

## The Utilization of Android-Based Application as a Stunting Prevention E-Counseling Program Innovation during Covid-19 Pandemic

Erlin Friska<sup>1)</sup>, Helen Andriani<sup>2)</sup>

<sup>1)</sup> Masters Program in Public Health, Faculty of Public Health, Universitas Indonesia

<sup>2)</sup> Faculty of Public Health, Universitas Indonesia

### ABSTRACT

**Background:** Stunting in children is one of the most significant barriers to human development, globally affecting approximately 162 million children under 5 years of age. During the Covid-19 pandemic, the development of communication and information media such as smartphones has encouraged the creation of various kinds of application-based health innovations known as mobile health. The purpose of this study was to analyze the utilization of android-based applications as a stunting prevention e-counseling program innovation in the Covid-19 pandemic era.

**Subjects and Method:** This research was a systematic review. The articles were selected from Google Scholar, PubMed, ScienceDirect, and Elsevier. The keywords for this review are: prevention, education, stunting counseling, Covid-19, android-based stunting prevention application, stunting counseling application during the Covid-19 pandemic, application for stunting, android application for stunting. The search process to exclude the articles used for this literature review using the PRISMA method.

**Results:** The results showed that the existence of an Android-based stunting prevention application innovation can make it easier for the public to monitor health, obtain the education, and provide counseling to health workers. This is in line with government policies during the Covid-19 pandemic which urges the public to limit activities.

**Conclusion:** The conclusion of this study is android-based applications are very friendly if used by the wider community because they can access information anytime and anywhere, are more flexible, and affordable.

**Keywords:** android-based applications, stunting, COVID-19

### Correspondence:

Erlin Friska. Faculty of Public Health, Universitas Indonesia. Jl. Margonda Raya, Depok 16424, West Java. Email: erlinfriska03@gmail.com. Mobile: +6282337880585.

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### BACKGROUND

Stunting has become a major health problem for countries in this world, following the points Sustainable Development Goals (SDGs) number 2 that is no hunger. One of the targets defined by the World Health Organization (WHO) is to end all forms of malnutrition, including the achievement of stunting and wasting targets in children

under the age of 5 years. Stunting in children is one of the most significant barriers to human development, globally affecting approximately 162 million children under 5 years of age. Stunting is defined as a condition of failure to thrive in children under five due to chronic malnutrition so that the child is shorter than his age. The projection made by WHO shows that 127

million children under the age of 5 years will experience stunting in 2025 (WHO, 2014). Based on WHO data, the prevalence of stunting in 2020 in children under age 5 years as big as 22%. That data indicates that the target has not been met WHO for the incidence of stunting is below 20%. World Health Statistics 2021 states that stunting cases are concentrated in developing countries. Proportion the incidence of stunting in the world, 25% occurs in low-income countries, 59% lower-middle-income, 14% upper-middle-income, and 2% in high-income countries (WHO, 2021). The period of the first 1000 days of life (1000 HPK) is a critical node as the beginning of stunting growth, which will have long-term and repeated impacts in the life cycle. The direct cause of stunting is malnutrition, especially in toddlers which has a short-term impact on increasing morbidity. If this problem is chronic, it will affect cognitive function, namely a low level of intelligence, and have an impact on the quality of human resources. In repeated conditions (in the life cycle), children who experience malnutrition in early life (1000 HPK period) have a risk of non-communicable diseases in adulthood (Black et al., 2008).

Based on data Basic Health Research (Riskesdas) stunting prevalence in Indonesia from 2010 and 2013 there was an increase, from 35.6% to 37.2%, while in 2018 the prevalence fell Becomes 30.8% (Kemenkes RI, 2010, 2013, 2018). However, this figure still exceeds the target set by WHO that is below 20%. In the 2019-2024 RPJMN, Indonesia has a stunting rate target of 14% in 2024. The target to be achieved is to improve the health status and nutritional status of the community through health efforts and community empowerment supported by financial protection and equitable distribution of health services.(Kemenkes RI, 2018).

