

The use of smart phones and their mobile applications among older adults in Hong Kong: An exploratory study

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Abstract—The purpose of this study was to explore social participation using smart phones by the older population in Hong Kong. The present study was conducted from 10-June-2013 to 16-August-2013. It was a cross-sectional survey study, and data were collected from street interviews. Potential participants were approached and invited to respond to a questionnaire. The locations for collecting data were evenly distributed on Hong Kong Island, Kowloon, and the New Territories. The size of the samples for Hong Kong Island, Kowloon, and the New Territories were calculated based on their respective proportion of the Hong Kong population in 2011. The estimated time to complete the questionnaire was approximately 10 minutes. The questionnaire included questions on demographic data and the use of smart phones and their related features. A total of 982 participants were interviewed, 46% of whom were male and 54% female. The participants were divided into the following two groups: the young-old (age 50-69) and the old-old (age 70 or above). The mean age was 67.93 ± 10.386 . The findings showed that, in comparison with the young-old group (age 50 to 69), a smaller percentage of the old-old group (70 and over) used smart phones and mobile messaging applications to communicate with others. There were no differences in patterns with regard to the type and frequency of the mobile applications being used. However, a smaller percentage of the old-old group had installed the mobile app by themselves and introduced the mobile app to others. This study reveals the behavioral patterns of the young-old and the old-old groups in the use of mobile devices to communicate. The young-old and old-old groups exhibited the same patterns in terms of the types and frequency of the mobile apps used; however, a smaller percentage of the old-old group used mobile apps to communicate. Different educational programs on the importance of social support should be established, and the promotional strategies for these programs need to be tailored to older adults. (Abstract)

Keywords – social support; communication; Hong Kong population; older adults

I. INTRODUCTION

According to the World Health Organization (WHO), the elderly population is growing faster than any other segment of the population (1). The situation in Hong Kong is consistent with this global trend. According to the Census and Statistics Department, Hong Kong Special Administrative Region of China (HKSAR), the proportion of the population aged 65 and over will increase from 13% in 2011 to 30% in 2041. By contrast, the population aged 15-64 will decline from 75% to 61% within the same period (2). There is a negative relationship between physical functioning and age (3); thus, older adults have worse mobility. A 10% increase in frailty among older adults in Hong Kong was also seen in a 3-year follow-up study (4). Accompanying this increase in frailty, the activities of daily living score (ADL) dropped by 0.5 points. (4). Growing older can therefore be said to contribute to a decline in physical functioning and health status.

In addition, aging leads to a decrease in social activity (5,6). Participating in social activities is essential for maintaining good health and for active aging (7). It can help older people to maintain their cognitive abilities (8,9) lead to a decrease in mortality rates (10,11) and symptoms of depression (12), and prevent the development of Alzheimer's disease (13). In a recent study, social participation was shown to have physical and mental health benefits regardless of a person's socio-economic status (SES), with the relationship being even stronger in the case of low SES (14). Researchers have found that a decline in motor ability is correlated with a decrease in social participation (5). Through social participation, people become more involved in social activities and gain more social

support. Social support was shown to be a protective factor for children and adolescents when they are facing chronic and acute stress, anxiety-inducing events, and depressive experiences (15–17). In this regard, the benefits of social support would extend to adults and older adults.

Loneliness is common among older people and is a main source of psychological distress, affecting almost every aspect of an individual's psychological health (18). However, loneliness is not a simply the physical state of being alone. Studies have found that living alone is only a contributory risk factor to loneliness (18), while participation in social activities is a sufficient factor in itself to prevent loneliness (19). The quality of the social participation is a more powerful predictor of the presence of loneliness than the state of living alone and participating in social activities (19). Loneliness, however, is a strong risk factor for depression (19–22). Depression has a negative influence on the well-being of the individual, with the most severe states leading to suicide. Therefore, it is also important to prevent depression in the elderly. It is noted that the use of communication networks, including mobile phones, may enhance communication and social networking among older adults.

