (11.3)
health application	
*T1 <u>1</u>	wide means

*The respondents can provide more than one answer

This study highlighted that the majority medical and health students had an moderate sense of usefulness the internet in making decision about health (53.3%) their and The of accessing important health resource on the internet (64.4%), which is opposite to another studies, more than 60% students had an adequate sense of usefulness the internet and more than 70% students had appreciate important of accessing health resource on the internet (Tubaishat and Habiballah, 2016; Park and Lee, 2014). The findings suggest majority of medical and health students owned 1 mobile health application. Contrary to previous studies, the most participants owned 1-5 mobile health applications (Grasso et al., 2006).

Hallodoc[®] is most usually used among medical and health students. In contrast to previous studies, Lexicomp® was mostly mobile health application in USA students (Ratzan and Parker, 2000). Medscape[®] highly preferred application among pharmacy students in Turkey (Üstün et al., 2020). This may be due to massive advertising

and user-friendly mobile health application will be more chosen in Indonesia.

This study found that 68.4% (n=206) and 78.1% (n=235) medical and health students said mobile health application supported in health services and supported in learning process. However, only 60.5% (n=182) and 66.1% (n=199) participants agree that mobile health application should used more in delivering health services and learning activity. Participants agree that mobile health application increase patent's quality of life were 64.5% (n=194) and majority of participants 82.4% (n=248) agree that mobile health applications useful in patient's source knowledge about their disease and medication and around 80.4% (n=242) participants agree that mobile health applications elevate patient's knowledge.

In other hand, only 60.8 (n=183) participants agree that mobile health application could be enhance patient's adherence. Some of participants (n=2) disagree stated that healthcare professional should has good knowledge about using mobile health application. The medical and health students attitudes toward mobile health application are shown in table 3.

Statement	Disagree n (%)	Neither agree nor disagree n (%)	Agree n (%)
Mobile health application supported in health services or	0	95 (31.6)	206
healthcare professional practice			(68.4)
Mobile health application supported in learning process	0	65 (21.6)	235
			(78.1)
Mobile health application should used more in delivering	6 (2)	113 (37.5)	182
health services or healthcare professional practice			(60.5)
Mobile health application should used more in delivering	4 (1.3)	98 (32.6)	199
learning process			(66.1)
Mobile health application could be enhance patient's	7 (2.3)	100 (33.2)	194
quality of life			(64.5)
Mobile health application usefulness in patient source	0	52 (17.3)	248
knowledge about their disease and medication			(82.4)
Mobile health application may improve patient's	3 (1)	56 (18.6)	242
knowledge about disease and medication			(80.4)
Mobile health application could be enhance patient's	8 (2.7)	110 (36.5)	183
adherence on their medication			(60.8)
Healthcare professional should be good knowledge about	2 (0.7)	80 (26.6)	219
using mobile health application			(72.8)

Table 3. Attitude About Using Mobile Health Application (n=301)

More than half (60.8%) of participants agree that mobile health might application be improve patient's adherence. Similar to previous studies, approximated 63% of health students agree or promote mobile health application to support medication patient's adherence (Davies et al., 2014). Besides, majority of medical and health students agree that mobile health application meaningful tools to manage their disease and medication (Bryant et al., 2017).

The core competencies should be mastered by medical and health students consists of processing, understanding, appraising, and applying health related information (Magasi et al., 2009). Health literacy influences health attitude and access health service, and thereby will also impact on health outcome and on the health costs in individual and society (Schyve, 2007). However, more studies should be conducted to assess and improve the knowledge, attitude, and practice about the utilization of mobile health applications in large sample size.

This study highlighted educational institutions could be encouraged renewing curriculum by including e-health and mobile health applications as one tool in learning process.

CONCLUSION

This study found a moderate level (52.6%) actively using health application among medical and health students. Hence, only 68.4% of medical and health students agree that mobile health application useful in health services. Likewise, 78.1% medical and health students agree that mobile health application supported their learning process.

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