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Research Article

The Habits and Preferences of Smartphone use in Obtaining Health-Related Information among Community-Dwelling Older Adults

Mimi Mun Yee Tse[1*], Venus Hiu Ying Ngai[1], Percy Poo-See Tse[1], Carol Pui Shan Kwok[2], Karen Ka Man Cheung[2]

[1]Department of Nursing and Health Studies, Hong Kong Metropolitan University, Kowloon, Hong Kong; [2]Department of Nursing, Tung Wah College, Homantin, Kowloon, Hong Kong

ABSTRACT

Background and purpose: The need for health services and information increases as the aging population increases. Meanwhile, the COVID-19 pandemic created an enormous barrier between older adults and healthcare. This study aimed to assess how the habits of using smartphones and preferences of smartphone use relate to the accessibility of health-related information among community-dwelling older adults.

Methods: This study used a quantitative, cross-sectional, and descriptive design approach. Data collection occurred between October 1, 2022, and December 31, 2022. A 33-item questionnaire in Chinese was developed to examine smartphone usage habits and preferences for obtaining health-related information. A panel of five gerontology experts assessed the validity and reliability of the questionnaire.

Results: A total of 360 participants were recruited for this study. This study showed that older adults expressed a more positive attitude toward using smartphones as their source of health-related information, significantly when the COVID-19 pandemic limited their access to this information through traditional methods like leaflets or written material.

Conclusion: As technology advances, the way of delivering health-related information needs to upgrade. Mobile Health (mHealth) should be widely used to encourage more effective health-seeking behaviors and improve the overall health outcome in the older population. The healthier this population, the longer their lifespan is.

Keywords: Older adults; Smartphone use; Health information; Seeking behaviour

BACKGROUND

By 2050, the number of older adults worldwide is expected to triple to 1.6 billion [1]. Older adults are a high-risk group regarding health status; their healthcare-seeking behavior is essential in society [2]. During the COVID-19 pandemic, older adults were advised to be protected with social distancing, and most health services for older adults were suspended [3]. It became more complicated for older adults to access health-related information, such as the information on vaccines for COVID-19.

Mobile health (mHealth) is one of the strategies for delivering health information [4]. According to the WHO, mHealth is a medical and public health practice supported by mobile devices, such as smartphones [5]. In recent years, increased older adults have access to the Internet, so using mHealth to implement interventions may be feasible and acceptable [6,7]. Technological advancements allow older adults to improve their health-related outcomes [8]. Using mHealth to deliver health information can promote healthy lifestyles, decrease the pressure on health and social service systems, and create better outcomes due to its potential for effectiveness and scalability [9-11].

Though older adults consistently have lower smartphone adoption rates than the general public, they are more digitally connected than ever [12]. In the United States of America, the smartphone adoption rates among older adults from 2013 to 2017 rose by 24% (from 18% to 42%) [12]. In Hong Kong, the smartphone penetration rate in older adults rose from 57.2% in 2018 to 68.1% in 2020 [13]. This increased smartphone penetration rate in older adults was due to the mandatory use of the Hong Kong government's coronavirus risk-exposure app. The Hong Kong

Correspondence to: Mimi Mun Yee Tse, Department of Nursing and Health Studies, Hong Kong Metropolitan University, Kowloon, Hong Kong, E-mail: mmytse@hkmu.edu.hk

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government provided a smartphone and a year-long data plan to some disadvantaged older adults to use the app [14].

Older adults are less likely to use smartphones despite their positive attitude toward technology [15]. Several studies identified the barriers to older adults for smartphone use, such as financial limitations, physical impairment, and lack of knowledge about using smartphones [16]. Besides, older adults prefer using old-fashioned technologies than more recent ones in communication and healthcare activities [17]. Some older adults lack interest in using smartphones, as they show little enthusiasm for adopting new technologies compared to the young [15]. Besides, older adults with impaired health and existing disabilities had predicted less technology use [18].

According to The World Bank (2022), in 2020, the world's life expectancy was 72.91 [19]. Since 2013, Hong Kong has sustained the highest life expectancy in the world (Ni et al., 2021), and the current life expectancy for Hong Kong is 85.16 years [20-22]. Using smartphones to obtain health-related information among older adults should be emphasized to support the growth in life expectancy. It is the right time to examine smartphone habits and preferences to obtain health-related information among community-dwelling older adults.

