The use of Manajemen Nutrisi Balita Stunting (MNBS) Smartphone Application to Increase the Growth of Stunting Children

by Ika Arum Dewi Satit Kurniawan Erman Wicaksono

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The use of Manajemen Nutrisi Balita Stunting (MNBS) Smartphone Application to Increase the Growth of Stunting Children

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Abstract

Introduction: Stunting is a condition that describes a malnutrition status whose prevalence is still high and has not met the reduction target, one of which is in Kabupaten Malang. Manajemen Nutrisi Balita Stunting (MNBS) is an innovation in providing specific nutrition interventions that have been developed into a form of smartphone application that can be used as a medium to prevent stunting problems. This study aims to analyze the effect of Manajemen Nutrisi Balita Stunting (MNBS) to increase the growth of children under age five with stunting condition.

Methods: This study used a pre-experimental research design with a one group pretest/posttest design approach. This research was conducted in the working area of Puskemas Kabupaten Malang. The population of this study were parents with stunting children. The sampling technique used was a total sampling of 20 respondents. The inclusion criteria of this study include parents who have stunting children, parents have a smartphone, and parents are willing to take part in the research until complete.

Results: The results showed that there was a significant change of children growth with stunting based on the increase in weight and height of children with stunting after the intervention using the Manajemen Nutrlisi Balita Stunting (MNBS) smartphone application with p value <0.000, and p value> 0.05.

Conclusion: There is an effect of the Manajemen Nutrisi Balita Stunting (MNBS) smartphone application on the growth of under-five children with stunting.

INTRODUCTION

Stunting is a condition that describes chronic undernutrition status during the early stages of growth and development. The data of Pusat Status Gizi (PSG) for the last three years shows that stunting has the highest prevalence compared to other nutritional problems such as malnutrition, underweight and obesity (Kementerian Kesehatan Badan Penelitian dan Pengembangan, 2018). The results of basic health research conducted by the Indonesian Ministry of Health, Research and Development Agency (2018) stated that the prevalence of stunting under five has decreased by 3.1%, but this decline continues to be targeted until 2024 to be 19% (Direktorat Jendral kesehatan, 2018).

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Kabupaten Malang is included in 100 districts / cities which are priority interventions for toddler stunting (Supariasa and Purwaningsih, 2019). The prevalence of stunting in Kabupaten Malang in 2018 was 30,323 out of a total of 154,188 children under age five in Kabupaten Malang. The incidence of children under age five with stunting in Kabupaten Malang is spread across 10 districts, one of which is Dampit District in Malang Regency. The results of the survey in Kecamatan Dampit showed there were 20 children under age five who were stunted.

There are many factors causing stunting problems, one of them is inadequate intake of nutrition and nutritional state. Nutritional problems, especially stunting in toddlers, can inhibit children's growth and development (Ismawati *et al.*, 2020). In addition, the negative impacts caused by stunting include intellectual decline, susceptibility to non-communicable diseases, decreased productivity, leading to poverty and the risk of giving birth to babies with low birth weight (LBW) (Konstan *et al.*, 2017). Therefore, interventions that can be used to overcome the problem of stunting in under-fives are prenatal and postnatal interventions as specific nutritional interventions (Galasso and Wagstaff, 2019).

In regard to smartphones, Indonesia is ranked fourth in the world with nearly 100 million users (Rahmah, 2015). The results of research on the use of smartphone applications can improve treatment after coronary heart disease surgery (Yu *et al.*, 2020). In addition, there is research on the use of smartphone applications that can improve a mother's first ability to breastfeed (Lewkowitz *et al.*, 2020). Therefore, the use of applications on smartphones can be used as a medium to prevent health problems.

One form of stunting intervention is using nutrition management in the form of an application on a smartphone. Manajemen Nutrisi Balita Stunting (MNBS) is the development of specific nutritional

Table 1. Content from Manajemen Nutrisi Balita Stunting (MNBS) Application

No.	Content	Sub-content
1	About Manajemen Nutrisi Balita Stunting (MNBS)	Application describes
2	Fill in the children's biodata	a. Toddler age
		b. Gender
		c. Weight
		d. Height
3	Stunting	a. What is stunting?
		b. What causes stunting?
		c. The characteristics of stunting
4	Specific nutrition intervention	a. How to provide nutrition
		b. Exclusive breastfeeding and the timeliness of complementary feeding
		c. Texture of MP ASI
		d. Frequency and amount of MP ASI
		e. Components of MP ASI
5	Children age, ideal body weight and height for children	Table of ideal age, weight and height children

interventions. MNBS can be used by parents or health workers to prevent stunting. Therefore, this study aims to analyze the effect of MNBS in increasing the growth of children under five with stunting.

