JKM (Jurnal Kebidanan Malahayati),Vol 10, No. 11. November 2024,
ISSN (Print) 2476-8944 ISSN (Online) 2579-762X, Hal 1073-1081

EFFECTIVENESS OF ANDROID APPLICATION CETING ON SCREENING OF STUNTING RISK FACTORS IN PREGNANT WOMEN

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ABSTRAK : EFEKTIFITAS MEDIA APLIKASI ANDROID CETING (CEGAH STUNTING) TERHADAP PENAPISAN FAKTOR RISIKO STUNTING PADA IBU HAMIL

Latar Belakang: Berdasarkan data Survei Status Gizi Balita Indonesia (SSGBI) tahun 2021, prevalensi stunting saat ini masih berada pada angka 24,4% atau 5,33 juta balita, belum mencapai target RPJMN yang ditetapkan yaitu menjadi 14 % di tahun 2024. Diperlukan promosi kesehatan sebagai upaya pencegahan terhadap resiko stunting, salah satu medianya yaitu aplikasi android.Tujuan: Mengetahui efektifitas media aplikasi android CETING (Cegah Stunting) Terhadap Penapisan Faktor Risiko Stunting pada ibu hamil. Metode: Penelitian dilakukan dengan menggunakan *Quasy Experiment* dengan *Pretest and Postest Control Group Design*. Sampel dalam penelitian ini adalah ibu hamil di wilayah kerja Puskesmas Saigon dengan jumlah 50 orang dan kriteria inklusi ibu hamil yang memiliki Smartphone android dan bisa menggunakannya. Ibu hamil dikelompokkan menjadi 2 yaitu 25 diberikan aplikasi CETING dan 25 tidak diberikan aplikasi CETING. Variabel yang diukur yaitu pengetahuan ibu hamil, berat badan, lingkar lengan atas, kadar Hb dan kepatuhan konsumsi Tablet Fe pada ibu hamil. Analisis yang digunakan adalah *univariat* dan *bivariat.* Uji statistiuk yang digunakan yakni uji *Wilcoxon, Paired T-test dan Man-Whitney.* Hasil: Terdapat hasil analisis bahwa terdapat efektivitas aplikasi CETING (Cegah Stunting) terhadap pengetahuan ibu hamil tentang stunting (p-value 0,000), kenaikan berat badan ibu hamil (p-value 0,000), kadar haemoglobin (p-value 0,003) dan kepatuhan konsumsi tablet Fe (p-value 0,001, Sedangkan tidak ada efektivitas media aplikasi CETING (Cegah Stunting) terhadap lingkar lengan atas ibu hamil (p-value 0,186). Kesimpulan: Terdapat efektivitas media aplikasi CETING terhadap pengetahuan ibu hamil tentang stunting, kenaikan berat badan ibu hamil, kadar haemoglobin dan kepatuhan tablet Fe. Sedangkan tidak ada efektivitas media aplikasi CETING terhadap lingkar lengan atas ibu hamil. Saran: Dapat digunakan aplikasi CETING ini untuk ibu hamil agar dapat memonitoring dan evaluasi pengetahuan ibu hamil tentang stunting, kenaikan berat badan ibu hamil, kadar haemoglobin dan kepatuhan konsumsi tablet Fe.

