







The role of digital mobile technology in elderly health management among health care workers in Indonesia: Analysis of knowledge, attitudes, and practice

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Anastasia A. Dinakrisma¹ , Purwita Wijaya Laksmi¹ , Teofilus Abdiel¹ ,
Johannes P. Fernandez¹, Nuri Indahwati¹, Anindya Pradipta Susanto^{2,3} ,
Arya Ananda Indrajaya Lukmana⁴ and Prasandhya Astagiri Yusuf^{2,3} 

Abstract

Background: Technology, including information and communication technology (ICT), plays a significant role in the quality of health services. However, its application in elderly health services is still lacking. The aim of this study was to determine the knowledge of, attitudes toward, and practices of cell phone and mobile application use for elderly health care among Indonesian health care workers.

Methods: This was a cross-sectional study conducted with health care workers in Jakarta, Indonesia. The potential subjects were contacted through instant messenger application and/or through conventional short message service or telephone calls from August through November 2020.

Results: There were 134 subjects. All the subjects had used various health applications to assist with their daily work, including telemedicine (64.2%), guidelines (60.4%), and medical calculators (46.3%). However, 96.3% of the subjects were not aware of the existence of a health application for geriatric assessment. Furthermore, 98.5% of subjects thought that it is important to use ICT to manage geriatric patients, and 94.8% felt that comprehensive geriatric assessment (CGA) in digital form would help them manage geriatric patients better. Nevertheless, 35.10% of subjects had never applied CGA to their geriatric patients.

Conclusions: The current health care system has begun to enter a period of using ICT in performing health services for geriatric patients. Nevertheless, only a few Indonesian health care workers were aware of or were using the geriatric mobile application. It is essential to improve the dissemination of geriatric health care and e-health literacy among them to improve the quality of elderly health care.

Keywords

cell phone, elderly, health care worker, ICT, mobile application

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Introduction

In 2019, the number of elderly people in Indonesia reached 25.6 million people. In other words, 9.6% of Indonesia's population was elderly, and this percentage is predicted to reach 19.8% by 2045.¹ The conditions of the elderly vary from fit, pre-frail, to frail.² Various health problems arise with advancing age, and the health problems that occur are usually chronic and complex.^{3,4}

¹Geriatric Division, Department of Internal Medicine, Faculty of Medicine Universitas Indonesia/Dr Cipto Mangunkusumo Hospital, Jakarta, Indonesia

²Department of Medical Physics, Faculty of Medicine Universitas Indonesia, Jakarta, Indonesia

³Medical Technology Cluster, Indonesian Medical Education and Research Institute (IMERI), Faculty of Medicine Universitas Indonesia, Jakarta, Indonesia

⁴Faculty of Medicine Universitas Indonesia, Jakarta, Indonesia

Corresponding author:

Purwita Wijaya Laksmi, Geriatric Division, Department of Internal Medicine, Faculty of Medicine Universitas Indonesia/Dr Cipto Mangunkusumo Hospital, Jakarta, Indonesia.
Email: adekerahman@gmail.com



Geriatric patients are elderly patients who are characterized by the presence of several concurrent diseases (multi-comorbid) that are generally chronic degenerative, with aberrant clinical signs and symptoms, low physiological reserves, decreased functional status, and malnutrition.⁵ These characteristics lead to the need for a special clinical approach and management for geriatric patients (comprehensive geriatric assessment/CGA) through continuous assessment and intervention on their physical, functional, psycho-cognitive, nutritional, and social conditions (biopsychosocial). An interdisciplinary approach is conducted while not only paying attention to curative aspects but also to promotive, preventive, and rehabilitative measures to achieve optimal health and quality of life.⁵ Indonesia has issued a Ministry of Health (MoH) Decree related to the implementation of health services for geriatric patients at primary health care and in hospitals.^{6,7} Therefore, CGA performed by trained physicians and nurses in a geriatric team should be applied from primary care to tertiary referral health facilities. In conjunction with the Indonesian Geriatric Society, the Indonesia MoH has routinely held trainings of trainers for geriatric services in primary health care as well as for the referral level. Nevertheless, there are challenges in implementing CGA in clinical practice, such as being time-consuming, requiring too much paperwork, and lacking human resources in terms of skill and numbers. Various forms/instruments are needed to evaluate the various dimensions included in CGAs that necessitate the use of digital-based geriatric assessment to provide fast, appropriate, and effective patient-centered medical intervention.