MATERIALS AND METHODS

This study used a pre-experimental research design with a one group pretest/posttest design approach. The independent variable in this study is the smartphone application Manajemen Nutrisi Balita Stunting (MNBS), While the dependent variable is the children's growth, in this case, the children's height and weight. The population of this study were parents with stunting children and the sampling technique used was total sampling with a total of 20 respondents with the inclusion criteria of parents who have stunted children under age five, parents have smartphone cellphones, parents are willing to take part in the research until complete. The research was carried out in the working area of the Puskesma Pamotan Dampit, Kabupaten Malang, East Java.

The instrument of this study used a height measuring instrument of the GEA brand unit

Table 2. Frequency Distribution and Homogeneity Test of Respondents

Characteristic	Amount	%	P Value
Parents' Age			0.912
≤ 25	6	30	
> 25	14	70	
Total	20	100	
Toddlers' gender			0.167
Male	8	40	
Female	12	60	
Sum	20	100	
Toddlers 'Age			0.871
≤ 12	7	35	
13-24	13	65	
Total	20	100	
Children Order in Family			0.888
≤ 3	19	95	
>3	1	5	
Sum	20	100	
Parents' Occupation			1.000
Buruh Tani	12	60	
PNS	3	15	
Swasta	5	25	
Sum	20	100	

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Table 3. The Results of The Normality Test of Growth Data for Stunting Children Under Age Five

Domain	α	Asymp.sig (2-Tailed)	Result
Height Before	0.05	0.289	Normal
Height After	0.05	0.267	Normal
Weight Before	0.05	.341	Normal
Weight After	0.05	0.401	Normal

with a capacity of 200 cm and an accuracy of 0.1 cm. Meanwhile, body weight was measured using the type of metal dacin Budi brand 25 Kg with an accuracy value of 0.1 Kg. Both tools were tested for validity and reliability on 10 respondents who have the same characteristics in Bantur district, Kabupaten Malang and the results of Cronbach's alpha 0.991 for height measurement tools and Cronbach's alpha value 0.89 for weight measurement tools.

The data collection process begins with creating a Manajemen Nutrisi Balita Stunting (MNBS) application. The application is developed in two stages: the manufacturing and testing stages. At the manufacturing stage, it is made by researchers, nutrition experts and information technology experts by creating content and expert systems.

After the application had been completed, a legibility test was carried out by the Balai Pengembangan Pendidikan Anak Usia Dini Non Formal dan Informal (BPPAUDNI) and information technology experts. The second stage was tested on 20 respondents who were the research sample. At this stage, respondents who have children with stunting filled and signed statements saying they were willing to become respondents. Then the stunting children from the respondents were measured by the researcher for their height and weight. After that, the respondent downloaded the Manajemen Nutrisi Balita Stunting application: on his smartphone, then studied it and applied it for three months. Then the respondents having stunting children were measured again for their height and weight.

The research phase was carried out from June to August 2020. Data analysis used the SPSS 16 application. Differential analysis of the mean high scores and body weight of stunting in under-fives used the Paired Sample T-Test which was previously tested for normality and homogeneity test. Approval was given by Research Ethics Committee STIKES Kepanjen Malang with number 087 / S.Ket / KEPK / STIKesKPJ / VI / 2020.

RESULTS

The results obtained in this study describe the characteristics of the respondents based on the age of the parents, the gender of the children under five, the order of children in the

Table 4. The Differences of Toddler Growth with Stunting Before and After Being Given A Smartphone Application: Manajemen Nutrisi Balita Stunting (MNBS)

Variable	Average Before	Average After	Difference In Mean	t	Sig	95% CI Lower	95% CI Upper
Height	57.125	62.720	-5.595	-7.922	0.000	-7.073	-4,116
Weight	5.990	6.550	-0.560	-7,519	0.000	-0.715	-0.404

family, and the parents' occupation. Specific data for the study were the ability of stunting under five years of age and nutrition status in terms of body weight and height before and after the use of MNBS application for stunting children. The data of this study were taken by measuring body weight and height of 20 stunting toddlers in the working area of the Puskesmas, Dampit District, Kabupaten Malang before and after using the application, with a summary table of the results as follows.

Table 2 shows the characteristics of the respondents in the study, totaling 20 respondents, namely working mothers with stunting toddlers, which indicated that the age of parents at most was ≥ 25 years of age by 70%. Characteristics of respondents based on the gender of the children under five were mostly female children (60%). Characteristics of respondents based on the age of children under five who experienced stunting were mostly in the age range 13-24 months with a percentage of 65%. The characteristics of the respondents with the highest sequence status of children in the family are the first to third children with a percentage of 95%. The characteristics of the type of work of mothers with stunting children under five years are as farm laborers, amounting to 60%. Respondents' data were declared homogeneous with a value of p> α = 0.05.

Table 3 shows the calculation of the results of the normality test for the growth of children under five with stunting. The domain of height before the intervention obtained a significance value (asymp sig) of 0.289, which is greater than the value of α = 0.05, thus the data from the height domain before the intervention are normally distributed. The height domain after the intervention obtained a significance value (asymp sig) of 0.267, which is greater than the value of α = 0.05, thus the data from the height domain after the intervention are normally distributed. The weight domain before intervention obtained a significance value (asymp sig) of 0.341, which is greater than the value of α = 0.05, so the data from the weight domain before the intervention are normally distributed. The weight domain after the intervention has a significance value (asymp sig) of 0.401, which is greater than the value of α = 0.05, so the data from the weight domain after the intervention are normally distributed.