Kata Kunci : Andorid, Anemia, Aplikasi, Ibu Hamil, Stunting

ABSTRACT

Background: Based on data from the 2021 Indonesian Toddler Nutrition Status Survey (SSGBI), the prevalence of stunting is currently still at 24.4% or 5.33 million toddlers, not reaching the RPJMN target set at 14% in 2024. Health promotion is needed as an effort to prevent the risk of stunting, one of the media is the android application. Objective: To determine the effectiveness of the CETING (Prevent Stunting) android application media on Screening Stunting Risk Factors in pregnant women. Method: The study was conducted using a Quasy Experiment with Pretest and Posttest Control Group Design. The sample in this study were pregnant women in the Saigon Health Center work area with a total of 50 people and the inclusion criteria were pregnant women who had an Android Smartphone and could use it. Pregnant women were grouped into 2, namely 25 were given the CETING application and 25 were not given the CETING application. The variables measured were knowledge of pregnant women, body weight, upper arm circumference, Hb levels and compliance with Fe Tablet consumption in pregnant women. The analysis used is univariate and bivariate. Statistical tests used are Wilcoxon test, Paired T-test and Man-Whitney. Results: There are analysis results that there is effectiveness of the CETING (Prevent Stunting) application on pregnant women's knowledge about stunting (p-value 0.000), weight gain of pregnant women (p-value 0.000), hemoglobin levels (p-value 0.003) and compliance with Fe tablet consumption (p-value 0.001, While there is no effectiveness of the CETING (Prevent Stunting) application media on the upper arm circumference of pregnant women (p-value 0.186). Conclusion: There is effectiveness of the CETING application on pregnant women's knowledge about stunting, weight gain of pregnant women, hemoglobin levels and compliance with Fe tablets. While there is no effectiveness of the CETING application on the upper arm circumference of pregnant women. Suggestion: The CETING application can be used for pregnant women to be able to monitor and evaluate

pregnant women's knowledge about stunting, weight gain of pregnant women, hemoglobin levels, and compliance with Fe tablet consumption.

Keywords: Application, Android, Stunting, Anemia, Pregnant Women

INTRODUCTION

Stunting is a condition of growth failure in toddlers (babies under five years old) due to chronic malnutrition so that the child is too short for his age. Malnutrition occurs since the baby is in the womb and in the early period after the baby is born, but stunting only appears after the baby is 2 years old. Based on data from the Indonesian Toddler Nutrition Status Survey (SSGBI) in 2021, the prevalence of stunting is currently still at 24.4% or 5.33 million toddlers. The prevalence of stunting has not reached the RPJMN target set at 14% in 2024 (3). There are several factors that influence stunting, including pregnant women with anemia, pregnant women with KEK (LILA <23.5), weight gain during pregnancy <9 kg, babies born BBL <2500 grams and/or PBL <47 cm, babies who are breastfed <6 months, babies who do not receive complete immunization, parenting patterns, and food diversity (Febri Kurniatin, 2020). Children of mothers who experience anemia during pregnancy have a 3.761 times greater chance of suffering from stunting compared to pregnant women who are not anemic (Kebidanan & Pontianak, n.d.). Therefore, health promotion is needed as an effort to prevent the risk of stunting, one of the media is the Android application. The increasingly sophisticated technology in the modern era today makes humans very dependent on smartphone-based mobile phones. The resulting product is an Android-based application media CETING (Prevent Stunting) as a health information media for pregnant women and mothers of babies. For the initial stage, researchers focused on the knowledge of pregnant women first because malnutrition in stunting occurs since the baby is in the womb. Based on Nurcahyanti's 2023 research on the use of mobile stunting to prevent stunting in Banyumas Regency, the results obtained a p-value of 0.001, meaning that there is a significant difference in the level of knowledge of mothers of toddlers after education using mobile stunting with a gain-score value of 0.45, so it can be said that the use of mobile stunting activities carried out has moderate effectiveness in increasing knowledge (Hastuty, 2020). This application has 4 main features. The first feature of the application will provide automatic notifications containing information related to maternal nutrition during pregnancy which will appear every morning with different message content for 14 days and will repeat 6 times. The second feature, the application will screen for stunting risk factors. The third feature of this application is also equipped with a column for compliance with taking iron tablets, an alarm reminder to take iron tablets will sound at night every day. The fourth feature, the summary of this application can be accessed by Puskesmas midwives as monitors and evaluators. The incidence of stunting in Pontianak City in 2020 was quite high, as many as 1359 (15.8%) toddlers were short and 540 (6.3%) toddlers were diagnosed as very short. Pontianak Timur District is the district with the highest stunting rate in Pontianak City and Saigon Village is the village with the highest stunting rate, namely 62 (20.7%) toddlers (AlAteeq M. Al-Rusaiess A., 2015). The specific objective of the study was to determine the effectiveness of the CETING (Prevent Stunting) android application media on screening stunting risk factors in pregnant women at the Saigon Health Center in Pontianak City. The urgency of the study is that pregnant women can use this CETING application to prevent stunting in their children later and midwives can monitor stunting risk factors in every pregnant woman in the work area of their health center through the application on Android. The scheme of this research is a second-year beginner study with a roadmap in the third year to be modified to monitor the 50 respondents up to the post-natal stage for the baby's mother, both monitoring nutrition and parenting patterns. So that the final result is expected that this application can be used by pregnant women, mothers of babies and health workers to prevent stunting from various risk factors (Setiawati, 2024).