At present, even though Indonesian health care workers are accustomed to using various gadgets, they are still using paper when writing medical records, prescribing medicines, and instructing others on supporting examinations. This paper use is due to the limited resources in Indonesia, including the unavailability of digital/electronic facilities that can assist with these activities. Silva et al. (2018) developed a mobile CGA application based on IOS and Android interfaces in Portuguese, which they named Geriatric Helper, and it is useful as a practical guide for health care workers in conducting CGAs and updating the latest information.⁸ A pilot study of 31 subjects addressing the use of geriatric assessment (GA) applications (apps) and interventions via digital applications on cancer patients for the sick elderly and their caregivers was conducted by Loh et al. in the United States in 2018 using the Touch Stream mobile application. The results showed a system usability scale of 74 (>68 indicates above average), with a retention of 80%.⁹ In relation to CGAs, the World Health Organization (WHO) has also proposed a guideline called the Integrated Care for Older People (ICOPE). ICOPE was made to support community and health care workers to assess the health and social care needs of the elderly. ICOPE is also available as a mobile application. This form is expected to make ICOPE easier to use.³

Further studies must be done so that the development of health applications for GA can be done in accordance with user needs. However, studies related to this topic that are aimed at health care workers in Indonesia have never been performed, even though they are the main potential users. Therefore, it is necessary to conduct a study on the knowledge, attitudes, and behaviors of Indonesian health care workers regarding the use of elderly health applications.

Methods

This was a cross-sectional study conducted on health care workers (nurses, internal medicine residents, and internists) in Jakarta, the capital city of Indonesia. The subjects were randomly chosen from the database of internal medicine residents and fellowship trainees at Dr Cipto Mangunkusumo Hospital, a tertiary hospital in Jakarta, as well as the database of geriatric service workshop participants held by the Indonesian Geriatric Society and MoH. The Ethical Committee of the Faculty of Medicine Universitas Indonesia/Dr Cipto Mangunkusumo General Hospital approved this study (No. 458/UN2.F1/ETIK/PPM.00.02/2020).

The potential subjects were contacted through an instant messenger application (WhatsApp) and/or through a conventional short message service (SMS) or telephone calls from August until November 2020. Each subject was asked to complete the online questionnaire form. Subjects were excluded if they refused to participate in this study.

The minimum sample size was 97 participants, based on predicting a population proportion formula with a statistical power of 80% and an α value of 5%. The data were analyzed using IBM SPSS Statistics for Windows 20.0 (IBM Corp., Armonk, NY, USA). Categorical data are displayed as a percentage. In addition, numerical data were displayed as the mean (standard deviation) when the data were normally distributed or the median (minimum-maximum) when abnormally distributed, based on the Kolmogorov–Smirnov test.

Results

There were 138 potential health care worker subjects who were contacted through WhatsApp and/or SMS or telephone calls. Out of 136 health care workers who responded, two people explicitly refused to participate. Ultimately, 134 subjects participated in this study.

Demographic characteristics

The demographic characteristics of the subjects are shown in Table 1. The 134 subjects consisted of 71 nurses (53%), 30 internal medicine residents (22.4%), and 33 internists (24.6%). The majority of subjects were female

(60.4%). The median age was 37 (22–60) years old, with most of the subjects aged less than 45 years old (80.9%). Approximately 60.4% of subjects were working in the Healthcare Center, which has an Integrated Geriatric Service.

Cell phone use

The data on cell phone use are shown in Table 2. All of the subjects had cell phones. The majority of subjects only had one cell phone (76.2%) and had changed or purchased a new cell phone more than once every three years (69.4%). The median duration of cell phone daily use was 5 (1–24) hours. This study also reveals that most subjects use Android-based smartphones (91.8%). Telephone and internet browsing were the most frequently used pre-installed features on the cell phone (90.3%), followed by camera (82.1%), email (80.6%), photo gallery (77.6%), calculator (70.1%), and video (64.2%), whereas only 52.3% still use text messaging (SMS).

Table 1. Demographic characteristics of subjects ($N=134$).

Variables	<i>N</i> (%)
Sex	
Male	53 (39.6)
Female	81 (60.4)
Occupation	
Nurse	71 (53)
Internal medicine resident	30 (22.4)
Internist	33 (24.6)
Age (years-old)	
18–25	6 (4.5)
26–35	53 (39.6)
36–44	48 (35.8)
45–59	26 (19.4)
≥60	1 (0.7)
Median (min–max)	37 (22–60)
Working in Health Center That Has Integrated Geriatric Service	
Yes	81 (60.4)
No	53 (39.6)

Mobile application usage

Data on mobile application usage are presented in Table 3. WhatsApp message, telephone, WhatsApp video call, Instagram, Facebook, Zoom video call, SMS, Telegram, Google meet-video call, Line, Twitter, Google team video call, and Skype video call were among the various communication features or applications on the cell phone that have been used by the subjects. The most frequent use of social media and video call apps was WhatsApp (76.1% and 78.4%, respectively).