MATERIALS AND METHODS

Study design and sampling

This quantitative, cross-sectional, and descriptive study was approved by the author's university ethics review board. Community-dwelling older adults were recruited from 18 council districts in Hong Kong along the Mass Transit Railway (MTR) stations. Twenty participants were recruited from each district. This recruitment method improved the generalizability and captured the gap between the richest and poorest older adults living in different districts [23].

Participants

The inclusion criteria:

- Aged 65 years or above (In Hong Kong, all residents aged 65 or above are eligible to apply for a Senior Citizen Card) (services, 2022)
- Able to understand Chinese
- Possess a smartphone
- Abbreviated Mental Test (AMT-10)>6.

The exclusion criteria:

- With severe visual and/or auditory deficits.

Data collection

Instrument: The instrument for this study was a questionnaire consisting of 33 items divided into four sections (see Appendix I). Section one consisted of 7 items assessing demographic data, including age, gender, education level, marital status, parental status, monthly household income, and health condition. Section two consisted of 10 items on smartphone usage habits, such as the frequency, location, and importance of smartphone use. Section three consisted of 13 items on the preferences of using this technology in obtaining health-related information, such as the delivery modalities and accuracy of the health-related information obtained via smartphones. The responses included multiple-choice answers and a 5- point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher marks indicate more preferences for using smartphone technology to obtain health-related information. Section four consisted of 3 open-ended questions exploring the preferences of smartphone technology in obtaining health-related information. The questionnaire was designed based on validated theories and previous studies, which are widely accepted [24-27]. The questionnaire was in Chinese since the target population was Chinese community-dwelling older adults.

Validity: The validity of the questionnaire was assessed by the Content Validity Index (CVI). A panel of five experts was invited to validate the study questionnaire. The panel consisted of gerontology experts, including one medical officer and two registered nurses with working experience in the geriatrics department in Hospital Authority hospitals; one academic staff expert in research; and one registered nurse-in-charge currently practicing in an elderly center. They were invited to rate the degree of representation of each question using a four-point Likert scale to determine the relevancy and to comment on the appropriateness and clarity.

The final CVI was 0.89, which is more than 0.8. Hence, the study questionnaire was considered valid. Based on the comments from the five experts, some minor changes were made. The average coefficient resulting from the test-retest method range was calculated as 0.986, near 1.00, indicating that the observed score represents the true score.

Reliability: The internal consistency of the study questionnaire was assessed by Cronbach's alpha in the main study. A correlation coefficient between 0.8 and 0.9 is desirable, but 0.7 is acceptable for new instruments (Stotts and Aldrich, 2007).

Stability: The stability of the questionnaire was assessed by test-retest method. The same group of respondents was recruited to fill in the questionnaires twice at a two-week interval. Cover letters for test-retest reliability and the questionnaires were distributed to 15 respondents with explanations on how to fill in the questionnaire two times with a time interval of two weeks. Pearson correlation was performed on the data collected for the reliability coefficient.

Data analysis

The data collected in this study was analyzed using R version 4.1.2. This study's statistical significance level was set at $p<0.05$. Descriptive statistics was employed to analyze the composition of the research participants. For continuous variables, the mean and standard deviation were calculated; for categorical variables, percentages were used. The chi-square test and independent-sample t-test were applied to evaluate the relationship between smartphone use habits and preferences in obtaining health-related information among community-dwelling older adults. These statistical techniques provide insight into significant differences or associations between the two groups of participants (smart-users and traditional-users) regarding their smartphone usage habits and preferences for obtaining health-related information.

RESULTS

Demographic results of the participants

This study recruited 360 participants who met the eligibility criteria, as shown in Table 1. The age of the participants ranged from 65 to 81 or above, where age 65-70 was the dominating group at 32%. The study group was primarily female, comprising 52% of the participants. Most of the participants obtained primary

and secondary education, comprising 29% and 35% of the participants, respectively. Nearly 40% of participants suffered from chronic illness, with hypertension being the most prevalent illness at 16.9%, followed by diabetes at 13.6%, and hyperlipidemia at 7.2% of the participants

Duration of smartphone usage

This study collected data on the duration of smartphone usage in hours and classified it into three categories: less than 2 hours, 2 to 6 hours, and greater than 6 hours, as shown in Table 1. Among the 360 participants, 130 reported spending less than 2 hours, 154 reported spending 2 to 6 hours, and 76 reported spending more than 6 hours on their smartphones. The average amount of time spent using a smartphone per participant ranged from 2 to 6 hours per day, with three-quarters of the age groups (groups 65-70 at 36%, 71-75 at 31%, 76-80 at 25%) showing the same usage pattern within this category. Significant differences existed in smartphone usage duration among the age groups in this study ($p<0.001$).