During the Covid-19 pandemic, it is estimated that the number of stunted children in Indonesia will increase. This is because the COVID-19 pandemic has an impact on the decline in the economic level of the community which is marked by the number of parents who have lost their jobs, it will be more difficult to meet the nutritional needs of the family. The decrease in Gross Domestic Product (GDP) globally every one percent results in an increase in the number of stunting children by 0.7 million worldwide. The current government is seriously solving the stunting problem by forming an Acceleration Team Decrease Prevention of Dwarfs. The management of stunting cases focuses on prevention, no longer a treatment process (Kementarian Kesehatan RI, 2020).

Prevention of stunting can be done from the time of pregnancy. The main key is to increase the nutritional intake of pregnant women by eating nutritious foods. Iron and folic acid are an important combination of nutrients that must be met during pregnancy to prevent stunting at the time the child is born. The way that can be done to prevent stunting is to emphasize the importance of proper nutrition for pregnant women so that they can meet the needs of micronutrients, including iron and vitamin D (Martini et al., 2018). In addition, counseling activities increase the knowledge and behavior of mothers. Providing education and counseling to parents about nutrition helps children to get better nutrition. The results of the research by Darwati et al. (2016) showed the influence of the feeding rules counseling intervention on the nutritional status of children (Darwati et al., 2016).

One of the government's efforts to protect Maternal and Child Health nationally by making a breakthrough book on Maternal and Child Health (KIA). The

KIA handbook contains records of maternal health during pregnancy, childbirth, and the postpartum period, as well as various important information and notes on how to maintain and care for the health of mothers and children. The KIA book is important to be understood by mothers, husbands, and other family members, while the role of health workers and cadres is to explain the contents of the MCH handbook to mothers and families and ask them to apply it (Rianti, Triwinarto and Lukman, 2020b). Based on the Riskesdas survey 2013 shows that 80.8% of pregnant women have KIA books, but those who use at least the KIA book are only 40.4%. Therefore, better and more practical monitoring is needed by health workers.

Due to the COVID-19 pandemic, the method of providing education is carried out online. The development of communication and information media such as smartphones has encouraged the creation of various kinds of application-based health innovations known as mobile health, the development of health applications using smartphones is a form of innovation in the health world to provide services to the community and reduce the burden ratio between demand for health services and availability health workers (Sama et al., 2014).

Mobile health provides health services anytime and anywhere without having to worry about geography and time (Silva et al., 2015). A dynamic relationship between health workers and the community can be formed through the availability of these health applications, and can potentially improve health quality and outcomes (Sama et al., 2014). The mobile health system that has mobility functions will have a strong impact on monitoring efforts, early warning, health administration, medical records, health diagnosis and examination,

treatment, information systems, and health promotion (Silva et al., 2015). The electronic application of Community-Based Nutrition Recording and Reporting (e-PPGBM) is a module used to record target individual data which is equipped with names and addresses sourced from Integrated Health-care Center. Research conducted by Meidiawani et al. (2021) stated that the e-PPGBM application information system has not played much of a role because it has not produced accurate and timely data or information. As of December 2019, data entry for toddlers in the e-PPGBM application in Palembang City has only reached 57.9%. This has an impact on incomplete information on nutritional status, causing inaccuracies in identifying nutritional problems and resulting in the formulation of incorrect policies in dealing with nutritional problems in Indonesia. The city of Palembang in particular and in Indonesian in general (Meidiawani et al., 2021).

The movement of the mobile health system has been widely developed and has become a director in the transformation of the delivery of the health system. Various applications are used to monitor child development, one of which is WHO Anthro, but this application does not provide information on monitoring child development. This information is very important and can be used by parents to find out whether their child is growing and developing according to their age or not (Amaliah, 2018). Based on previous research, android-based applications Growth Stimulation can improve the status of mother's knowledge about monitoring the nutritional status of toddlers, but no research has been found regarding the effect of stunting prevention on mother's knowledge and nutritional status of toddlers. Meanwhile, Rufaindah and Paternah's Research (2021) states that the use of applications in

smartphones has not been able to help change nutritional status statistically, the study was only carried out for 4 weeks so that the change in nutritional status produced in the study was only 2.6% (Rufindah, 2021).

To support the reduction in the prevalence of stunting, adequate efforts are needed in the aspect of prevention, one of which is by providing education, counseling, and early detection of risk groups. This study will examine the literature from various sources to identify the use of android-based applications designed for the prevention and treatment of stunting risk factors.