The results of this analysis indicate an increase in height and weight after mentoring the use of the MNBS smartphone application for the months. Using the dependent t test shows p value <0.000, so it is known that the p value <0.05. This shows that there is a significant difference between the growth of children under five with stunting in terms of body weight and height before and after using MNBS.

DISCUSSIONS

Stunting is a chronic malnutrition that occurs early in life. Stunting is one of the top 5 child health problems in Indonesia. According to the 2020 Indonesian Nutrition Study, as many as 37% of children in Indonesia are stunted (RI, 2020). This will greatly impact the quality of human resources in the future, considering that stunting has an impact on stunting children's growth and development. Children who are stunted are at risk of illness and death, non-maximal brain development, delays in motor development and mental development problems (A. J. Prendergast et al., 2014). Several studies also show the risk caused by stunting is a decrease in academic achievement (Picauly I, 2013).

Stunting is a form of growth failure (growth faltering) due to the accumulation of insufficient nutrients from pregnancy to 24 months of age (M. W. Bloem et al., 2013). This situation is exacerbated by not being balanced with adequate catch-up growth. Stunted children have less weight and height than children of their age. The growth delay in stunting children is caused by several factors, including the lack of pregnancy visits, economic conditions, poor environmental sanitation and poor nutritional fulfillment of children under five (C. R. Titaley, I. Ariawan, D. Hapsari, A. Muasyaroh, 2019). Decreasing the prevalence of stunting under five is one of the national development priorities; therefore, it needs the right effort to increase the growth of stunting children under five. One of the important efforts in increasing the growth of children under five is nutrition management with specific nutrition interventions.

Specific nutrition interventions are actions or activities that, in their planning, are specifically aimed at the first 1000 days of life and are short-term in nature. Components of

specific nutrition interventions consist of interventions for toddlers and mothers of children under five. Interventions for toddlers focus on monitoring growth and providing appropriate complementary feeding. Meanwhile, intervention in mothers includes increasing knowledge about proper nutrition and the importance of exclusive breastfeeding (Rosha C., 2016). Research in nine countries in Sub-Saharan Africa shows that specific nutrition intervention programs can consistently reduce the incidence of stunting in the three years after starting the program (M. de Onis and F. Branca, 2016) (R. Remans et al., 2011).

To support the success of the specific nutrition intervention program, it requires the involvement of all parties, especially mothers of toddlers. Lack of awareness, understanding and involvement of mothers under five in this program resulted in not achieving the target of stunting reduction. The presentation of specific nutrition interventions based on a smartphone mobile applications allows mothers of toddlers to independently access and follow specific nutrition intervention programs. Research conducted by Mickan (2013) states that application technology increases patient engagement through independent monitoring (S. Mickan, J. K. Tilson, H. Atherton, N. W. Roberts, 2013).

The Manajemen Nutrisi Balita Stunting (MNBS) smartphone application is an effort to tackle stunting based on electronic media. This application contains details about the specific nutrition intervention program for the first 1000 days of life which is displayed with complete features, language that is easy to understand and is equipped with pictures that improve the understanding of mothers. With this application, mothers can monitor the growth of their toddlers independently, and quickly find out if there is a deterioration or improvement in stunting conditions. This application contains several contents, including: 1) monitoring the growth of children 2) the concept of stunting 3) specific nutritional interventions according to age 4) a balanced nutrition menu to improve children's growth. Through this application, mothers can provide proper nutritional parenting according to the child's age, so that they can improve the growth of toddlers. In this study, 20 parents of stunting toddlers received assistance in the use

of the MNBS smartphone application for three months, and the results were that there was an increase in body weight and height of stunting children. This proves that the use of this application can effectively overcome the problem of stunting in the working area of the Sumbersuko Dampit Health Center, Malang Regency. This is supported by Villinger's (2019) study of mobile application-based nutrition interventions that can effectively improve behavior change related to nutrition and health (K. Villinger, D. R. Wahl, H. Boeing, H. T. Schupp, 2019). This mobile application-based intervention is considered very effective because it can be used in real life and real time conditions (Heron & Smyth, 2010) (MermelsteinR, 2011) (Nahum-Shani et al., 2015), provides a space for interaction between users and resource persons and allows loading various interventions according to the group (Rehg JM, Murphy SA, 2017) (J. Kim, D. Marcusson-Clavertz, K. Yoshiuchi, 2019).

CONCLUSION

There is an effect of the Manajemen Nutrisi Balita Stunting (MNBS) smartphone application on the growth of children under five with stunting condition. MNBS increases the weight and height of stunting children within three months.

Acknowledgement

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Conflict of Interest

There are no conflicts occurred in the research.

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