Table 2. Cell phone use.

Variables	<i>N</i> (%)	Variables	<i>N</i> (%)
Number of Cell Phones Owned		The Most Frequent Use of Cell Phone Pre-Installed Features	
1	102 (76.2)		
2	28 (20.9)	Telephone	121 (90.3)
>2	4 (2.9)	Internet Browsing	121 (90.3)
Duration of Cell Phone- daily use (hours)		Camera	110 (82.1)
		E-mail	108 (80.6)
Median (min–max)	5 (1–24)	Photo Gallery	104 (77.6)
Operating System		Calculator	94 (70.1)
		Video	86 (64.2)
Android	123 (91.8)	Alarm	85 (63.4)
iOS	19 (14.2)	Calendar	83 (61.9)
Other (Windows, etc.)	1 (0.7)	Music	80 (59.7)
Duration of Changing New Cell Phone		SMS	71 (52.3)
		Flashlight	68 (50.7)
Once a year	5 (3.7)	Games	39 (29.1)
Once per 2–3 years	36 (26.9)	Radio FM	11 (8.2)
Once more than 3 years	93 (69.4)	Others	20 (14.9)

Table 3. Mobile application usage.

Variables	N (%)	Variables	N (%)
The Use of Communication Features/Apps		The Use of Health Applications	
WhatsApp (video call excluded)	132 (98.5)	Telemedicine	86 (64.2)
Telephone	115 (85.8)	Guidelines (e.g. NCCN, ESC)	81 (60.4)
WhatsApp-video call	107 (79.9)	Medical calculator	62 (46.3)
Instagram	97 (72.4)	Fitness apps	46 (34.3)
Facebook	86 (64.2)	Do not know	24 (17.9)
Zoom-video call	83 (61.9)	Knowledge about Mobile Applications for Elderly	
SMS	77 (57.5)	Yes	5 (3.7)
Telegram	64 (47.8)	No	129 (96.3)
Google meet-video call	36 (26.9)	Knowledge about ICOPE Apps	
Line	26 (19.4)	Yes	6 (4.5)
Twitter	25 (18.7)	No	128 (95.5)
Google team-video call	18 (13.4)	Subscribe to Paid Apps	
Skype-video call	5 (3.7)	Yes	28 (20.9)
Others	2 (1.5)	No	106 (79.1)
Type of Paid Apps			
The Most Frequent Use of Social Media Apps		Netflix	19 (14.2)
WhatsApp	102 (76.1)	Spotify	14 (10.4)
Instagram	21 (15.7)	YouTube	2 (1.5)
Facebook	9 (6.7)	Others	5 (3.7)
Telegram	1 (0.7)	Type of Internet Package	
None	1 (0.7)	Prepaid phone credit	123 (91.8)
		Home internet	74 (55.2)
The Most Frequent Use of Video Call Apps		Office internet	72 (53.7)
WhatsApp	105 (78.4)	Others	2 (1.5)
Zoom	25 (18.7)	Purchase Prepaid Phone Credit and/or Home Internet Subscription Cost per Month	
Google meet	1 (0.7)		
None	3 (2.2)	Median (USD, min, max)	14.1 (3.5–85)

The subjects had used various health applications to assist with their daily work. Some of the health applications used here were telemedicine (64.2%), guidelines (60.4%), medical calculators (46.3%), and fitness apps (34.3%). However, most of the participants were not aware of the existence of a health application for GA in a clinical setting (96.3%). This observation was consistent with other findings in this study that the majority of subjects also did not know about the ICOPE application (95.5%).

Most of the subjects did not subscribe to paid applications (79.1%). However, the paid applications they used included Netflix (14.2%), Spotify (10.4%), and YouTube (1.5%). Further investigation showed that most of the subjects used prepaid phone credit (91.8%) as their internet package, followed by home internet (55.2%) and office internet (53.7%). From this study, it can also be observed that the median cost per month for subjects to obtain internet facilities was IDR200,000 (50,000–1,200,000) or approximately USD14 (3.5–85).

Attitudes and practices

Figures 1 and 2 show the attitudes about and practice of cell phone and mobile application usage. Regarding the attitude aspects, all the subjects agreed and strongly agreed that cell phones made it easier for them to perform their daily activities (Figure 1A) and communicate with other people (Figure 1B).