In recent years, there have been advances in mobile phone technology and the Internet. Many studies have been conducted to examine the impact of technology on the mental health of people. It has been found that the mobile applications used in smart phones can help to provide feedback on health conditions (23). Research also found that different social networking sites can enhance social interaction (24). Therefore, several studies have been conducted on how to develop successful mobile applications and social networking sites to address the needs of older adults (23–25).

Aging is an inevitable phenomenon. Age-related issues include reduced physical functioning, decreased social participation, and increased feelings of loneliness. These three factors interact with each other and can lead to depression (3–6,18–22). There is a trend of using smart phones and their related features including messaging apps to enhance communication and social networking and minimize the effect of aged-related issues (26). Therefore, the aim of this study was to explore the behavior of older adults in Hong Kong in using smart phones and their related features to communicate.

II. MATERIALS AND METHODS

A. Data Collection

A cross-sectional survey study was conducted, with data on the mobile app usage patterns of older adults collected from a street-intercept questionnaire. The targeted group was Hong Kong citizens aged 50 or over. The participants were divided into a young-old group (age 50 to 69) and an old-old group (70 and over). We chose 70 as the dividing line between the two groups because the Hong Kong government stipulates 70 as the age when a person can begin receiving the old age allowance. The interviews were held in private housing complexes in Hong Kong, Kowloon, and the New Territories. The sample size was determined based on 2011 data from the Census and Statistics Department (27), which indicated that the total

population of Hong Kong was 7,070,338, of whom 35.4% ($n = 2,501,105$) were aged 50 or older. By setting $\alpha = 0.01$ and with a 5% of margin of error, the estimated sample size was 609. Using proportional sampling, the sample sizes for Hong Kong Island, Kowloon, and the New Territories were 118, 193, and 298, respectively. Potential participants were approached individually and invited to take part in our study by answering the questionnaire administered by the research team. The estimated time taken to complete the questionnaire was around 10 minutes.

B. Measures

The questionnaire was comprised of two parts, of which the first elicited the subject's demographic data, including age, gender, marital status, education level, income source, and living status. The second covered the use of smart phones, and consisted of the following six questions: "Would you use smart phone?", "Would you use a mobile application to communicate with others?", "Which mobile app would you use to communicate with others?", "Would you introduce the mobile app to your family members/friends to use?", "Would you use the mobile app every day?" and "Who installed the mobile app?". Questions were closed-ended, with the respondents were asked to choose the most suitable answer from a set of multiple choices.

C. Data Analysis

The statistical software SPSS (Version 20) was used to process and analyze the quantitative data. An intention-to-treat analysis was conducted for any missing data. Descriptive statistics were generated to illustrate the characteristics of the young-old and old-old groups of participants. A Chi-squared test was used to compare the differences between the groups. A p-value of less than 0.05 was considered statistically significant for all statistical data.

III. RESULTS

A. Demographic Data

A total of 982 older people, of whom 46% were males and 54% females, participated in this interview. The participants were divided into a young-old group and an old-old group. The mean age was 67.93 ± 10.386 . The sampling locations were in private housing estates in Hong Kong Island, Kowloon, and the New Territories (19%, 32%, and 49%, respectively). Most of the participants were married (81% of the young-old and 68% of the old-old group). In terms of education, 72% of the young-old participants and only 42% of the old-old participants had attained a secondary level of education.

In terms of sources of income, most of the young-old participants relied on the salary from their job, support from their children, and their savings (45%, 39%, and 23%, respectively), while the old-old participants relied on support from their children, Old Age Allowance, and their personal savings (67%, 65%, and 24% respectively).

Regarding living status, most of the participants lived in privately owned housing (60% for the young-old group and 44% for the old-old group). Among the young-old group, 18%

lived with family members, 12% in public rental housing, and 7% in private rental housing, respectively, which was similar to the old-old group at 34%, 15%, and 4%, respectively. Overall, there were statistically significant differences between the two groups in terms of marital status, education level, income source, and living status.

