The "Ibu Pintar Stunting" Application to Enhance Maternal Knowledge with Children Under Five

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Abstract

Various efforts need to be made to prevent stunting, one of which is by increasing maternal knowledge about stunting and its prevention. Education can be provided using various media, one of which is an Android-based application. This study aimed to determine the effect of education using the "Ibu Pintar Stunting" application on the knowledge of mothers with under five children about stunting. This study employed a quasi-experimental design with a pretest-posttest control group design. The sample for this study comprised 60 people, with 30 in the intervention group and 30 in the control group. Samples were selected using a purposive sampling method. The intervention provided was education using the "Ibu Pintar Stunting" application. The instrument used was a questionnaire knowledge about stunting. Data analysis employed the Wilcoxon and Mann-Whitney tests. The results showed that there was a significant difference on the knowledge of mothers about stunting between intervention and control group with a p-value of 0.001. It can be concluded that education using an Android-based application is effective in increasing the knowledge of mothers of underfive about stunting. Android applications can be used as an educational media to increase mothers' knowledge.

Keywords: *Android-based application; mothers with under five children; knowledge; stunting*

Abstrak

Berbagai upaya perlu dilakukan untuk pencegahan stunting, salah satunya dengan meningkatkan pengetahuan ibu tentang stunting dan pencegahannya. Edukasi dapat diberikan dengan menggunakan berbagai media, salah satunya melalui aplikasi berbasis android pada telepon seluler. Penelitian ini bertujuan untuk mengetahui pengaruh edukasi menggunakan Aplikasi "Ibu Pintar Stunting" terhadap pengetahuan ibu balita tentang stunting. Metode penelitian ini menggunakan desain *quasi experimental* dengan *pretest posttest with control group design*. Sampel yang digunakan pada penelitian ini sejumlah 60 orang yang terdiri dari 30 kelompok intervensi dan 30 kelompok kontrol. Sampel diambil dengan metode purposive sampling. Intervensi yang diberikan adalah edukasi dengan menggunakan aplikasi "Ibu Pintar Stunting". Instrumen yang digunakan adalah kuesioner pengetahuan tentang stunting. Analisis data yang digunakan pada penelitian ini adalah uji Wilcoxon dan Mann Whitney. Hasil penelitian menunjukkan bahwa terdapat perbedaan yang bermakna pengetahuan ibu tentang stunting antara kelompok intervensi dan kontrol dengan nilai p value: 0,001. Dapat disimpulkan bahwa edukasi menggunakan aplikasi android efektif untuk meningkatkan pengetahuan ibu balita tentang stunting. Aplikasi android dapat digunakan sebagai salah satu media edukasi untuk meningkatkan pengetahuan ibu.

Kata kunci: Aplikasi berbasis android, ibu balita, pengetahuan, stunting

INTRODUCTION

Stunting is a condition where a toddler has less height compared to their age. The number of stunted toddlers in the world in 2022 was projected to be 148.1 million or 22.3% (UNICEF,WHO, 2023). Indonesia is one of the countries with the highest malnutrition rates globally, with 1 in 10 toddlers being wasted (thin), and 3 in 10 toddlers experiencing stunting (UNICEF Indonesia, 2022). Stunting prevention remained a priority in 2022, emphasizing the need to understand its causes and the various efforts that can be taken to prevent it.

Stunting can be caused by various factors, and one of the factors linked to its incidence is the mother's level of education and knowledge (Kiik & Nuwa, 2021; Aghadiati et al., 2023). Good maternal knowledge about breast milk, the practice of providing complementary foods alongside breast milk, and child growth can play a crucial role in preventing stunting. However, the majority of mothers exhibit a medium level of knowledge about stunting (Rahayu et al., 2021). Another study indicates that more than half of the respondents, mothers of toddlers, lack sufficient knowledge about stunting (Putri et al., 2021). Mothers with stunted toddlers tend to possess a lower level of knowledge compared to mothers with normal toddlers (Sari, 2021). Nurses can enhance maternal knowledge through promotional and educational activities focused on preventing and treating stunting in toddlers. Educational interventions can be implemented using various types of media.