Among the agree and strongly agree groups, 94.8% of subjects felt that CGA in a digital form will help them manage geriatric patients better (Figure 1E). Furthermore, among the agree and strongly agree groups, 97% of subjects thought they needed mobile health applications (Figure 1D), and 88.1% felt that the condition of the coronavirus disease-19 (COVID-19) pandemic required them to use the cell phone more in terms of maintaining better communication with their patients (Figure 1N). This result was consistent with the higher proportion of agree and strongly agree groups who thought that it was important to use information and communication technology (ICT) to manage geriatric patients (98.5%, Figure 1C) and felt better if the health applications for the elderly could be accessed via cell phone (96.3%, Figure 1I). Moreover, among the agree and strongly agree groups, 98.5% of subjects would use a health application for GA in a clinical setting if available (Figure 1J), and 85.1% of subjects thought that it was important for the elderly to be able to use smartphones (Figure 1M).

This survey also shows the characteristics of the expected health application supporting elderly assessment. A large percentage of them agreed (50.7%) and strongly agreed (47.8%) that health applications for the elderly will be better in the Indonesian language (Figure 1F). This finding was also consistent with the large percentage who disagreed (53.7%) and strongly disagreed (6.7%) with the statement that there would be no problem if

health applications for the elderly use the English language (Figure 1G). They also felt that the application would be better if it were adapted based on Indonesian culture. This finding was indicated by the percentage of respondents who agreed (53.7%) and strongly agreed (45.5%) with that statement (Figure 1H).

Another insight that can be obtained from the survey is the features and costs of health care applications. Regarding the feature, 96.3% of subjects in the agree and strongly agree groups who felt the need for online courses or workshops, virtual symposiums, or webinars to improve their knowledge and skill to manage geriatric patients (Figure 1K). Regarding the cost, it was found that 59.7% of subjects were unwilling and very unwilling to pay the subscription fee for the application (Figure 1L).

In practice, 43.3% of subjects had used mobile health applications for general practice at least once per week (Figure 2A). However, 31.3% of the subjects had never used them (Figure 2A). When treating geriatric patients, 44.8% of the subjects had used cell phones to search for information related to their work at least once a week (Figure 2B). However, 37.3% of the subjects had never used some features on their cell phone to manage their geriatric patients (Figure 2C). This finding was consistent with the finding that 78.4% of the subjects had never used a mobile health application supporting elderly assessment (Figure 2D), and less than 50% (32.8%) of the subjects had applied CGA to their geriatric patients at least once per week (Figure 2E). Moreover, 35.10% of the subjects had never applied CGA to their geriatric patients.

There were 31 male (58.49%) compared with 27 female (33.33%) subjects and 33 (60%) subjects aged ≤ 35 years old compared with 25 (31.65%) subjects aged > 35 years old who frequently used mobile health applications for general practice. In addition, there were 20 male (37.74%) compared with 24 female (29.63%) subjects and 24 (43.64%) subjects aged ≤ 35 years old compared with 20 (25.32%) subjects aged > 35 years old who frequently implement CGA in their clinical practice. Table 4 shows the significant association between the sex and age groups with the use of mobile health applications for general practice. Moreover, Table 5 shows a significant association between the implementation of CGA by the clinician and the clinician's age group; however, there was no significant association with the sex group.

Table 6 shows the expected features of a mobile health application for geriatric care and the types of medical calculators. The top three expected features of mobile health applications for the elderly or their caregivers were elderly health education (90.3%), caregiver health education (87.3%), and geriatric health diaries (e.g. diaries to record medications, food and fluid intake, and urine volume) (77.6%). However, the top three most expected types of medical calculators were the CGA (91%), a



Figure 1. Attitudes toward cell phone and mobile applications usage.