Table 1: Demographic characteristics of study participants N=360.

Characteristic	Total	<2 hours, N=130	2–6 hours, N=154	>6 hours, N=76	p.value
Age					<0.001*
65-70	115 (32%)	28 (22%)	56 (36%)	31 (41%)	
71-75	101 (28%)	38 (29%)	47 (31%)	16 (21%)	
76-80	90 (25%)	25 (19%)	39 (25%)	26 (34%)	
81 or above	54 (15%)	39 (30%)	12 (7.8%)	3 (3.9%)	
Gender					0.007*
Female	188 (52%)	77 (59%)	83 (54%)	28 (37%)	
Male	172 (47%)	53 (41%)	71 (46%)	48 (63%)	
Education level					<0.001*
No schooling	75 (21%)	42 (32%)	25 (16%)	8 (11%)	
Primary	104 (29%)	51 (39%)	38 (25%)	15 (20%)	
Secondary	127 (35%)	30 (23%)	63 (41%)	34 (45%)	
Tertiary or above	54 (15%)	7 (5.4%)	28 (18%)	19 (25%)	
Marital status					<0.001*
Single	38 (11%)	12 (9.2%)	5 (3.2%)	21 (28%)	
Widowed	47 (13%)	26 (20%)	16 (10%)	5 (6.6%)	
Married	261 (73%)	89 (68%)	126 (82%)	46 (61%)	
Divorce or separation	14 (4%)	3 (2.3%)	7 (4.5%)	4 (5.3%)	
Number of children					<0.001*
0	45 (13%)	14 (11%)	10 (6.5%)	21 (28%)	
1	47 (13%)	18 (14%)	21 (14%)	8 (11%)	
2	126 (35%)	32 (25%)	70 (45%)	24 (32%)	
3 or above	142 (39%)	66 (51%)	53 (34%)	23 (30%)	
Family income					<0.001*
$5000 or below	124 (34%)	65 (50%)	37 (24%)	22 (29%)	
$5001 - $10000	100 (28%)	27 (21%)	50 (32%)	23 (30%)	
$10001 - $20000	67 (19%)	11 (8.5%)	29 (19%)	27 (36%)	
$20001 - $30000	26 (7%)	8 (6.2%)	16 (10%)	2 (2.6%)	
$30001 or above	43 (12%)	19 (15%)	22 (14%)	2 (2.6%)	
Health status					0.063
Chronic disease	143 (40%)	56 (43%)	60 (39%)	27 (36%)	
No any disease	183 (51%)	68 (52%)	79 (51%)	36 (47%)	
Types of illness					
Hypertension	61 (16.9%)	23 (18%)	23 (15%)	15 (20%)	0.633
Diabetes	49 (13.6%)	16 (12%)	23 (15%)	10 (13%)	0.806
Hyperlipidemia	26 (7.2%)	11 (8%)	9 (6%)	6 (8%)	0.675

Note: *$p \leq 0.05$ to be considered significant

Table 1 showed that most male and female participants spent an average of 2 to 6 hours on smartphones compared to the other two duration categories, consisting of 71 male (46%) and 83 female (54%) participants. When compared to male from female participants, females showed a significantly more extended smartphone usage period (p=0.007).

Participants with lower education levels reported spending less time (<2 hours) on their smartphones, with no schooling at 32% and primary education at 39% of participants (Table 1). Whereas participants with higher education levels reported spending more time on their smartphones, the most frequent smartphone usage duration of secondary education was 2 to 6 hours (41%), and that of tertiary education or above was more than 6 hours (25%). The significance difference (p<0.001) suggested that the education level impacted the duration of smartphone usage. On the other hand, there were 143 participants (40%) with chronic diseases and 183 participants (51%) with no illnesses. The p-value of 0.063 showed that there was no correlation between health status and duration of smartphone usage.