Maternal knowledge about stunting needs to be increased as a preventive effort. The use of cellphones is now widespread, functioning not only as a means of telecommunications but also capable of performing various tasks. Smartphones can positively influence changes in health behavior for the better (Bert et al., 2014). Mobile applications are effective tools for increasing knowledge and skills, and both online/offline and Android/iOS-based applications are equally effective in enhancing knowledge (Chandran et al., 2022). Education about stunting through the development of an Android-based application is expected to be one of the efforts to prevent stunting by leveraging technology.

Several previous studies regarding applications related to stunting have been conducted. These applications were designed to enhance cadres' knowledge about early detection and prevention of stunting (Fitriani et al., 2022; Utario & Sutriyanti, 2020). In this study, researchers modified the stunting education application to be provided to mothers of babies and toddlers, covering stunting, early detection, and prevention. An additional menu for monitoring child development in this application to address the necessity arising from the association between stunting and developmental disorders in children. This study aimed to determine the effect of education using the *"Ibu Pintar Stunting"* (Smart Mother on Stunting) application on the knowledge of mothers of underfive children about stunting.

METHODS

This study employed a quasi-experimental design with a pretest-posttest control group

design. The population in this study comprised all mothers with under five children in the working area of the Perumnas Community Health Center, Rejang Lebong, Bengkulu Province. This study was conducted in August and September 2023. The sampling technique employed purposive sampling of 60 mothers with under five children. Inclusion criteria for this study encompassed mothers with children aged 0-60 months, mothers have proficiency in reading and writing, ownership of an Android cellphone, and a willingness to participate as respondents. Meanwhile, exclusion criteria for this study encompassed mothers who did not complete the research process from start to finish, for example because the mother refuses to continue her participation in the research.

The research began with a pre-test to assess the knowledge level of mothers of babies and toddlers, employing a questionnaire. Subsequently, respondents received an educational intervention using the *"Ibu Pintar Stunting"* Android-based application. The development of the material in this application were assisted by experts in the field of child nursing who helped to validate the content in this application. There was also the involvement of information technology experts in this study. Mothers trained on how to use the application. This application was downloaded initially and could be used offline. Researchers designed this application by modifying a previous one from own researcher, incorporating education on stunting, covering the definition, causes, impacts, and prevention of stunting. Additionally, the application includes a nutritional status check menu to determine whether the child's status falls within the normal or stunting category. It is also equipped with a menu to check the child's development, providing guidance on age-appropriate developmental stimulation. Following the intervention, a post-test was conducted to assess the knowledge level of mothers of underfive children. The implementation time from start to finish was 60 minutes. In the control group, respondents received standard education through leaflets covering the definition, causes, impacts and prevention of stunting. Pre-test and post-test assessments were conducted to evaluate maternal knowledge. The education in the control group was provided individually through home visits.

Data collection employed a questionnaire, consisting of questionnaire A for demography data and questionnaire B for knowledge about stunting. The questionnaire on knowledge about stunting comprised 15 statement items with answer choices of yes or no. In collecting data, researchers were assisted by research assistants with shared perceptions in data collection and education using the *"Ibu Pintar Stunting"* application. Data in this study were analyzed employing univariate analysis to determine respondent characteristics. Bivariate analysis utilizing the Wilcoxon to examine pre and post data within one group and Mann-Whitney tests to examine data between intervention and control groups to determine the effect of education using the *"Ibu Pintar Stunting"* application on the knowledge of mothers of underfive children about stunting . This study received approval from the Research Ethics Committee of Poltekkes Kemenkes Bengkulu with No. KEPK/340/07/2022. Researchers adhered to research ethics, including obtaining informed consent with providing an explanation of the research to

be carried out and asking respondents to sign the consent form if they are willing, guaranteeing respondent confidentiality, maintaining comfort, providing benefits, and ensuring fairness. After the research was completed, the control group was also given the same application as the intervention group.