TABLE I. DEMOGRAPHIC DATA

	Total (N=982)	50 - 69 (N=493)	70 and over (N=488)	p-value ^b
	N (%)	N (%)	N (%)	
Age	67.93 (10.386)			
Gender				.517
Male	445 (45.6)	228 (46.6)	217 (44.6)	
Female	531 (54.4)	261 (53.4)	270 (55.4)	
Marital Status				.000**
Married	721 (74.8)	390 (81.1)	331 (68.5)	
Divorced	119 (12.3)	47 (9.8)	72 (14.9)	
Single	40 (4.1)	29 (6.0)	11 (2.3)	
Widowed	84 (8.7)	15 (3.1)	69 (14.3)	
Interview Location				.446
Hong Kong Island	186 (19.0)	94 (19.1)	92 (18.9)	
Kowloon	311 (31.7)	148 (30.0)	163 (33.4)	
New Territories	484 (49.3)	251 (50.9)	233 (47.7)	
Education Level				.000**
No Formal Education	141 (14.4)	9 (1.8)	132 (27.3)	
Primary Level	275 (28.2)	127 (25.8)	148 (30.6)	
Secondary Level	404 (41.4)	248 (50.4)	156 (32.2)	
Tertiary Level or Above	156 (16.0)	108 (22.0)	48 (9.9)	
Income Source^a				.000**
Supported by Children	524 (53.4)	194 (39.4)	330 (67.6)	
OAA	338 (34.5)	20 (4.1)	318 (65.2)	
Working	235 (24.0)	223 (45.2)	12 (2.5)	
Savings	236 (24.1)	116 (23.5)	120 (24.6)	
Pension	122 (12.4)	65 (13.2)	57 (11.7)	
Investments	88 (9.0)	59 (12.0)	29 (5.9)	
Supported by Partner	48 (4.9)	45 (9.1)	3 (0.6)	
CSSA	26 (2.7)	2 (0.4)	24 (4.9)	
Living Status				.000**
Living with Family Member	258 (26.4)	89 (18.1)	169 (34.6)	

Private Rental Housing	62 (6.3)	38 (7.7)	24 (4.9)	
Own Housing	515 (52.6)	299 (60.9)	216 (44.3)	

a. Multiple responses. b. Chi-square was used. *p < .05 and **p < .01 were considered to be statistically significant.

B. Use of Smart Phones

In terms of smart phone usage, 55% of the participants in the young-old group said that they had used one, whereas only 9% the participants in the old-old group had used one. There was a statistically significant difference between two age groups in the use of smart phones, at $X^2(1, N = 981) = 238.4, p < .01$. Regarding the use of mobile apps, 53% of the participants in the young-old group had used a mobile app, whereas only 7% of the participants in the old-old group had done so. There was a statistically significant difference between the two age groups in the percentage of those who had used a mobile app, at $X^2(1, N = 982) = 249.9, p < .01$. Nearly 90% of the participants had used WhatsApp to communicate with others, regardless of age group; there was no statistically significant difference between the young-old and old-old groups in the type of mobile app used, at $X^2(5, N = 296) = 6.4, p > .05$

With regard to introducing mobile apps to others, 62% of the young-old participants had done so, compared with only 35% of the old-old participants. The relationship between introducing a mobile app to others and age group was statistically significant, at $X^2(1, N = 296) = 8.5, p < .05$. The old-old group was less likely to introduce health supplement products to others. More than 70% of the participants had used the mobile app every day, regardless of their age group, and there was no statistically significant difference between the two age groups in their frequency of using the mobile app, at $X^2(1, N = 296) = 2.1, p > .05$. More than 50% of the participants in both age groups said that the mobile app had been installed by a family member, friend, or relative. There was no statistically significant difference between the young-old and old-old groups in the installation of the mobile app, at $X^2(4, N = 296) = 7.3, p > .05$. However, 70% of the old-old participants said that the mobile app had been installed by a significant other, whereas the figure for the young-old group was only 57%.

