

# Trend Analysis of the Mobile Health COVID-19 Application As A Preventive Strategy in the Era of COVID-19 Pandemic in Surakarta

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## ABSTRACT

**Background:** Digital technology innovation is believed to increase the effectiveness of the health system's response to epidemics. Some of the potential benefits of mobile Health (mHealth) applications for managing the coronavirus 2019 (COVID-19) pandemic have been explored. This study aimed to determine the trend of using mobile health applications during the COVID-19 pandemic in Surakarta, Central Java.

**Subjects and Method:** This study was descriptive study conducted in Surakarta, Central Java, from February to August 2021. A sample of 184 subjects aged 15 to 64 years was selected in this study. Data were collected using a questionnaire through an online survey. Data were presented in descriptive-analytical form based on the characteristics of gender, age, occupation, and education.

**Results:** The majority of study subjects were women (84.78%), with an average age (Mean= 20.61; SD= 0.12). As many as 55.98% had used the COVID-19 mobile health application. 51.45% were satisfied with the COVID-19 mobile health application service used. As many as 60.19% of the subjects felt it was faster to get information about COVID-19. 73.78% of the study subjects reported the mobile health application could improved knowledge about preventing transmission of COVID-19. As many as 71.84% reported that the application could assist in implementing health protocols.

**Conclusion:** The mobile health COVID-19 application accelerates the dissemination of health information, increases knowledge about preventing transmission of COVID-19 and implementation of health protocols.

**Keywords:** mobile health, COVID-19, application, prevention

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## Cite this as:

Widiyanto A, Atmojo JT, Handayani RT (2021). Trend Analysis of the Mobile Health COVID-19 Application As a Preventive Strategy in the Era of COVID-19 Pandemic in Surakarta. J Health Promot Behav. 06(02): 104-111. <https://doi.org/10.26911/thejhp.2021.06.02.03>.



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## BACKGROUND

Coronavirus Disease 2019 (COVID-19) is an emerging infectious disease that was first identified in China in December 2019. It is caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). On January 30, 2020, the World Health Organization (WHO) declared this disease a Public Health Emergency of International Concern (PHEIC), which then on March 11,

2020, COVID-19 was declared a pandemic. (Gan et al., 2020; WHO, 2020).

Although the SARS-CoV-2 pandemic had a significant impact in terms of quarantine and deaths, the public was becoming more eager to get information about the spread of infection. Their efforts to stay up-to-date with the latest information about COVID-19 involve existing technologies such as watching the national bulletin on television or listening to the news on the

radio. However, most people may not like the idea of waiting for a live broadcast on a fixed schedule. Reading digital news articles and browsing official websites seem to be top choices for tech-savvy individuals. This opens up a golden opportunity for web or mobile medical application developers to create a platform for the public to provide the information they need. With the advancement of software and mobile technology, mobile applications have become an important element in our daily lives (Abd-Alrazaq et al., 2020; Chen et al., 2020; Materia, et al., 2020).

The popularity of mobile technology has led to high and increasing ownership of mobile technology, meaning that interventions can be delivered to many people. In 2009, more than two-thirds of the world's population owned a cell phone and 4.2 trillion text messages were sent. In many high-income countries, the number of mobile phone subscriptions exceeds the population. In low-income countries, mobile communications technology is the fastest growing sector of the communications industry with a high geographic coverage (International Telecommunication Union, 2011; Krishna et al., 2009).

The use of mobile computing and communication technologies in healthcare and public health is a rapidly growing area of e-health. There is considerable enthusiasm for mobile-health interventions and great potential to have a beneficial effect on health and healthcare delivery processes, especially in areas with weak infrastructure (Free et al., 2013).

The mHealth app can play a major role in self-management and home care. Several existing studies have explored variations in the use of mobile phones for problems related to health information and consultation. Several studies have also begun to report the results of feedback or

responses from users of certain applications, most of which indicate that these technological advances have enabled better health care services to the public (Lang et al., 2008; Costa et al., 2012; Lindberg et al., 2013).

Research on surveys on the use of COVID-19 mobile health applications is still rarely carried out in Indonesia. Therefore, this study aims to determine the trend of using COVID-19 mobile health applications in Surakarta.

## SUBJECTS AND METHOD

### 1. Study Design

This was a descriptive study conducted in Surakarta, Central Java, Indonesia.

### 2. Population and Sample

The study subjects were adults of productive age (15 to 64 years). The target population is adults who live in Surakarta.

### 3. Study Variable

The dependent variable is the handling of the COVID-19 pandemic. The independent variable is the COVID-19 mobile health application.

