



Original Article

## The Feasibility of Mobile Health Application “Me-Co Care” in Supporting Health Services in the Community

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### ABSTRACT

The purpose of this research was to review the feasibility of the Me-Co Care to be applied in the community setting as well as its effect in increasing participant's knowledge. This study was conducted in Jakarta, Indonesia, from July to November 2019 and used a pre-post-test without a control group design. Ninety-three participants recruited from five community health centres were assigned to use Me-Co Care. A paired t-Test was used to analyse the mean difference of knowledge before and after the intervention, while the feasibility of application was measured based on the percentage the five evaluation domains. The results showed significant improvement of participants' knowledge after the intervention (mean different 1.67, 95% CI 0.00-6.00, p-Value 0.000). Patient, caregiver, health volunteer, and mental health nurse found Me-Co Care a satisfied application to be used in community in terms of content, accuracy, format, easiness, and time-saving (ranged 79%-100%). This study revealed Me-Co Care as a potential application in enhancing the quality of mental health services in Jakarta, Indonesia.

### GRAPHICAL ABSTRACT

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## Introduction

Based on both moral incidence ratios and life years wasted, people with mental health problems are at higher risk of premature mortality, according to the findings of a systematic study. Men and women with a psychiatric illness had a lower overall life expectancy than those without a diagnosis, based on the years of life lost. Data were obtained from patients diagnosed in a hospital, outpatient, or emergent environment who received treatment and did not capture individuals seen by a general practitioner or who did not receive care for a mental health condition. In addition, the researchers noted that due to overestimating the age of mental illness onset, they may have marginally underestimated life years lost. Mental health problems are major public health issues worldwide and account for 8.5% of premature death and also disability [1–4]. The handling of mental health problems is still a challenge for developing countries, especially Indonesia. Around 6.1%-9.8% of Indonesians suffer from mental disorders such as depression, schizophrenia, and other psychological problems [5]. The main reason for lack of treatment for patients with mental health problems was lack of awareness regarding the importance of mental health, the stigma related to mental illness that affected the health-seeking behaviour, lack of appropriate mental health services, and limited of trained mental health professionals [6,7]. Persistent care is the solution for various health problems being currently faced. Hariyati and Sahar [8], in their qualitative research, found that patients expected to receive sustainable health services after undergoing treatment at a hospital through easy and fast communication. In Indonesia, mental nursing services are still conventional without paying attention to the unique geographic characteristics, often hindering services delivery to patients in need. Health services tended to be centred on urban areas that therefore have not been able to meet people's needs in rural areas. These conditions are more severe in rural populations [9],

especially in regions with particularly poor infrastructure and resources for health care delivery in general, with almost no capacity for providing mental health care. A geographical factor was a problem faced in delivering the services in Indonesia. Officers faced complex cases with limited resources and had to work with unique communities. Being unique in this case was in the context of environment, distance, geography, policy, structure, and social contexts. With ever-advancing technologies, the number of electronic health applications is also increasing, including many of those that can be used for mental health [10]. Telehealth is a communication technology-based program aiming at providing health services to isolated communities [11–15]. Telehealth has been widely used as a health care program that can reach all society levels in various developed and developing countries such as the Netherlands, Australia, Britain, America, and others. In Sweden, telenursing services have been applied since 2003 and have been receiving good responses from the public. There are currently 1.300 telenursing services in the country, and it is estimated that more than five million calls go to these services each year [16]. Telehealth provides quick and easy access, transfer, and tracking of health of information and interactive displays and interventions that can allow users to be highly engaged in promoting health outcomes and changing health-related behaviours [17]. The research identified three potential benefits of the app: Providing remote consultation, organizing, and analysing based on providing tutorial support for non-specialized care-givers [18]. In Indonesia, the implementation of Telehealth or Telenursing is considered not optimal yet since the number of health practitioners providing consultation and information to patients is still low.

Utilization of digital technology, for example mobile applications that anyone can access from a smartphone, would reduce the healthcare cost, and also improve the relationship between patients and their families with a healthcare

professional. This could also resolve the geographical barrier and possibly reduce stigma in mental health services [19]. Although many technology-based tools are widely available, most of them are not adapted to local settings, and users have not been consulted to develop tools [20]. Efficacy, satisfaction, and effectiveness are key elements of the usability of technology-based equipment. These factors have to be fulfilled for tools to be tailor-made to meet the needs of users, mainly in mental health fields [21]. Me-CO Care is a special application of community mental health service developed based on the needs and expectation of the patients and also healthcare provider [22] to answer the global challenge of the importance of improving access and quality of cares for patients, families and community. This research aims at reviewing the feasibility of the Me-Co Care application to be applied to health service management in the community.

## Material and methods

The research was carried out at four local health centres (*puskesmas*) in DKI Jakarta, the capital city of Indonesia. The research was conducted from August to December 2020.

### Study design

This was a pre-post-test without a control group study. Participants received training and use the mobile application for a week which allowed us to determine the feasibility of Me-Co Care in supporting mental health services in a community setting.