RESEARCH METHODS

The research design used a Quasy Experiment with Pretest and Posttest Control Group Design. The population in this study were pregnant women in the Saigon Health Center work area. The sampling technique in this study used purposive sampling on 50 pregnant women in the Saigon Health Center work area, divided into 2 groups, namely 25 pregnant women were given the CETING application and 25 other pregnant women were only given counseling. The inclusion criteria in this study were pregnant women who had an Android smartphone and could use it and were willing to be respondents. This study was conducted for 4

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months, namely April to July 2024. Data analysis will be tested for normality using the Shapiro Wilk Test, then a paired t-test analysis test will be carried out if it is normally distributed, but if it is not normally distributed, it will be tested with Wilcoxon. The inclusion criteria in this study were pregnant women who had an Android smartphone and could use it.

The normality test is intended to determine whether the data from the variables being studied are normal or not. The normality test determines the type of statistics used in hypothesis testing. The analysis technique for testing data normality uses the *Shapiro-Wilk test* with the help of a computerized program.

RESEARCH RESULTS

Normality Test

Table 1
Normality Test Result

Characteristics	*Shapiro Wilk*	Conclusion
Knowledge		
Intervention		
Pretest	0.033	Abnormal
Posttest	0.403	
Control		
Pretest	0.279	Normal
Posttest	0.075	
Weight Gain During Pregnancy		
Intervention		
Pretest	0.002	Abnormal
Posttest	0.000	
Control		
Pretest	0.002	Abnormal
Posttest	0.001	
LILA (Upper Arm Circumference)		
Intervention		
Pretest	0.000	Abnormal
Posttest	0.001	
Control		
Pretest	0,000	Abnormal
Posttest	0.001	
Hemoglobin Level		
Intervention		
Pretest	0.277	Abnormal
Posttest	0.019	
Control		
Pretest	0.520	Normal
Posttest	0.196	
Compliance Consumption of Fe Tablets		
Intervention		
Pretest	0.022	Abnormal
Posttest	0.000	
Control		
Pretest	0.004	Abnormal
Posttest	0,000	

Based on the results of the data normality test above, it shows that all data are not normally distributed, marked by a probability or significance value in the *Shapiro-Wilk* test *p value column* <0.05, except for the knowledge control data and hemoglobin level control which are normally distributed, marked by a probability or significance value in the *Shapiro-Wilk* test *p value column* > 0.05. Therefore, a *paired t-test was then carried out on the knowledge control data and hemoglobin level control.*

While the Wilcoxon test was carried out on other data. Then to find out the effectiveness of each variable, the *Man-Whitney analysis test was carried out* .