## SUBJECTS AND METHOD

### 1. Study Design

The design of this study is a systematic review. This research was conducted in February-June 2021.

### 2. Inclusion Criteria

The articles were selected from Google Scholar, PubMed, ScienceDirect, and Elsevier. The keywords for this review are: prevention, education, stunting counseling, Covid-19, android-based stunting prevention application, stunting counseling application during the Covid-19 pandemic, application for stunting, android application for stunting. The inclusion criteria in this research articles are: 1) The research article was published in 2018-2021 2) The type of research design in the article is experimental. 3) The research study discusses the use of android applications in the prevention and treatment of stunting 4) The research study is carried out in Indonesia, including articles that use English 5) There is the respondent in research articles.

### 3. Exclusion Criteria

Exclusion criteria in this study is articles that published before 2018.

### 4. Operational Definition of Variables

In formulating research problems here using PICO. Population is mother who used the android-based application for stunting. The intervention was using the android-based application for stunting with comparison of the features available in each application. The outcome was the utilization of android-based application for stunting.

**Stunting** was a condition of failure to thrive in children under five due to chronic malnutrition so that the child is shorter than his age

**Android-based application** was application used for the prevention and treatment of stunting that can be accessed via android or smartphone.

**Utilization** was the benefits that can be obtained from using the application.

### 5. Study Instrument

Quality assessment on articles using the Critical Appraisal Skills Program (CASP) for A Systematic Review of 3 selected articles (CASP, 2020).

### 6. Data Analysis

The articles selected using Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) method which is carried out systematically by following the correct stages or research protocols. The procedure of this systematic review consists of several steps, namely 1) preparing the Background and Purpose; 2) Research Questions; 3) Searching for the literature; 4) Selection Criteria; 5) Practical Screen; 6) Quality Checklist and Procedures; 6) Data Extraction Strategy; 7) Data Synthesis Strategy.

## RESULTS

The population in the study were all articles published in national, international journals and gray literature that had topics on android-based stunting prevention and treatment applications. The sample in this

study is articles published in national, international, and gray literature on the topic of android-based stunting prevention and handling applications that meet the inclusion criteria.

Based on the results of the search for articles using the keywords above, there were 22 articles found in national journals and 40 articles in international journals. After reviewing the abstracts of the 59 selected articles, 27 were excluded because the study was not conducted in Indonesia, and 21 articles were included for the next step which was a full-text review. Searching for the full text of the 32 selected articles, 29 articles were excluded because they did not meet the inclusion criteria. A total of 3 selected articles were included for analysis.

From the 3 research articles above, they have shown their feasibility for a inclusion criteria. A total of 3 selected articles were included for analysis.

### **1. Application to Prevent Child Born Stunting (ACALS)**

ACALS consists of 2 types, namely one application for pregnant women as assistance for mothers during pregnancy, especially for obediently taking iron tablet. This application design for pregnant women has 10 application structures/features. One other application is for health workers/midwives who are used to monitor, evaluate, and intervene in the health conditions of pregnant women and adherence to ANC, this application design for health workers has 13 application structures (Riyanti, 2005, 2019).

Based on research conducted in the Puskesmas Jonggol District, Bogor, West Java. The results obtained from 71 pregnant women, showed that there was a significant difference in the knowledge and behavior of pregnant women after being given assisted in the Application for Preventing Birth Stunting ( $p= 0.001$ ). In addition, the know-

ledge score of pregnant women after the trial was greater (18.65) compared to the delta of knowledge of pregnant women before after the test (17.79) with a difference of 0.86. The attitude score after the trial was greater (18.56) compared to the delta of the attitude score before after the test (17.85) with a difference of 0.71. And the behavioral score after the trial was greater (18.85) compared to the behavioral delta before after the test (18.14) with a score difference of 0.71 (Riyanti, 2005, 2017).