### Participants

The research focused on three groups, namely patient caregivers, health volunteers, and mental health nurses from each local health centres. In fulfilling their rights, the participants had to meet the inclusion and exclusion criteria. Caregivers of the patients (a) had to be the part or member of the biological family of the patients with a mental disorder, (b) had contact with the patients every day; health volunteers (a) had to live in the neighbourhood, (b) had been trained as health

volunteers; and the mental health nurses (a) were medical nurses, (b) had been registered as a mental nurse in the neighbourhood. All respondents were able to speak (c) Indonesian, (d) read and use cell phones, and (d) they were willing to be participants, and did not have any physical or mental illness.

The samples consisted of 43 caregivers, 46 Health volunteers', and 4 mental nurses selected based on the records from the local health centres. Mental health nurses and researchers were responsible for the selection and deployment processes. All participants who took part in the research were given approval information. Three caregivers of patients left the research without reason, so, there were 43 patient caregivers, 46 Health volunteers and four mental nurses joining this research (Local Health Centre of Koja, North Jakarta, Local Health Centre of Makassar, East Jakarta, Local Health Centre of Bukit Duri, South Jakarta, and Local Health Centre of Tanjung Duren Selatan, West Jakarta).

### Outcome and assessment tools

Participants were assessed at two times point, baseline, and one-week post-treatment. Assessment consisted of one demographic characteristic, mobile application feasibility as a primary outcome, and mental health knowledge as a secondary outcome.

### Demography

Demographic data consisted of age, gender, relationship with the patient, and address. Mental disorder data were obtained from local health centres.

### Primary outcome

The feasibility of the mobile application was measured using the Me-Co Care calculation scale. The research team designed this instrument by referring to the feasibility of the previous mobile application. Some modifications were carried out to find the purpose of this research. This scale consisted of 22 questions-accuracy, format,

easiness of use, timelessness, and satisfaction in using the Me-Co Care application.

#### *Secondary outcome*

The research team developed mental health variable questionnaire through an extensive literature search and expert review. After the calculation, the mean item content validity index (I-CVI) was .79 and in the current study, alpha coefficient showed acceptable internal reliability ( $\alpha = .701$ ) the I-CVI should not be lower than .78 [23]. Consisting of 10 questions, the tool was made to measure the basic knowledge based on mental health knowledge available at the first health setting, signs and symptoms of mental disorders, and how to deal with emergencies. The scores ranged from 0 to 10 of which the highest score was expressed as good knowledge.

#### *Intervention*

The research was divided into three sections, training for patient caregivers, application use practice, and evaluation process. All participants who agreed to participate in this research had filled out the consent information. In the first phase, health volunteers were invited to attend 8-hour training organized within two days by the research team. Subsequently, the research team gave them the knowledge questionnaires before and after the training. In the next two days, all participants, namely, patient caregivers, health volunteers, and mental health nurses, attended the 8-hour training about the Me-Co care application, which was informed in two days. The participants were trained to download, enter data and how to use their cell phones. The application feasibility evaluation process was carried out one week after the use.

#### *Ethical Considerations*

The approval to conduct the research was received from the Independent Review Committee of Universitas Muhammadiyah Jakarta (079/KEPK/UMJ/III/2019). Informed written consent was obtained from all participants and data were collected according to the Declaration

of Helsinki on ethical research. Approval for conducting the project was obtained from all the local health administrations.

#### *Data Analysis*

The descriptive statistics [24,25] were calculated based on the characteristics of the participants and the results of the application feasibility study, of which the measuring of knowledge was analysed using the Dependent T-Test where the data was normally distributed. The data was calculated by approaching and imputing the missing data using the average scores. The results of knowledge were presented as average difference scores and standard deviations with a significance of 0.05. The result of the feasibility study was presented proportionally for each part. Data were analysed using SPSS v.21 for windows (IBM Corp., Armonk, NY).

#### **Result and Dissection**

The average age of the 93 participants analysed was 46.7 years old, with a range of 16 to 80 years old. 93.4% of participants were female health volunteers, and 76% of patients' caregivers were old people.

The application feasibility study consisted of six sections. Referring to the results of the health volunteers, 100 percent showed that they were satisfied with the use of the Me-Co Care application in all respects. 100% of Me-Co Care users got the latest information about mental disorders and how to treat patients. 100% of participants stated the accuracy of the application and the fact that it was relevant to clinical information, 91 percent of them found out that the application was easy to use, 93 percent stated that it had an attractive format, and 93 percent found out that the application was able to save their time in providing mental health services. Referring to the results of the caregivers, 100 percent said that they were satisfied with the Me-Co Care application in all respects. 93% of Me-Co Care users got information relevant to mental health disorders and how to treat patients, 95 percent said that

the application was able to provide accurate information with respect to the clinical situation they perceived; 95 percent found out that the application was easy to use, only 79 percent of them who said that the application had an attractive format, and 97 percent experienced that the application could save their time in providing mental health services. The mental

nurses were very satisfied with this application in all respects.

The data analysis indicated a significant difference in the calculation of knowledge before and after the intervention (the average difference was 1.67, with a confidence level of 95% 0.00-6.00) by showing a correlation between the knowledge before and after giving the intervention 0.000.