### 4. Operational Definition of Variables

The COVID-19 health mobile application is a health web (mHweb), and medical applications (mHApps) that can be downloaded on the Play store or App Store such as Halodoc, Alodokter, iHealth, MyVitals which are used to access health information and services through devices with internet.

### 5. Instrument

Data collection was carried out using a questionnaire through an online survey.

### 6. Data Analysis

The data will be presented and analyzed in descriptive analytical form based on the characteristics of gender, age, occupation and education.

### 7. Research Design

This research has been approved by the Board of Research Ethics Committee of

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questions about the COVID-19 mobile health application. The demographic characteristics of the sample of respondents consist of gender, age, education and occupation (Table 1).

## RESULTS

### 1. Sample Characteristics

A total of 184 respondents filled out an online questionnaire containing several

**Table 1. Sample Characteristics (dichotomous)**

Characteristics	Category	Frequency	Percentage
Gender	Male	28	15.22
	Female	156	84.78
Education	Senior high school	5	2.7
	Diploma/bachelor	180	97.3
Occupation	Uni student/student	168	91.30
	Health personnel	3	1.63
	Education staff	1	0.54
	Entrepreneur	3	1.63
	Private employee	9	4.89

**Table 2. Sample Characteristics (Continous)**

Variable	Mean	SD	Min.	Max.
Age (year)	20.61	0.12	18	27

### 2. Analysis of Trends in the Use of Mobile Health COVID-19 Applications

Of the total 184 respondents, 55.98% have used the COVID-19 mobile health application. 40.22% of respondents received infor-

mation about the COVID-19 mobile health application from friends or family, 31.52% from advertising services, 4.35% from television, and 23.91% from others consisting of social media, and the workplace (Table 3).

**Table 3. List of questions and the number of answers on the questionnaire**

No	List of Question	Frequency	Percentage
1	Have you ever used the COVID-19 health mobile application?		
	• Yes	103	55.98
	• No	81	44.02
2	How did you find out about the COVID-19 mobile health application?		
	• Advertising services	58	31.52
	• Television	8	4.35
	• Friends, family	74	40.22
	• Etc	45	23.91

Based on the survey results, respondents who answered that they had used the Mobile Health COVID-19 application were 103 respondents, with 16 male respondents and 87 female respondents. Ages ranged

from 18-23 years and consisted of high school graduates amounting to 99 respondents and Diploma/Bachelor graduates amounting to 4 respondents. From 103 respondents, 5 respondents work as private

employees, 94 respondents work as students, 2 respondents work as health work-

ers, 1 respondent is an entrepreneur, and 1 respondent works as an educator (Table 4).

**Table 4. Trends in the use of Mobile Health COVID-19 based on the characteristics of the study sample**

No	Characteristics	Frequency	Percentage
1.	<b>Gender</b>		
	Male	16	15.53
	Female	87	84.47
2.	<b>Age</b>		
	18-23	103	100
3.	<b>Education</b>		
	SHS	99	96.1
	Diploma/ bachelor	4	3.9
4.	<b>Occupation</b>		
	Private Employee	5	4.8
	Univ student/student	94	91.3
	Health Personnel	2	1.9
	Staff Academic	1	1
	Entrepreneur	1	1

**Table 5. List of questions and the number of answers on the questionnaire for respondents who have used the Health COVID-19 mobile application**

No	Question	n (%)	Percentage
1.	Are you satisfied with the COVID-19 mobile health application that you are using?		
	• Yes	53	51.45
	• No	50	48.54
2.	Do you use the COVID-19 health mobile application to get health information more quickly, especially about COVID-19?		
	• Yes	62	60.19
	• No	41	39.81
3.	Does the COVID-19 health mobile application help in implementing health protocols?		
	• Yes	74	71.84
	• No	29	28.15
4.	Can the COVID-19 health mobile application increase knowledge about preventing the spread of COVID-19?		
	• Yes	76	73.78
	• No	27	26.12
5.	Do you think that the COVID-19 mobile health application should always be developed?		
	• Yes	87	84.46
	• No	16	15.53

Of the 103 respondents who have used the COVID-19 mobile health application, 53 respondents said they were satisfied with the application used, while 50 respondents said otherwise. 62 respondents claimed to get health information faster

when using the COVID-19 mobile health application, while 41 respondents said otherwise. A total of 74 respondents answered "yes" to the question "does the COVID-19 mobile health application help in the implementation of health protocols?",

while 29 respondents answered "no". 76 respondents answered "yes" to the question "Can the COVID-19 mobile health application increase knowledge about preventing the spread of COVID-19?", while 27 respondents answered "no". On the question of opinion, namely "Do you think that the COVID-19 mobile health application should always be developed?", 87 respondents answered "yes" and 16 respondents answered "no" (Table 5).

