EVALUATION OF FACTORS ASSOCIATED WITH EHEALTH LITERACY AMONG OLDER ADULT SOCIAL MEDIA USERS IN THAILAND

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Abstract. The term "eHealth literacy" refers to the ability to access, understand, and use information about health obtained through internet. In this study, we aimed to determine the level of eHealth literacy and the factors associated with them among older Thai adults who are social media users in order to inform programs to develop eHealth literacy in the study population. The minimum sample size of 995 calculated by G power was required. Study subjects were selected using a multi-stage stratified sampling technique. A total of 1,237 subjects were recruited from 10 provinces representing 5 regions of Thailand. Inclusion criteria for study subjects were being ≥60 years old and using social media or the internet while exclusion criterion was applied to the older adults who have cognitive impairment. Data collection was conducted during July to December 2016 using self-reported questionnaires. Of 1,237 study subjects, 59.8% were female with mean age 66.9 (±5.5) (range: 60-94) years, 30.2% of study subjects had very low income (THB ≤2,500 per month), 80.5% perceived good health, 41.8% used the internet and social media <1 hour per day and 26.9% used the internet and social media 1-2 hours per day). eHealth literacy mean score was 18.94 (±9.79) which was lower than the cut off score of 26. Multiple regression analyses revealed that the study variables (age, education, health status, and internet or social media usage) account for 41.0% (R^2 = 0.41, p<0.001) of eHealth literacy of Thai older adults. eHealth literacy of Thai older adults associated positively with level of education (p<0.001), health status (p<0.01), and internet or social media use (p<0.001); and negatively with age (p<0.001).

Keywords: eHealth, health literacy, social media, elderly

INTRODUCTION

The number of adults in Thailand aged ≥60 years increased from 10.7% in 2007 to 17.1% million in 2017 and to 20% in 2021 (NSO, 2018), making the country become the aged society (TGRI, 2016). This group is facing with physical deterioration resulting to health problems and chronic

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illnesses (Colón-Emeric *et al*, 2013). Health challenges are increased significantly as they become older (Chung and Nahm, 2015). Advanced technology made health information more available online, therefore accessibility to electronic health information is essential for maintaining and promoting good health especially among this age group (Watkins and Xie, 2014). A study conducted in older adults showed that low health literacy associated with poor health outcomes (Cutilli *et al*, 2018). At present, healthcare organizations often use internet as a reliable and crucial channel to disseminate health information. Therefore, it is important to have the ability to use technology to access such health information in order to make appropriate decisions regarding health care.

Internet and social media network use among Thai older adults (referred to as people aged 60 and older) increased from 0.8% in 2008 to 3.3% in 2014 (NSO, 2015). Online social media, such as Twitter, YouTube, Facebook, and Line have been widely used among this age group (Tayati *et al*, 2017) either for entertainment, social interactions, sending emails, or shopping online (Wijitboonyarak, 2011; Keenan, 2009). Studies also found the older adults obtained information about their diseases, symptoms, and treatment from internet and social media (Loipha, 2014; Rattanawarang, 2015). The elderly is often slow to adopt new technologies due to their cost and complexity. Therefore, abilities to use these technologies to access, evaluate, and use health information on their health effectively is important (Tennant, 2013).

The term "eHealth literacy" has been defined as "the ability to seek, find, understand, and appraise health information form electronic sources and apply the knowledge gained to addressing or solving a health problem", and is influenced by several factors such as educational background, health status, and motivation to seek information (Norman and Skinner, 2006). Although eHealth literacy has been investigated among several age groups, few studies have been conducted among older adults. More research regarding eHealth literacy among older adults is needed to understand the abilities and needs of this age group. The aims of this study were to determine the level of eHealth literacy and the factors associated with it among Thai adults aged ≥60 years in order to inform programs to promote eHealth literacy among this group.

MATERIALS AND METHODS

Population and sample

Inclusion criteria for study subjects in this cross-sectional study were Thai people aged ≥60 years who used internet and/or social media, and could read Thai. Exclusion criteria for study subjects were not able to complete the questionnaire. The minimum number of study subjects for the study was calculated using G Power version 3.1.9.7 (Faul *et al*, 2009) with a p-value <0.05, a power of 0.80 and inclusion of 5 studied factors (age, education level, income, perceived health condition and social media use) and finally took into consideration the proportion of the population aged ≥60 years in each of the studied provinces; this yielded a minimum sample size of 995 subjects.

Study subjects were selected using multistage sampling. Firstly, we selected 10 out of a total of 76 provinces of Thailand from five administrative regions including northern (Lampang and Phrae), northeastern (Surin), central

(Bangkok, Saraburi, and Suphan Buri), western (Ratchaburi and Phetchaburi), and southern (Surat Thani and Yala). The total population of adults aged >60 years in the selected provinces were 2,068,358. As there is no statistic of internet and/or social media user among adults aged >60 years, therefore we applied the quota distribution of 0.05% in proportion with the target population each province to obtain the required sample size. Secondly, a senior club of Muang District in the target province was selected purposively, except for Bangkok the senior club members of Ratchathewi District were selected. Thirdly, senior club members were approached using accidental sampling. Only study subjects who used internet and/or social media and agreed to participate in this study were asked to complete the questionnaire.