**Table 1:** Demographic information for all participants (N=93)

Variables	Sample Description							
	Patient caregivers		Health volunteers'		Mental health nurses		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Age Range	16-80	-	20-80	-	32-44	-	16-80	
Average					39			
Sex								
Male	23	53	3	6.5	1	25		
Female	20	47	43	93.4	3	75		
Relationship with the patient								
Parents	35	76	-	-	-	-		
Sibling	5	12	-	-	-	-		
Family	5	12	-	-	-	-		

**Table 2:** Feasibility of Me-Co Care Application (N=93)

Domain	Patient Caregiver (N=43)		Health volunteers' (N=46)		Mental health nurse (N=4)	
	N	%	N	%	N	%
Content	200/215	93	225/230	97	20/20	100
Accuracy	123/129	95	138/138	100	12/12	100
Format	204/258	79	252/276	91	24/24	100
Easy to use	164/172	95	168/184	91	16/16	100
Saving time	126/129	97	129/138	93	12/12	100
Satisfaction in all respects	43/43	100	46/46	100	4/4	100

**Table 3:** Calculation of the difference in knowledge before and after intervention

Results	Before		After		The difference in value before and after intervention		P value
	Mean (SD)	95%CI	Mean (SD)	95%CI	Mean (SD)	95%CI	
Knowledge on Mental Health	5.63	1.00-7.00	7.3	3.00-10.00	1.67	0.00-6.00	0.000

As shared knowledge, this was the development of the first mental health application that integrates mental nurses, patient caregivers and health volunteers in Indonesia. Me-Co Care was developed to improve the quality of mental health services for the community. Based on this

research, it was transpired that Me-Co Care Application not only gave information to all participants in educating new things, but also connected three important parts with patients suffering from mental disorders.

Due to the limited number of health professional, health volunteers were one of the health drivers in Indonesia. As part of the community, health volunteers directly contacted with individuals wherever and whenever they were. They had collaboration with health care professionals in organizing, monitoring, documenting, and evaluating health programs. This research revealed significant results that the health volunteers greatly influenced the development after joining training on mental health. Based on the previous research, psychoeducation was known to be an important part of developing one's knowledge. A study [17] delved into the effectiveness of health apps for health-related behaviour change. Seventeen studies among 20 showed a positive contribution to the enhancement of health-related behaviours. Therefore, using health apps became an effective strategy to improve users' outcomes along with the high popularity of smartphone use in everyday lives of users. Eighteen studies achieved (80%) retention rates in the intervention group with health apps as the intervention. It can be assumed that the reasons for the high retention rate were the high feasibility and acceptability of app use in users' everyday lives. Health apps could be effectively adopted for users to improve health-related outcomes by managing and supporting health-related behaviours of users [17]. It has been reported [18] health apps evidently increase both knowledge and skills together, and also brings expertise to app users. Health app can effectively lower a person's state anxiety about solving emergency problems [18]. By improving the knowledge of the health volunteers, the quality of health services in the community could improve.

This research also proved that Me-Co Care was an effective and satisfying application based on its accuracy, format, ease of use, and time-saving. Although the scores were not too good, the lowest score obtained from in the evaluation was for the format of the application. Meanwhile, around 21 percent of participants were not interested in the application format. The low rate

of dissatisfaction could be considered as a driving force for development.

Recently, mobile health applications have been rapidly deployed to scale up their existence and provision. Many applications were developed to identify diseases, symptoms, manage health programs, and be used as a means of communication between patients and health care providers. A previous study reported that patients with knowledge deficits or low health literacy are expected to benefit most from health interventions [26]. However, in Indonesia, combining mobile health applications with clinical training was still a challenge since mobile health applications were still limited. Various factors, such as the level of knowledge, cultural differences, and availability for mental health activities influenced the use of mobile applications in social environments. This research proved the importance of mobile health applications, especially Me-Co Care, in supporting mental health services for the community.

Despite the significant results, there were some limitations. First, the research was only conducted in Jakarta, as the capital city of Indonesia, which was an urban area. Second, the research did not evaluate the long-term effectiveness of the Me-Co Care application. Third, the research only used a quasi-experiment without using a control group. In the future, researchers may use an advanced research method in rural areas and evaluate the long-term effectiveness of the Me-Co Care application.

## Conclusion

Mobile Health applications can help improve health care in the community. Me-Co Care is an application that is worth being used in improving the quality of mental health services. This research reveals the potential use of mobile health applications in Indonesia, especially for patients with mental disorders, mental nursing health volunteers, and mental health nurses. The results indicated that the patient, caregiver, health volunteer, and mental health nurse found Me-Co Care was a satisfied application to be used

in community in terms of content, accuracy, format, easiness, and time-saving (ranged 79%-100%). This study revealed Me-Co Care as a potential application in enhancing the quality of mental health services in Jakarta, Indonesia.

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### Authors' contributions

All authors contributed toward data analysis, drafting and revising the paper and agreed to be responsible for all the aspects of this work.

### Conflict of Interest

We have no conflicts of interest to disclose.

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