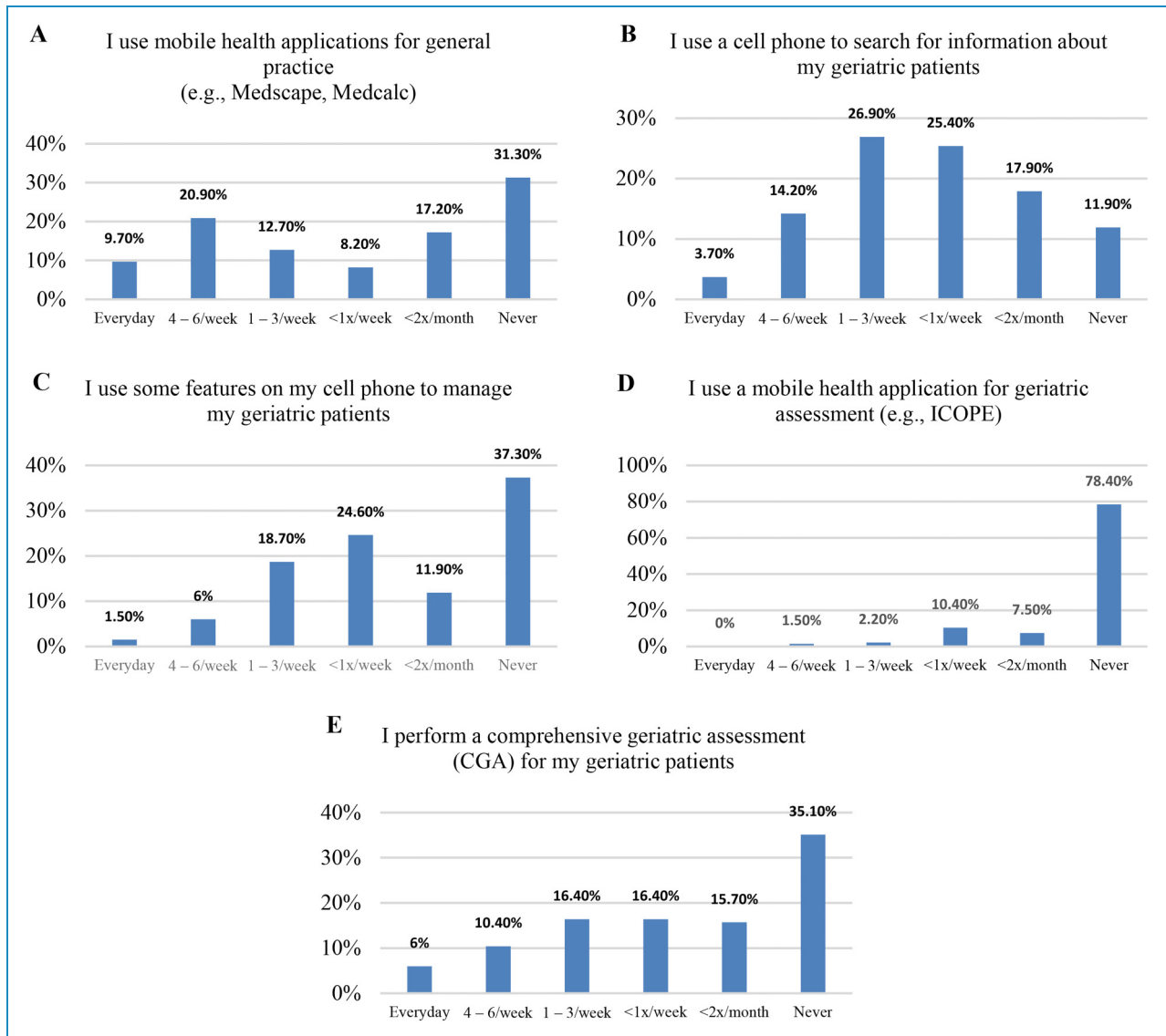


Figure 2. Practices of cell phone and mobile application usage.

polypharmacy calculator (85.1%), and a medical calculator related to common diseases in geriatric patients (83.6%).

Discussion

The number of Indonesian health care workers recorded based on the national data in 2020 was as high as 1,500,541 people. The highest proportion of health care workers was nursing personnel, who made up as much as 30.67% (460,267 people) of the total health workforce.¹⁰ This proportion corresponds to the proportion of nurses involved as subjects in our study (53%). A higher proportion (39.6%) of age subjects in our study were included in the millennial generation (26–35 years old). Millennials grew up surrounded by modern technology and the internet.¹¹ According to the report, millennials in the United

States spend 211 min a day accessing apps or the internet on their smartphones. Millennials were also found to unlock their devices an average of 63 times a day, just behind Gen Z smartphone users (9–25 years old) with 79 unlocks per day. The intensive use of the internet by millennials was also part of their professional lives: more than half of millennials believe that their work would be different without the internet and that internet access should be a human right.¹²

The literature indicates that at the present time, the use of ICT has become a habit of everyday life. A study from Australia described the majority (91%) of health care professionals in the study owning a mobile phone, and 87% of them used it during clinical practice. Furthermore, 71% of those who use mobile phones during clinical practice use smartphones.¹¹ Similar findings were also found in

Table 4. Use of mobile health application for general practice based on sex and age groups.

Variable	Frequent user, <i>N</i> (%)	Infrequent user, <i>N</i> (%)	<i>p</i> *
Sex Group			
Male	31 (58.49)	22 (41.51)	0.004
Female	27 (33.33)	54 (66.67)	
Age Group			
≤35 years old	33 (60.00)	22 (40.00)	0.001
>35 years old	25 (31.65)	54 (68.35)	

*Chi-square test.