The Effectiveness of the Android Application CETING on Screening of Stunting Risk Factors in Pregnant Women at Saigon Health Center, Pontianak City

Table 2
Effectiveness of the Android Application CETING on Screening of Stunting Risk Factors in Pregnant Women

Variables	*Mean+SD*	*Median*	*Min-Max*	*p-value**	*p-value #*
Knowledge					
Intervention					
Pretest	44.0+13.46	40	25-70	0,000*	
Posttest	64.4+14.74	65	35-90		0.000 #
Control					
Pretest	46.8 + 12.57	45	25-70	0,000**	
Posttest	53.0 + 10.60	55	35-75		
Weight Gain During Pregnancy					
Intervention					
Pretest	52.8+5.60	51	45-60	0,000*	
Posttest	58.8+5.41	56	53-67		0.000 #
Control					
Pretest	53.2 + 5.14	50	47-61	0,000*	
Posttest	55.3 +5.00	52	50-63		
Lila (Upper Arm Circumference)					
Intervention					
Pretest	24.06+3.00	24.1	11.8-28.8	0,000*	
Posttest	25.14+1.66	24.8	23.2-29.7		
Control					0.186 #
Pretest	24.7 + 1.60	24.3	23.1-28.2	0,000*	
Posttest	25.2 + 1.66	25.1	23.5-28.8		
Hemoglobin Level					
Intervention					
Pretest	10.96+0.61	11.0	9.3-12	0,000*	
Posttest	11.56+0.47	11.7	10.8-12.2		
Control					0.003 #
Pretest	11.22 + 0.55	11.2	10.2-12.4	0,000**	
Posttest	11.48 + 0.52	11.6	10.5-12.8		
Compliance Consumption of Fe Tablets					
Intervention					
Pretest	4.12+1.87	4	0-7	0,000*	
Posttest	6.60+0.70	7	5-7		0.001 #
Control					
Pretest	4.56 + 2.02	5	0-7	0.009*	
Posttest	5.40 + 1.91	6	0-7		

*: Wilcoxon
** : Paired T-Test
# : Man-Whitney

Based on the table above, it shows that there is an effect of the CETING (Prevent Stunting) application media on pregnant women's knowledge about stunting, weight gain in pregnant women, upper arm circumference, hemoglobin levels and compliance with Fe tablet consumption with a p-value <0.05 in both intervention and control groups. Then the *Man-Whitney results* showed that there was

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an effectiveness of the CETING (Prevent Stunting) application media on pregnant women's knowledge about stunting (p-value 0.000), weight gain in pregnant women (p-value 0.000), hemoglobin levels (p-value 0.003) and compliance with Fe tablet consumption (p-value 0.001, While there was no effectiveness of the CETING (Prevent Stunting) application media on the upper arm circumference of pregnant women (p-value 0.186), although there was an influence in each group.

DISCUSSION

The potential and problems found are regarding Stunting, KEK (Chronic Energy Deficiency) and Anemia in Pregnant Women. Factors that influence stunting are pregnant women with anemia, pregnant women with KEK (LILA <23.5), weight gain during pregnancy <9 kg, babies born with BBL <2500 grams and or PBL <47 cm, babies who receive breast milk <6 months, babies who do not receive complete immunization, parenting patterns and food diversity (Nurlatifah, 2020). Children from mother who at the time pregnant experience anemia have opportunity For suffer from stunting 3,761 times compared to Mother pregnant who is not anemia (Hastuty, 2020).

So that required promotion health as effort prevention to risk of stunting, one of the the media that is android application . Technology is increasingly sophisticated in the modern era This make Humans are very dependent on mobile *phones smartphone* . The products produced in the form of application media Android- based CETING (Prevent Stunting) as an information media health for Mother pregnant and also Mother baby . For stage early , researcher focus to knowledge Mother pregnant moreover formerly Because lack Nutrition in stunting occurs since baby in content(Budianto, 2016) .