### **2. Application for Friends of Pregnant Women (ASIH)**

The Friends of Pregnant Women (ASIH) application is an application that is used to improve the quality of antenatal care in rural areas. The sample in this study were 61 village midwives and pregnant women in West Bandung Regency. Analysis of the increase in satisfaction of pregnant women in the two groups was carried out by comparing the average logit person pre and post-test scores. There was a significant difference in the score of increasing satisfaction in the control and treatment groups ( $p < 0.001$ ). The application of companions for pregnant women (ASIH) plays a role in increasing midwife compliance with antenatal care standards by 47.2% and pregnant women's satisfaction by 43.8%. The proportion of antenatal care with good quality in the treatment group was 84% and in the control group 37% (Farhati et al., 2018).

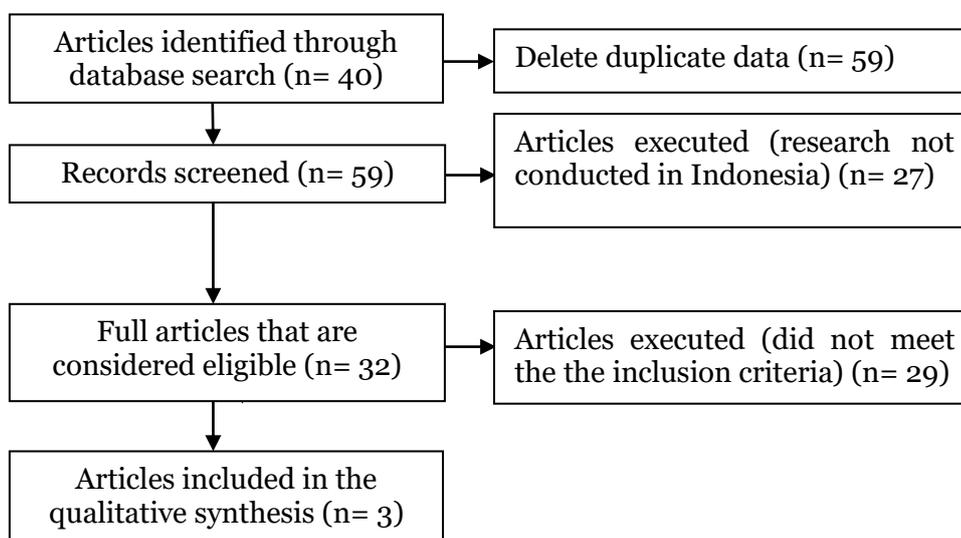
### **3. Stunting Prevention App**

This application contains information on preventing stunting during pregnancy, during delivery, providing exclusive breastfeeding (in infants 0-6 months), complementary feeding mixed with breast milk until infant are 2 years old, providing immunizations, monitoring growth and development regularly, clean, and healthy lifestyle. This application is made by

researchers and technology experts, with material content that has been adapted to the journal. With this application, it is hoped that mothers can access information on how to prevent stunting from pregnancy until the baby is two years old. The information contained in the application uses easy-to-understand language and attractive visualizations.

The study was conducted on 38 mothers of children aged 0-36 months in Mojolangu Village, Malang City. Based on

the results of the study, it was found that the knowledge of respondents before getting the application of stunting prevention applications had the best knowledge, namely 21 respondents (55.3%) and after getting the application of stunting prevention applications the most knowledgeable were 35 respondents (92.1%). There is a difference in knowledge before using the application and after using the application (Rufindah, 2021).



**Figure 1. PRISMA flow diagram**

## DISCUSSION

The development of technology is now increasingly widespread and growing rapidly so that it helps many people to enjoy the various conveniences that have been produced by this technology. One aspect of mobile technology is smartphone devices (smartphones). Smartphone technology that is becoming a trend today is the existence of an Android-based operating system, so it is considered to be able to provide many conveniences and benefits for its users (Amaliah, 2018; Izah et al, 2018).

Based on analysis three of the article that was done, nowadays the use of technology is very helpful in the implementation

of health promotion and prevention programs. One of them is the problem of stunting. The existence of an Android-based stunting prevention application innovation can make it easier for the public to monitor health, obtain the education, and provide counseling to health workers. In addition, health workers can also monitor the health of the mother and remind the examination more easily. This is in line with government policies during the COVID-19 pandemic which urges the public to limit activities.