Study instrument

The instrument was a self-reported questionnaire to collect data on 1) socio-demographic, 2) perceived health status, 3) internet and/or social media use, and 4) eHealth literacy.

The socio-demographic data included gender, age, education, and income. Monthly income was categorized using the combination of poverty line (NESDC, 2018), minimum labor wage per day, and base salary for the bachelor degree holders into 5 groups; as very low (THB<2,500 per month), as low income (THB2,501-9,000 per month), as lower middle income (THB 9,001-15,000 per month), the upper middle income (THB 15,001-50,000 per month), and high income (THB>50,000 per month).

The perceived health status focus on both physical and mental health dimensions by two questions: "How healthy is your body overall?" and "How healthy is your mental health overall?". The response options ranges from 1 (poor) to 10 (excellent), the score of each item was averaged and categorized into 3 levels: poor health (<5), fair health (5-6), and good health (≥7).

Internet and/or social media use was assessed for 1) overall time spent on internet and/or social media per day and 2) number of days per week using internet and/or social media (email, Line, Instagram, Social cam, Twitter, Facebook, blogs, web board, search information, watch media/music, Online game) by two questions. The first question asked "How many hours per day do you use the internet and/or online social media?". The response options ranging from 1 (<1 hour), 2 (1-2 hours), 3 (3-4 hours), 4 (>5 hours). The second question asked "How many days per week do you use the internet and/or social media according to each platform?". The response options were 1 (≤2 days), 2 (3-4 days), 3 (5-6 days), and 4 (every day). The score of two questions were combined and averaged to indicate levels of internet and/or social media use as low (<1.33), moderate (1.34-2.67), and high (>2.67).

We assessed eHealth literacy using the Thai version of eHEALS questionnaire comprising 8 items (Chamnansua *et al*, 2016) to determine subject's ability to find, understand, evaluate health information online in order to solve health problems. Responses consisted of a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total score ranged from 8-40 and was categorized into low literacy level (<26 points) and a high literacy level (≥26) based on the results of a previous study (Richtering *et al*, 2017). The internal consistency reliability of the e-Health literacy questionnaire in this study was 0.98.

Data Analysis

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 23.0 (IBM Corp, Armonk, NY). The descriptive statistics used were frequency, percentage, mean, and standard deviation. Pearson product momentum correlations was used to determine relationships between age, education, income, health status, internet and online social media use and eHealth literacy. Multiple linear regression analysis was used to analyze the association between years of age, levels of education, monthly income, perceived health status, levels of internet and/or social media use and scores of eHealth literacy. Statistical significance was set at $p<0.05$.

Ethical consideration

The study was approved by the Research Ethics Committee of Boromarajonani College of Nursing Saraburi, Thailand (EC number 1003-2559). Researchers collected data during July to December 2016 using self-reported questionnaire. Subjects were asked to give written informed consent before participating in this study.

RESULTS

Demographic Data

A total of 1,237 subjects were included in the study; 59.8% female. The mean ($\pm$SD) age of study subjects was 66.9 ($\pm$5.5) (range: 60-94) years. Forty-three point eight percent of subjects had an elementary education. The average monthly income of study subjects was THB11,120 ($\pm$12,035), 30.2% of study subjects had very low income (THB $\leq$2,500 per month). Eighty point five percent of subjects perceived they had good health (Table 1).

Internet and online social media use

The level of internet and online social media use of the study subjects was at moderate level (mean = 1.43, SD = 1.12). The amount of time spent on using the internet and accessing social media per day was <1 hour in 41.8%, 1-2 hours in 26.9%, 3-4 hours in 20.3% and >5 hours in 11.0%. The most common activities were: watching videos, listening to music, using the Line social media application and using Facebook.

E-Health literacy

The total mean score of e-Health literacy of study subjects in this study was at low level (18.94$\pm$9.79) (Table 2).

Factors associated with e-Health literacy

The factors significantly associated with e-Health literacy in our study were: age, level of education, perceived health status, levels of internet and/or online social media uses. Multiple linear regression analysis indicated the effects of age, education, health status and internet and/or social media use which accounted for 42.0% ($R^2 = 0.42$, $p<0.001$) of e-Health literacy of Thai older adults. eHealth literacy was correlated positively with levels of internet and /or online social media use ($p<0.001$), education ($p<0.001$), perceived health status ($p<0.001$), and negatively with age ($p<0.001$). Older adults with higher level of internet and online social media use, higher education, higher income, perceived better health status, and younger age had higher eHealth literacy (Table 3).

DISCUSSION

The overall eHealth literacy of our study subjects was low. In our study, older subjects had lower eHealth literacy than younger subjects, similar to the results of another study that reported an inverse

Table 1
Characteristics of study subjects, (n = 1,237).