## DISCUSSION

Based on the results of survey data collection that has been carried out on a research sample of 184 respondents, half of them have used the mHealth COVID-19 application. This phenomenon is in line with the statement that mHealth, which promotes the use of wireless technology in healthcare, is one of the fastest growing fields in electronic health (eHealth). Mobile technology is mobile and popular, so nowadays, almost everyone carries their cell phone with them wherever they go. This allows temporal synchronization of the delivery of interventions that claim people's attention when an intervention or information is relevant to their respective situations and conditions (Free et al., 2013).

The majority of respondents in this study are high school graduates and work as students. This is in line with data by Madden et al., (2013) and Madden et al., (2013) that young people are early adopters of new consumer technologies, such as smartphones and applications. Smartphone ownership among young people is indeed on the rise, from 23% in 2011 to 37% in 2012 in the United States, with equal distribution across ethnicities and family incomes. In addition, 58% of all US youth aged 12 to 17 reported having downloaded an app compared to 34% of adults.

The use of health applications certainly helps the public in obtaining health information, especially during the COVID-19 pandemic. This is in line with the statement that the use of mobile devices allows for intervention or interaction with individuals in the context of their daily life moments, which is a form of intervention called ecological momentary intervention (EMI). The most reliable method to use in investigating emotions in the real world is to contact people who are doing their daily activities and ask them to report their thoughts, feelings, and actions at that moment (Killingworth and Gilbert, 2010).

The use of mHealth in the community can also help in implementing health protocols and increase knowledge about preventing transmission or transmission of the COVID-19 virus. There are several policies that have been implemented by each government in the world since the COVID-19 pandemic began. According to Han et al., (2020) and Roy & Ramadoss (2021) worldwide, many countries have adopted different policies to implement classic health care and safety management measures, such as the use of face masks, implementing social distancing, this was all done to curb the spread of COVID-19. The most common national-level health crisis management strategies include imposing lockdowns, bans on out-of-town travel, isolation or quarantine of confirmed positive patients and close contact tracing of positive patients, and bans on gatherings and public transportation.

The development of a COVID-19 mobile health tool (mHealth) to statistically track the progress of COVID-19, monitor potential COVID-19 symptoms, and reduce the social and mental health impact of the COVID-19 pandemic that emerged at the same time as the pandemic (Menni et al., 2020; O'Dowd, 2020). Several COVID-19



applications that have been developed for public health surveillance provide up-to-date statistical information, including the number of new cases, hospitalizations, and confirmed deaths (Menni et al., 2020; O'Dowd, 2020; Soriano et al., 2020). Among applications that enable real-time monitoring of symptoms, trackers and telemedicine systems also help explain the frequency of symptoms associated with COVID-19, enabling patients and health-care providers to respond early to symptom development (Menni et al., 2020; Timmers et al., 2020; Xu et al., 2020; Yap and Xie, 2020). Reviews of contact tracing applications have highlighted their effectiveness in improving reporting of new cases, management and follow-up of COVID-19 cases, and education on transmission prevention behaviors (Altmann et al., 2020; Echeverría et al., 2020; Jonker et al., 2020; Sun et al., 2020; Walrave et al., 2020; Yasaka et al., 2020).

In addition to the classical policies as described above, the government also needs to highlight or pay attention to, and regulate the use of information traffic in cyberspace, this is considered important because according to Kataki et al., (2021) and Khadse et al., (2020) there are several other factors that we should focus on. For example, the imposition of a lockdown or quarantine policy has drastically improved the habit of shopping for food and equipment online. With the increase in home delivery of food, groceries and other products, proper sanitation protocols and minimal contact with delivery people must be strictly regulated by delivery and transportation systems to minimize the risk of further spreading the virus. The Centers for Disease Control and Prevention (CDC) has established appropriate guidelines to minimize these risks.

The conclusion of this study is that the use of the COVID-19 mobile health application can assist the public in obtaining health information, especially about COVID-19 during quarantine implementation, increasing knowledge about preventing COVID-19 transmission, and implementing health protocols.

### FINANCIAL AND SPONSORSHIP

This research was conducted using the Research Grant Fund for Beginner Lecturers of the Ministry of Research and Technology/National Innovation Research Agency for Fiscal Year 2021.

### ACKNOWLEDGMENT

I would like to say thank you to the participants and Mamba'ul 'Ulum School of Health Sciences.

### CONFLICT OF INTEREST

There is no conflict of interest in this study.

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