Ownership of phones and locations of phone usage

In Table 2, most participants reported owning one smartphone (91%). Participants who owned one smartphone reported spending an average of 2 to 6 hours, with 139 participants out of 328 who owned one smartphone. Similarly, participants who owned two or more smartphones reported spending an average of 2 to 6 hours, with 15 participants out of 32 who owned two or more smartphones. There was no significant difference in the ownership of phones (p=0.300).

Participants commonly used their smartphones, including home, restaurant, transportation, park, and toilet. Most participants reported spending more time on their mobile phones at restaurants (N=277) and on transportation (N=198). The duration of mobile phone usage in these two was significantly higher than in other locations (p<0.001). Among these two locations, most participants reported spending an average of 2 to 6 hours on their smartphones, suggesting they tend to spend more time on their smartphones during leisure time.

Purpose and duration of smartphone usage

The purposes of smartphone usage are reported in Table 3. Participants reported utilizing their smartphones for a broader range of purposes, including banking (12%), entertainment (42%), communication (91%), social media (41%), obtaining health information (30%), browsing news (48%), shopping (9.4%), and investment (12%). Communication usage was significantly higher than the other eight purposes, with 146 participants reporting spending<2 hours, 72 reporting spending 2 to 6 hours, and 108 reporting spending>6 hours (p=0.001), respectively. The differences were significant for all of the purposes listed in Table 3.

Preferences of receiving health information

There were 198 participants who preferred receiving health information via smartphone (55%), and 162 participants preferred traditional methods (leaflet or written material) (45%), as shown in Table 4. Among the 130 participants who reported spending<2 hours on their mobile phones, 100 of them (77%) showed a higher preference for receiving traditional methods, and only 30 (23%) preferred receiving health information using a smartphone. Meanwhile, among the 76 participants who reported spending>6 hours on their mobile phones, 60 of them (79%) exhibited a more positive attitude toward receiving health information via smartphone, and only 16 (21%) preferred receiving it through traditional methods. Overall, participants expressed a higher preference for using smartphones to obtain health information.

Table 2: Ownership of smartphones and locations of smartphone usage.

Characteristic	Total	<2 hours, N=130	2–6 hours, N=154	>6 hours, N=76	p.value
Number of smartphone					0.3
1	328 (91%)	122 (94%)	139 (90%)	67 (88%)	
2 or above	32 (9%)	8 (6.2%)	15 (9.7%)	9 (12%)	
Locations (multiple select) of using smartphone					
Home	331 (92%)	115 (88%)	146 (95%)	70 (92%)	0.15
Restaurant	277 (77%)	86 (66%)	123 (80%)	68 (89%)	<0.001*
Transportation	198 (55%)	33 (25%)	105 (68%)	60 (79%)	<0.001*
Park	95 (26%)	25 (19%)	47 (31%)	23 (30%)	0.068
Toilet	28 (8%)	5 (3.8%)	13 (8.4%)	10 (13%)	0.051

Note: *p ≤ 0.05 to be considered significant

Table 3: Purposes of mobile phone usage.

Characteristic	Total	<2 hours, N=130	2–6 hours, N=154	>6 hours, N=76	p.value
Banking	45 (12%)	29 (19%)	12 (16%)	4 (3.1%)	<0.001*
Entertainment	152 (42%)	82 (53%)	49 (64%)	21 (16%)	<0.001*
Communication	326 (91%)	146 (95%)	72 (95%)	108 (83%)	0.001*
Social media	148 (41%)	84 (55%)	50 (66%)	14 (11%)	<0.001*
Seek health information	108 (30%)	51 (33%)	30 (39%)	27 (21%)	0.010*
News	174 (48%)	91 (59%)	51 (67%)	32 (25%)	<0.001*
Shopping	34 (9.4%)	13 (8.4%)	21 (28%)	0 (0%)	<0.001*
Investment	43 (12%)	19 (12%)	21 (28%)	3 (2.3%)	<0.001*

Note: *p ≤ 0.05 to be considered significant

Table 4: Preferences of receiving health information.