RESULTS

Respondent characteristics in this study include age, education, income, child's gender, and child's age. Respondent characteristics are described in the following table:

Table 1. Respondent Characteristics

Characteristic Variables	Group			
	Intervention (n=30)		Control (n=30)	
	n	%	n	%
Age				
Age 17-25 years old	6	20.0	8	26.7
Age 26-35 years old	21	70.0	16	53.3
Age 36-45 years old	3	10.0	6	20.0
Maternal education				
Elementary education	4	13.3	2	6,7
Secondary education	25	83.3	21	70.0
Tertiary education	1	3.3	7	23.3
Maternal employement status				
Working	6	20	2	6,7
Not working	24	80	28	93.3
Income				
< 1 million	4	13.3	3	10.0
1-3 million	26	86.7	24	80.0
> 3 million	0	0	3	10.0
Child's gender				
Male	13	43.3	8	26.7
Female	17	56.7	22	73.3
Child's age				
Under 2 years old	11	36.7	14	46.7
Over 2 years old	19	63.3	16	53.3

Based on Table 1, it is evident that the majority of respondents in the intervention group are aged 26-35 years (70.0%). Furthermore, a significant portion of mothers in this group have a secondary school education (83.3%), do not work (80%), have a family income between 1 to 3 million Rupiah (86.7%), have female children (56.7%), and have children aged over 2 years (63.3%). Similarly, the majority of respondents in the control group are aged 26-35 years (53.3%). Additionally, a significant portion of mothers in this group have a secondary school education

(70.0%), do not work (93.3%), have a family income between 1 to 3 million Rupiah (80.0%), have female children (73.3%), and have children aged over 2 years (53.3%).

Bivariate analysis was conducted to determine the relationship between two variables. A normality test was applied to the data on knowledge about stunting. The results that data are not normally distributed. The analysis of knowledge about stunting involved the utilization of the Wilcoxon and Mann-Whitney tests, with the results presented in the following table.

Table. 2 Difference in Mean Scores of Respondent Knowledge in Pre and Post-Tests

	Median (Minimum-Maximum)	**p-value**
Intervention Group		
Pre	66.6 (33.3-93.3)	0.001*
Post	93.3 (80.0-100.0)	
Control Group		
Pre	66.0 (33.3-86.6)	0.001*
Post	86.6 (53.3-100.0)	

*Wilcoxon test

Based on Table 2, it is evident that the mother's knowledge score about stunting in the intervention group, before the intervention, was 66.0, and after the *"Ibu Pintar Stunting"* application intervention, it increased to 93.3. Regarding the mother's knowledge score about stunting in the control group, before standard education, it was 66.0, and after, it was 86.6. A Wilcoxon signed-rank test showed that there is a significant difference in the mean score of mothers' knowledge about stunting in the intervention group before and after being given the intervention using the *"Ibu Pintar Stunting"* application (p=0.001). Similarly, there is a significant difference in the mean score of mothers' knowledge about stunting in the control group before and after being given standard education (p=0.001).

Table 3. Differences in Mean Scores of Respondent Knowledge in the Intervention and Control Groups

	Median (Minimum-Maximum)	**p-value**
Intervention Group	93.3(80.0-100.0)	0.001*
Control Group	86.6(53.3-100.0)	

* Mann-Whitney Test

Based on Table 3, it is evident that there was a significant difference in the mean scores of mothers' knowledge about stunting in the intervention and control groups (p=0.001). Statistically, this indicates a substantial difference in mothers' knowledge about stunting when using an Android-based application compared to standard education. This implies that an educational intervention

using the *"Ibu Pintar Stunting"* application significantly affects the knowledge of mothers of babies and toddlers about stunting.

DISCUSSION

One of the causes of stunting is maternal factors, particularly the lack of nutrition during pre-conception, pregnancy, and breastfeeding, which are the primary contributors to stunting in Indonesia (Beal et al., 2018). This indicates a deficiency in mothers' knowledge, especially regarding nutrition. Previous studies have identified that maternal knowledge significantly affects stunting (Novianti Utami et al., 2022). Given the importance of maternal knowledge in preventing stunting, efforts should be made to enhance mothers' understanding of stunting and its prevention.