Frequent user: 1–3 × /week to every day; infrequent user: <1 × /week to never.

our study; all of the subjects in our study owned a cell phone and replaced or bought a new cell phone after more than three years (69.4%). The median duration of daily cell phone use was 5 (1–24) hours. Our study also shows that the majority of health care workers used Android-based smartphones (91.8%). According to research by Watkins et al. (2018), doctors and most nurses use their mobile phones socially to make phone calls, send text messages, or use WhatsApp.¹³ This finding is consistent with the results of our study that the majority of health care workers also used their smartphones for telephone and internet browsing (90.3%).

The WHO said that a phone is a technical object that allows changes in “maintenance seeking” and the practice of care delivery, leading to the increased capacity of health services.¹⁴ The majority of subjects in our study also thought that smartphones can greatly facilitate daily activities (63.4%) and communication between health care workers (73.9%). Moreover, 97% of health care workers in our study thought they needed mobile health applications, and 53% of them thought that smartphone use is also important in finding health information to improve the health of geriatric patients. Mobile telephones provided many benefits to the participants in our study. With mobile phones, health care workers can speed up the treatment process, which leads to an increase in their ability to provide effective health.¹³ In this COVID-19 pandemic situation, the use of smartphones for health services has also increased worldwide. Therefore, it is not surprising that 88.1% of health care workers in our study felt that this pandemic requires them to use a cell phone more to have better interactions with their patients.

Table 5. Implementation of CGA by the clinicians depending on sex and age groups.

Variable	Frequent, <i>N</i> (%)	Infrequent, <i>N</i> (%)	<i>p</i> *
Sex Group			
Male	20 (37.74)	33 (62.26)	0.329
Female	24 (29.63)	57 (70.37)	
Age Group			
≤35 years old	24 (43.64)	31 (56.36)	0.026
>35 years old	20 (25.32)	59 (74.68)	

*Chi-square test.

Frequent: 1–3 × /week to every day; Infrequent: <1 × /week to never.

According to our study, 98.5% of health care workers thought that it is important to use ICT to manage geriatric patients. One of the important aspects of managing geriatric patients is the use of CGAs. Today, CGA programs in several countries have used modern technology. CGAs are available in the application form so that assessments can be conducted in different locations, communication can continue by telephone or electronically, and results are recorded in internet databases.¹⁵ One example of this CGA application is the Geriatric Helper application, which was made by Silva et al. in Portugal. In their survey, this application was considered useful and made it easier for health workers to perform CGAs and update health information.⁸ This opinion is consistent with the opinion of the subjects in our study. According to our study, in the agree and strongly agree groups, 94.8% of subjects felt that CGA in a digital form helped them manage geriatric patients better.

The WHO defined mobile health or mHealth as medical and public health practice that is supported by mobile devices, such as mobile phones, personal digital assistants, patient monitoring devices, and other wireless devices. mHealth improves the service provision and knowledge of health care workers. mHealth facilitates the provision of care, the recording of medical records, patient and health care worker education, disease prevention, and patient self-management. These tools can improve surveillance, clinical care, prevention, and self-management. Furthermore, they have the potential to expand public health impacts at the population level through wider dissemination and scale-up for widespread use.^{15,16} mHealth interventions also produced some evidence of behavior change and improvements in clinical outcomes.¹⁷

In our study, 43.3% of health care workers used mHealth applications for general practice at least once per week. Numerous mobile health applications are now available

Table 6. Expected features of a mobile health application for geriatric patients and the type of medical calculator.

Expected feature of geriatric mobile application		Expected type of medical calculator	
Feature	N (%)	Type	N (%)
Applied for the Elderly or Their Caregivers		Comprehensive Geriatric Assessment	122 (91)
Elderly Health Education	121 (90.3)		
Caregiver Health Education	117 (87.3)		
Geriatric Health Diary (e.g. diary to record medications, food and fluid intake, and urine volume)	104 (77.6)	Polypharmacy Calculator	114 (85.1)
Applied for Health Care Workers		Medical Calculator Related to Common Diseases in Geriatric Patients	112 (83.6)
E-book, Journal, or Guidelines	97 (72.4)		
Online Course	99 (73.9)		
Medical Calculator	95 (70.9)	Perioperative Assessment	101 (75.4)
Online Health Consultation with Patient	89 (66.4)	Guidelines and Recommendations	99 (73.9)
Online Health Consultation with a Consultant	88 (65.7)		

for many important tasks, such as information and time management, health record maintenance and access, communications and consulting, reference and information gathering, patient management and monitoring, clinical decision-making, and medical education and training that can be used for general practice.¹⁸ The majority of cell phones and mobile apps used in our study were used to access medical knowledge (e.g. Medscape, MedCalcs) at 20.9% 4–6 times a week, and 26.9% of apps were used to seek information about geriatric patients 1–3 times a week. Watkins et al.'s (2018) study indicated that 60% of nurses and doctors reported using their mobile phones more than once per week for health-related purposes.¹³ The results of the study by Koehler et al. (2013) showed that 79% of health care workers use an internet search engine (e.g. Google, Safari) to search for unknown clinical conditions.¹¹ In addition, 70% are more likely to use internet search engines than peer-reviewed online journals to obtain additional clinical information when treating patients. The study also mentions that only 16% of health professionals believe that the content of medical applications is unreliable. This result could be explained by the

fact that three-quarters of health care professionals use smartphones in clinical practice and are aware of the medical applications used in clinical practice. That number is likely to rise as more health care professionals buy smartphones and become aware of the use of medical apps.^{13,19}