Characteristic	Total	<2 hours, N=130	2–6 hours, N=154	>6 hours, N=76	p.value
Health seeking method					<0.001*
Traditional (leaflet/ written material)	162 (45%)	100 (77%)	46 (30%)	16 (21%)	
Smartphone	198 (55%)	30 (23%)	108 (70%)	60 (79%)	

Note: *p ≤ 0.05 to be considered significant

DISCUSSION

The present study recruited 360 community-dwelling older adults from the 18 council districts in Hong Kong and examined their habits and preferences of smartphone use for obtaining health information. The socioeconomic gap is significantly large from district to district, and health disparity exists even in Hong Kong, one of the wealthiest cities in the world [28]. This study is a great representative of how the city's elderly population uses their smartphones, and its main findings suggested that older adults have basic knowledge of using a smartphone and that they spend a moderate amount of time each day, with an average of 2 to 6 hours spent on communication predominantly. The higher demand for healthcare and the availability of affordable smartphones increased the acceptance and adoption of mobile health (mHealth) in the older population.

Female participants reported spending more time on smartphones than male participants in this study. Previous research supported this phenomenon, finding that females were more actively searching on the internet for health-related information than males [29]. There should be more emphasis on promoting healthcare in the male population as they often have shorter lifespans than females [30]. Males tend to take bigger risks and participate in more dangerous activities by nature, so increasing health education and promotion activities in sports, including soccer, basketball, and horse racing, would be beneficial. In this way, male older adults could gain access to health information, engage and develop more healthy habits and enjoy a better living in the community.

The major findings suggested that older adults presented a positive attitude toward using mobile health services [31]. Healthcare disparity and inconvenience of healthcare access led to a higher acceptance of the change to mHealth. There has been an increase in using mobile technologies for healthcare purposes among older adults and one explanation could be the availability of inexpensive smartphones on the market, which increased older adults' smartphone use [32]. This consistent pattern in smartphone usage among older adults can provide healthcare professionals with valuable insights on how to better design and deliver health-related information and services to the aging population utilizing mobile health (mHealth) using communication apps [33].

In Hong Kong, the Office of the Government Chief Information Officer initiated the Community Initiatives and IT Services outreach program, educating older adults on mobile devices and increasing their digital awareness (Office of the Government Chief Information Officer, 2023) [34]. As 1 in 4 older adults in Hong Kong still do not own a smartphone [35]. In this regard, more governmental support for digital inclusion and the affordability of smartphone services could further raise healthcare awareness and access. We could use the Chinese government's policy on digital market regulation and inclusion for those with disabilities as a reference to build and enhance our digital healthcare support system for older adults [36].

The locations of smartphone usage affected the amount of time spent on smartphones. There was higher usage of smartphones at restaurants and transportation, implying that people tend to use their smartphones more frequently during spare time. This finding was consistent with Pressey et al. [37]. Thus, health-related information can be delivered in these public areas, including restaurants and transportation, and with QR codes to access via smartphones.

There was a difference in smartphone usage between those with lower education and those with higher education, consistent with Pearce and Rice [38]. Participants with lower education spent a shorter time on smartphones than those with higher education. The reason for that may be due to the difference in access to mobile internet. This current study suggested that traditional methods of health information delivery (leaflets or written material) can be focused on those with lower education, and more innovative ways of health information delivery (smartphones) can be promoted more in those with higher education.

Regarding the presence of chronic illness and the use of smartphones, our study showed no relationship between health status and the amount of time spent on smartphones. Indeed, those with chronic illnesses did not seek more healthcare information via smartphones [25]. This way, various methods can reach more people seeking health-related information, especially those with chronic illnesses. In general, older adults are enthusiastic about receiving health-related information through mHealth. This finding provides superb evidence that health professionals can incorporate mHealth into the mainstream as an advantageous method to raise healthcare awareness.

CONCLUSION

This present study examined the habits and preferences of smartphone usage in receiving health-related information. Due to social restrictions in the COVID-19 pandemic, mobile health (mHealth) has become popular and widely used as an additional method to deliver health-related information. The participants showed an enthusiastic attitude toward this method of receiving health information. Thus, using mHealth as a delivery method of health information in conjunction with traditional methods could increase healthcare access and reduce the high demand for healthcare in general. Shortly, the adoption and popularization of mHealth use would benefit older adults by fostering better communication between them and physicians.

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