From the three type of the application being analyzed, ACALS is more comprehensive because it has two types (for

pregnant women and health workers). Each application is also equipped with complete features ranging from assistance to inspection (Rianti et al., 2020a). From the results of data collection, most (60%) pregnant women feel that the Preventing Childbirth Stunting Application is very easy to use and the application is very helpful for reminding to take blood-added tablets, reminding time to check pregnancy and a lot of knowledge that can be obtained in the application and in line with the government's recommendation that one solution to stunting prevention is online services such as the use of books health of both mother and child (KIA) as a guide, telecommunications and online mother class for pregnant women.

ACALS can be used by the general public and can be accessed free of charge. Meanwhile, the Pregnant Mother's Companion Application (ASIH) is only designed for antenatal services in rural areas. However, ASIH is very influential in the compliance of antenatal care by pregnant women and health workers. Stunting prevention applications are more focused on providing education on how to prevent stunting during pregnancy, during delivery, exclusive breastfeeding, and child care patterns until the age of 2 years. However, each application is made by adjusting the problems that exist in the region so that it can reduce the stunting burden in the region, considering that many factors that can cause stunting.

In handling and preventing stunting as a form of cross-sectoral collaboration, the government launched different applications from three ministries, namely 1) Electronic Community Based Nutrition Recording and Reporting (e-PPGBM) application from the Ministry of Health, 2) Healthy Child Application from the Ministry of Communication and Informa-

tion Technology, and 3) e-Human Development Worker (e-HDW) application from the Ministry of Villages, Development of Disadvantaged Regions and Transmigration. The results of research on the use of the e-PPGBM application show that there is a relationship between system quality and application user satisfaction. The strengths of this application include the ease of learning the system, while the weaknesses are long waiting times (response time), difficulty to access during working hours / when many officers access the application (Meidiawani et al., 2021). However, research on the evaluation of the Healthy Children Application and the e-HDW Application was not found.

Each country has its own strategy in dealing with stunting cases. Handling cases of stunting and child mortality in India using The Lives Saved Tool (LiST). It has been used to estimate the impact of scaling up intervention coverage on undernutrition and mortality at national and subnational levels. LiST provided national projections close to. Further refinements to the LiST for subnational use would improve the usefulness of the tool (Alderman et al., 2019).

In addition, Singh et al. (2018) also has an application that is used to reduce child mortality with quality care, it is Integrated Child Health Record cloud (iCHRcloud). This application is based on HL7 protocol enabling integration with the hospital's HIS/EMR system. It provides Java based web portal for doctors and mobile application for parents, enhancing doctor-parent engagement. iCHRcloud has also been recognized as one of the best innovative solution in three nationwide challenges, 2016 in India. It also offers sustainable solution to reduce child mortality (Singh et al., 2018).

The results of a systematic review by Chaudhry et al. (2016) on the impact of

health information technology on the quality, efficiency, and cost of medical care also conclude that health information technology can improve the quality and efficiency of health services. Three major benefits to the quality shown are increased adherence to treatment guidelines or guidelines, optimization of supervision and monitoring, and reduction of errors in treatment procedures. The main domain of improvement is preventive health efforts (Chaudhry, 2016).

This study concludes that there are various applications created as innovations and strategies in the prevention and handling of stunting during the COVID-19 pandemic, including ACALS, ASIH, and Stunting Prevention. Each application was created by adjusting the problems found in the field so that it was able to reduce the stunting burden in certain areas. Android-based applications are very friendly if used by the wider community because they can access information anytime and anywhere, are more flexible, and affordable. The use of android-based applications for the prevention and treatment of stunting is following the government's recommendation that public health services, especially maternal, be carried out online such as the use of KIA books as a guide, telecommunications, and online mother classes for pregnant women. This study only discusses the use of stunting prevention applications overall which has been used in society. The use of android-based applications is very helpful for parents in caring for and nurturing children. Therefore, it is necessary to research with longer time-related influence app usage stunting prevention to changes in the nutritional status of toddlers so that it can be seen its activities in preventing and reducing stunting.

#### **AUTHOR CONTRIBUTION**

Erlin Friska and Helen Andriani collected and examined the articles, the wrote the systematic review, with about equal contribution.

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This study is self-funded.

#### **CONFLICT OF INTEREST**

There is no conflict of interest in this study.

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