Our study reveals that the use of ICOPE as a geriatric mobile application was still rare among health care workers. This observation is indicated by the fact that 78.4% of the subjects had never used the application. This low use occurred because the ICOPE application was only introduced by the WHO in 2019. Although many countries have used this application, some countries have not used it at all. In Indonesia, ICOPE has just reached the stage of review by the MoH. There has been no official dissemination regarding this application to health care workers in Indonesia yet. In addition, it still requires language and cultural adjustments to be widely used in Indonesia.^{20,21}

The use of the Indonesian language in health applications for the elderly is believed to make it easier for Indonesian users to use them. In our study, a large

percentage of the participants agreed (50.7%) and strongly agreed (47.8%) that health applications for the elderly would be better in the Indonesian language. This finding was also consistent with the large percentage of them who disagreed (53.7%) and strongly disagreed (6.7%) with the statement that there will be no problem if health applications for the elderly use the English language. They also felt that the application would be better if it were adapted based on Indonesian culture.

It turns out that lack of ICT development affects the service of health care workers in our study of geriatric patients. This finding was indicated by the fact that less than 50% (32.8%) of the subjects had applied CGA to their geriatric patients at least once per week. Moreover, 35.10% of the subjects had never applied CGA to their geriatric patients. The majority of these subjects were nurses (80.9%). This observation also indicates the need to evaluate the nursing education curriculum in Indonesia, especially the curriculum related to gerontological nursing. The learning of nurse candidates related to this field must be enriched, especially in terms of field practice. It is also necessary to ensure that the CGA is listed by that field.²²

From our study, it is also clear that health care workers have an interest in using health applications for geriatric patients. A total of 98.5% of health care workers would use a health application for GA in a clinical setting, if available. Furthermore, 96.3% of subjects felt better if the health applications for the elderly could be accessed via cell phone (96.3%). From this result, it can be concluded that there is an opportunity to develop mobile applications for geriatric health services for use by health care workers.

Interestingly, our study revealed that the male health care workers used the mobile health application for general practice significantly more frequently than their female counterpart health care workers. The millennial subjects also significantly used the mobile health application for general practice more often than those whose age was >35 years old, which supports the finding that the millennials were more tech-savvy.

In addition, our study indicated that there was no significant sex group difference in the implementation of CGA. However, millennial health care workers were significantly more likely to implement CGA in their clinical practice. This might be the case because the development of geriatric medicine in Indonesia started in the late 1990s. Furthermore, for undergraduate medical students, geriatric medicine was first introduced in the 2005 curriculum.

Increasing the role of ICT not only must be done by health care workers but also by the elderly. According to our study, 85.1% of subjects thought that it is important for the elderly to be able to use smartphones. Smartphones can help the elderly with various aspects of their health. With smartphones, the elderly can more easily obtain health information, conduct health consultations, and order medicines without having to leave the

house. The health condition of the elderly can also be monitored regularly and completely using various features available on smartphones, especially if there is a special application for that purpose. The role of ICT in the health of the elderly is also confirmed by research conducted by Choi et al. (2013). The authors identified that elderly individuals who had poor health status were unlikely to use ICT.²³

We also surveyed the expected features of the geriatric mobile health app and medical calculator to assess the needs of health care workers in supporting services for geriatric patients and other patients. The most desirable features of mobile health applications for the elderly or their caregivers were elderly health education (90.3%), followed by caregiver health education (87.3%) and geriatric health diaries (e.g. diaries to record medications, food and fluid intake, urine volume) (77.6%). The most desirable features of geriatric mobile health applications for health care workers were e-book, journals, or guidelines (72.4%), online courses (73.9%), and medical calculators (70.9%). These features were expected to support health care workers and caregivers. Therefore, they can provide the best service for geriatric patients. Notably, the CGA was the most expected medical calculator type (91%), followed by the polypharmacy calculator (85.1%) and the medical calculator related to common diseases in geriatric patients (83.6%). CGA delays the progression of frailty and may help to improve the frailty status.¹⁵ Despite the evidence of its positive impact, CGA is still applied by a limited number of professionals in geriatric care in many countries, mostly using a paper-based approach. Based on our study, the majority of our subjects belonged to the millennial generation. Millennials are heavily exposed to technology at an early age, making them social media-savvy and prone to relying on technology for entertainment and communication.²⁴ They assumed that the use of digital CGA was more helpful in managing geriatric patients and easily accessible via cell phone.