The results of this study indicate that after receiving education through an Android-based application, namely the "Ibu Pintar Stunting," in the intervention group, there is a significant difference in the average knowledge of mothers of babies and toddlers about stunting before and after the intervention. This aligns with several previous studies on the use of smartphones as an educational medium. Smartphone-based applications about breastfeeding, for example, have been shown to increase mothers' knowledge and attitudes about breastfeeding, significantly affecting breastfeeding self-efficacy (Seyyedi et al., 2021). Another study demonstrates the effectiveness of smartphone applications, both simple and gamified, in increasing oral health knowledge and practices in mothers of preschool children (Zolfaghari et al., 2021). Besides increasing knowledge, Android applications can also improve skills (Khoirini & Misniarti, 2022). A mobile health app may improve maternal and child health knowledge and practices about pregnant women (Musiimenta et al., 2022). Android applications have been widely used as health education tools, offering various benefits.

In the control group, the results showed a significant difference in the average knowledge of mothers of babies and toddlers about stunting before and after standard education. In this study, standard education was provided using leaflets. Providing health education has proven effective in increasing maternal knowledge and raising awareness in disease prevention (Tunny et al., 2020). This study aligns with previous studies that identify the effect of health education on the mother's level of knowledge about parenting patterns for toddlers in preventing stunting (Achjar et al., 2023). Health education intervention among adolescents have significantly improved their knowledge, attitudes and practices (Shapu et al., 2020). Health education about stunting needs to be conducted to increase mothers' knowledge about stunting (Utario & Sutriyanti, 2023). By enhancing mothers' knowledge about stunting, effective stunting prevention measures can be implemented.

The study identified a significant difference in mothers' knowledge about stunting using an Android-based application compared to standard education. This aligns with previous studies indicating that the use of mobile phones in health education can increase mothers' knowledge and attitudes in caring for children with pneumonia (Saudi et al.,

2020). The Smartphone-Based Health Applications has a good performance in Increasing Knowledge About Preconception Care (Fibrila et al., 2022). In this study, the post-test score in the intervention group was higher than the post-test score in the control group, despite there being more mothers with a high level of education in the control group compared to the intervention group. Mothers appear more enthusiastic when using the application on their cellphones, because accessibility and content delivery that made a difference. This application can also be used offline and opened repeatedly if the mother does not understand stunting.

Knowledge about stunting is the initial stage that determines behavior change regarding stunting prevention. Education about stunting detection can significantly increase mothers' knowledge about preventing stunting in children, making regular education crucial for optimal stunting prevention (Rahayu et al., 2021). Smartphones are effective in providing education about complementary feeding (MPASI) to mothers, helping reduce the problem of malnutrition in children (Seyyedi et al., 2020). Education via cellphones, combined with providing unconditional cash assistance, is effective in reducing malnutrition in children (Huda et al., 2020). Adequate infrastructure support is necessary for the use of mobile health in combating malnutrition (Seyyedi et al., 2019). Smartphones offer an easy way to access various applications regardless of time or location (Kang et al., 2020). Education using smartphones must continue to be developed along with technological advances to improve public health status, especially in preventing stunting. The limitation of this study, there was bias because randomization was not carried out when determining respondents.

CONCLUSION

The *"Ibu Pintar Stunting"* (Smart Mother on Stunting) application is designed to enhance mothers' knowledge regarding both the early detection and prevention of stunting. The results of this study demonstrate a significant effect on maternal knowledge about stunting through the use of an Android-based application. This application proves to be valuable for all mothers, particularly those with under five children, in comprehending stunting and its prevention. The education facilitated by the *"Ibu Pintar Stunting"* application can be extensively utilized to increase knowledge. Health practitioners can implement the use of the "Ibu Pintar Stunting" application in their programs. Further studies should explore education using smartphone applications, such as creating audio-visual videos or enhancing existing applications with consultation services. Future research that could be conducted a longitudinal studies to assess the long-term impact of the application on maternal knowledge and child health outcomes.

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