Characteristics	Number	%
Gender		
Male	497	40.2
Female	740	59.8
Age categories (mean ± SD = 66.9 ± 5.5 years)		
Younger (60-69 years old)	899	72.7
Middle (70-79 years old)	297	24.0
Older (≥80 years old)	41	3.3
Education levels (number of years in school)(mean ± SD = 9.6 ± 5.8 years)		
Elementary school or lower (≤6 years)	542	43.8
Junior high (9 years)	87	7.0
High school/vocational training (12 years)	260	21.0
Bachelor's degree (16 years)	280	22.6
Master's degree (18 years)	68	5.6
Monthly income in THB (mean ± SD = THB11,120 ± 12,035)		
≤2,500 (very low income)	373	30.2
2501- 9,000 (low income)	349	28.2
9,001-15,000 (lower middle income)	223	18
15,001 - 50,000 (upper middle income)	289	23.4
>50,000 (high income)	3	0.2
Health status score (mean ± SD = 7.6 ± 1.2)		
<5 (poor)	22	1.8
5-6.9 (moderate)	219	17.7
7-10 (good)	996	80.5

SD: standard deviation.

relationship between age and eHealth literacy (Tennant *et al*, 2015). These results may be partly due to physical changes that occur with aging limiting vision, hearing, movement, memory and thinking (Glisky, 2007; WHO, 2015). Older adults are more likely to have problems reading, seeing, hearing, understanding, and evaluating information leading to lower eHealth literacy (Kaeodumkoeng and Thummakul, 2015).

In our study, subjects with a higher education level had better eHealth literacy. This may be because a subject with a higher education level is better able to read, understand and process information obtained from a variety of resources. They can also better evaluate the trustworthiness of the information they glean. These results are similar to a previous study that reported education influenced health literacy (Tennant *et al*,

Table 2
Mean e-Health literacy scores by question among study subjects (n =1,237).

Questions	Mean	SD	Literacy level*
I know how to search for useful health resources on the internet	2.33	1.43	-
I know how to use the internet to find answers to my health problems	2.49	1.33	-
I know what health information resources are available on the internet	2.26	1.38	-
I know where to find useful health information resources on the internet	2.41	1.29	-
I know how to use health information on the internet to benefit myself	2.31	1.44	-
I have skills necessary to evaluate health information on the internet	2.20	1.35	-
I can differentiate between low and high quality health information on the internet	2.26	1.40	-
I can confidently use information on the internet to make my health decisions	2.26	1.41	-
Total	18.94	9.79	Low

*Total score <26 points: low; ≥26 points: high.

Table 3
Effects of income, education, perceived health status, online media use, and age on e-Health literacy of older adult social media users.

Variables	B	SE B	p-value
Constant	10.48	3.13	0.001
Income	-0.00001	0.00	0.642
Education	0.56	0.05	<0.001
Perceived health	0.56	0.18	0.001
Online social media use	31.10	1.66	0.001
Age	-0.14	0.04	0.001

B: unstandardized regression coefficient; *SE B*: standard error of a regression coefficient.

2015; Kim and Xie, 2017).

Health status had positive effects on eHealth literacy of older adults in this study. A previous study reported subjects with poor to fair health had less ability to search, evaluate and use electronic health information (Park *et al*, 2016).

Another reason for the low eHealth literacy could be reflected by the finding that most of our subjects spent less than 1 hour per day on online media. This could either indicate low internet skills causing

them to use the internet less often or the limited amount of time spent using the internet could lead to inadequate skills due to lack of time using those skills resulting in low eHealth literacy. Time spent on the internet was positively associated with eHealth literacy among our subjects, similarly to a study among older subjects that reported older subjects with cardiovascular disease who used the internet >1 hour per day had higher eHealth literacy than subjects who spent <1 hour per day (Richtering *et al*, 2017). This was also seen in another study (Park *et al*, 2016).

A limitation of our study was that we used convenience sampling to select our study subjects from urbanize area introducing bias into our results. It also is specific to the study population and cannot be applied to the general elderly population of Thailand. In our study, subjects had a low level of eHealth literacy and we report several factors significantly associated with this. These significant factors need to be taken into consideration when creating programs to improve eHealth literacy among older adults in the study population.

In conclusion, adequate eHealth literacy among older adults in Thailand could better allow integration of the elderly in the smart elderly care plans for Thailand (MOPH, 2018) which similar to the goal of applying information technology to connect the elderly with national health networks in China (Zhou, 2019). Peral-Peral *et al* (2015) reported socio-demographic variables were not enough to explain an elderly person's use or non-use of Information and Communication Technologies (ICT); instead, cognitive age, technology anxiety and the level of adventurousness better explained more elderly persons' use of online social networks. Soleimaninejad, *et al* (2019) also reported a caregiver's eHealth literacy also affects eHealth literacy in older adults. Therefore, future study should examine those factors.

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