In today's world, several applications can help with the implementation of CGA. The PT Measure Application, for example, can help in assessing the mental and functional aspects of geriatrics. The Indicator of Dependence Application can also assess the mental, functional, and social aspects of geriatrics. However, the items in this application are not separated by aspect. There is also the Onoscale Application, which examines mental, functional, and nutritional aspects as well as the Computerized Frailty Assessment application, which examines mental, functional, and frailty aspects. The problem is that none of these applications cover the whole CGA range.⁸ The CGA applications that are quite complete today are Geriatric Helper made by Silva et al., ICOPE, and mAgeing made by the WHO. However, none of these applications are in the Indonesian language and adapted to Indonesian culture, making them difficult to apply in clinical practice here.

A CGA application is important because this application will be able to reduce the time spent performing the assessment and the energy used to calculate the results. The information obtained from the CGA application can also be easily summarized for use as material for further research. Nevertheless, it is important to address the legal and ethical aspects of patient data. It could be in the form of a CGA calculator application with unsaved data or a CGA application that can save important consent data without affiliating it with the patient's identity.

Awareness of the CGA application among health workers must be increased. Incorporating ICT material into the education strategy for health care workers may also be performed to increase health literacy. Collaboration with professionals from disciplines outside of health is also needed. On the other hand, the government, health care providers, and other relevant stakeholders can assist in terms of facilities and funds for this development.⁸

Our study is the first to investigate the knowledge, attitude, and practice of cell phone and mobile application use by Indonesian health care workers. However, it may not represent the health workforce in Indonesia as a whole because this study was only conducted on 134 health workers. In addition, Indonesia had 1,500,541 health workers spread over 32,817 health units in 2020.¹⁰ Given the lack of time for health care professionals, we opted to collect data through online surveys and phone calls because it is faster to complete surveys this way than to complete and return paper surveys by physical mail. However, the use of online data collection methods (i.e. excluding health professionals who do not use the internet) would create a selection bias for our study because health care professionals in our study tended to have positive attitudes toward internet use, so they could complete online surveys.

The results of our study can be used as a guide to develop a mobile application for geriatric health services. Our study found several important results that must be considered to create an appropriate geriatric health care application.

- It is necessary to develop an application for geriatric health services because based on our study, most health care workers felt that the application would assist with their service activities.
- The application should be accessible via a smartphone because most of the health care workers in our study felt that a smartphone could help facilitate their daily activities.
- If the application is to be used in Indonesia, it is better to use the Indonesian language and be adapted to Indonesian culture, since most of the health care workers in our study believed that language and cultural adjustments could make the process of using the application easier.

- The important features for geriatric health applications intended for the general public are elderly health education, caregiver health education, and geriatric health diaries.
- The essential features that must be available in geriatric health applications intended for health care workers are literacy searches (e-book, journals, and guidelines), online courses, and medical calculators, especially for CGAs, polypharmacy, and medical calculators related to common diseases in geriatric patients.
- Better dissemination of geriatric health care and e-health literacy among health care workers as well as in the health profession curricula is crucial to improve the quality of elderly health care.
- It is important to disseminate the ICOPE application issued by the WHO to Indonesian health care workers.

Conclusion

The current health care system has begun to enter the period of using ICT in performing health services. There are needs and opportunities to use cell phones and mobile applications in the elderly health system among Indonesian health care workers. The mobile health system greatly facilitates health care worker tasks in diagnosing, monitoring, and communicating with elderly patients, especially during the COVID-19 pandemic. Nevertheless, only a few Indonesian health care workers were aware of and/or using the geriatric mobile application. It is essential to improve the dissemination of geriatric health care and e-health literacy among them to improve the quality of elderly health care. It is also important to develop mobile applications for geriatric health services. The results of this study can be used as a reference for development so that the application can meet user needs.

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Guarantor: PWL.

ORCID iDs: Anastasia A. Dinakrisma  <https://orcid.org/0000-0001-6486-990X>

Purwita Wijaya Laksmi  <https://orcid.org/0000-0002-5889-7581>

Teofilus Abdiel  <https://orcid.org/0000-0003-2884-3686>

Prasandhya Astagirir Yusuf  <https://orcid.org/0000-0002-4212-0794>

Anindyia Pradipta Susanto  <https://orcid.org/0000-0001-5155-6904>

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