TABLE II. USE OF SMART PHONE

	Total (N=982)	50 - 69 (N=493)	70 or above (N=488)	p-value ^b
	N (%)	N (%)	N (%)	
Would you use a smart phone?				.000**
Yes	313 (31.9)	270 (54.8)	43 (8.8)	
No	668 (68.1)	223 (45.2)	445 (91.2)	
Would you use a mobile app to communicate with others?				.000**
Yes	297 (30.3)	263 (53.3)	34 (7.0)	
No	684 (69.7)	230 (46.7)	454 (93.0)	
Which mobile app would you use to communicate with others?^a				.269
WhatsApp	274 (92.6)	244 (93.1)	30 (88.2)	
Facebook	121 (40.9)	111 (42.4)	10 (29.4)	
WeChat	79 (26.7)	73 (27.9)	6 (17.6)	
Line	38 (12.8)	36 (13.7)	2 (5.9)	
Others	27 (9.1)	24 (9.2)	3 (8.8)	
Would you introduce the mobile app to your family members/friends to use?				.004**
Yes	173 (58.4)	161 (61.5)	12 (35.3)	
No	123 (41.6)	101 (38.5)	22 (64.7)	

Would you use the mobile app every day?				.151
Yes	251 (84.8)	225 (85.9)	26 (76.5)	
No	45 (15.2)	37 (14.1)	8 (23.5)	
Who installed the mobile app? ^a				.119
Significant Others (including a family member, friend, or relative)	175 (59.1)	151 (57.6)	24 (70.6)	
Yourself	111 (37.5)	103 (39.3)	8 (23.5)	
Built-in	17 (5.7)	15 (5.7)	2 (5.9)	
Shop Staff	7 (2.4)	5 (1.9)	2 (5.9)	

a. Multiple responses. b. Chi-square was used. * $p < .05$ and ** $p < .01$ were considered to be statistically significant.

IV. DISCUSSION

In this study, the use of mobile messaging apps by people aged 50 and above was investigated, mainly in terms of the frequency with which smart phones and mobile applications were used to communicate. The findings showed that in comparison with the young-old group, a smaller percentage of the old-old group used mobile messaging apps to communicate with others. However, as indicated in Table 2, there were no differences in patterns with regard to the type and frequency of the mobile app that was used. This suggests that only two to three apps dominate the field of communication mobile apps, including WhatsApp, Facebook, and WeChat, and that the habit of using mobile apps is similar, regardless of age. It is a surprise to find that more than 30% of participants were using Facebook to communicate with others, as Facebook is a social networking website, not a mobile messaging application. This would imply that once the older people had been persuaded to use the mobile app to communicate, and once they had learned how to use it, other people began to use Facebook as a normal means of communicating with them. The results showed that this pattern of behavior was similar between the young-old and old-old groups. Although a larger percentage of older people were socially isolated, experiencing loneliness and less physical mobility than younger people (3–6,18–22), healthcare professionals, social well-being facilitators, or caregivers of the older people would use mobile apps to eliminate the negative effects of this lower level of physical mobility. Thus, older people were given a chance to participate in social activities, gain a high quality of social support from the healthcare profession, and prevented from feeling lonely.

Table 2 shows that only one fourth of the old-old group had installed the mobile app by themselves; therefore, in using the mobile app, the majority had depended on a family member, friend, or relative. In addition, only 35% of those in the old-old group had introduced the mobile app to others, compared to 62% of the young-old group. This may suggest that even though the old-old group used mobile apps to communicate, their virtual social activities were still limited to only a few types of people. Therefore, an educational program should be launched among the young-old and old-old groups, promoting the significance of social support, and focusing on the use of mobile apps as a means of achieving this goal.

V. CONCLUSION

This study reveals the behavioral patterns among the young-old and the old-old groups in the use of mobile devices to communicate. The young-old and old-old groups exhibited the same patterns in terms of types and frequency of mobile

apps used; however, a smaller percentage of the old-old group used mobile apps to communicate. Different educational programs concerning the importance of social support should be established, and the promotional strategies would need to be tailored to older adults.

ACKNOWLEDGMENTS

The authors would like to thank all of the participants in this study. Special thanks are accorded to the Senior Citizen Home Safety Association, Hong Kong, for providing financial support for this study.

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