Based on Anny 's 2012 research was obtained results that role education health increase knowledge in a way significant and there is increase practice consumption food shown to respondents group intervention . On fulfillment carbohydrates and protein, on average has fulfil need carbohydrates and protein per day . In consumption fruit , before intervention part big No consume fruit The same very in a day . After being given education health , pattern consumption and vegetables increase with consume it as many as 3 servings per day from food recall data overview (AlAteeq M. Al-Rusaiess A., 2015). Perdana (2017) researched about comparison nutritional status assessment use method conventional with application nutrition for mobile devices shows that in a way overall , positive feedback reported For application This . Application nutrition for mobile devices have interesting potential If used in practice dietetics . Android- based mobile applications can give information with fast and easy Because can used anywhere and can accessed anytimes. Therefore that, the use of This android based mobile application is very effective if used For spread information nutrition (Perdana, 2017a)

The Effectiveness of the CETING (Prevent Stunting) Android Application Media on Knowledge of Pregnant Women

Research result obtained that the Android Application Media CETING is effective can increase knowledge Mother pregnant with a p-value of 0.000. Before given intervention The CETING Android application is available number knowledge 44.0, after given intervention to 64.0. The results of the study This in line with results research by Siti Mulidah (2023) which was obtained the p-value result is 0.000 which means that effort increase knowledge can done with using media based *smartphone* because more practical, easy accessible and almost everyone at the moment that device. (Mulidah et al., 2023)The research results are also in line with Rofiq's research (2023) states that that in the given group education use Application Preventing Stunting (Ceting) has an effect in a way significant (pv = 0.005; α= 0.05). Temporary it's in the group that doesn't use application ceting No there is difference significant (pv = 0.059; α= 0.05).(Rofiq et al., n.d.)

Research result This in line with research (Melati, 2021) with Title " Education teeth prevention of stunting based on whatsapp group for increase knowledge and attitude Mother pregnant " which concludes that found differences in attitude mother , in the group experiment more show attitude more positive compared to group control (p<0.05) (Putri Melati et al., 2021).

Stunting problems that occur during growth flower child toddler need to get serious attention from family , society Health workers in particular and the government . The impact caused from this stunting problem that is the decline quality source Power man Where child weight below normal and short . Stunting is lack teeth chronic since child There is in pregnancy and early period after born as well as new will appear when the child the 1000 years old birth or not enough more than 2-3 years (Usman & Ramdhan, 2021). Knowledge and attitude Mother since beginning pregnancy and postpartum give birth to will relate with stunting condition that will experienced by his son later . Efforts to provide Accurate Health Information through good media print and also electronic even through smartphone usage is necessary done For increase knowledge and attitude

Mother about prevention of stunting.(Mulidah et al., 2023)

Parents need to have knowledge about nutrition, especially about *stunting,* which is very necessary. in realize early growth and development life . Related parental education with literacy health can determine good nutritional status in children . But in reality No all parents to go through related formal education with health . So that become solution in giving promotion nutrition can increase parental knowledge about *stunting* (Arindah, 2019)

This shows that the lower a person's level of knowledge, the greater the risk of *stunting.* Lack of knowledge about *stunting* can have an impact on intelligence levels, reduce productivity, economy, family and government ((Fauziyah, 2017)). High curiosity , thus arousing high curiosity, when someone already has a high curiosity, that person will find out as much information as possible so that it will affect the level of knowledge and understanding (Budianto, 2016). Meanwhile, according to (Mogre et al., 2016) humans are the only living things that develop knowledge seriously and this is a natural characteristic of a human being. (Notoadmodjo, 2014) said that knowledge is a very important domain for shaping a person's actions. Knowledge will have an impact on attitudes as a medium-term result of health education. The higher the level of knowledge of a mother, the higher the awareness to provide exclusive breastfeeding to her baby. One of the theories that explains the relationship between knowledge and decision-making attitudes is the theory of reasoned action by (Wawan, 2010) they state that humans generally act in a reasonable way and humans will consider the information that underlies the calculation of the consequences of the actions taken. Thus, the increase in knowledge experienced by a person will have an impact on the decisions of attitudes and behaviors that will be taken.

This is in line with research conducted by Perdana et al., 2017 related to the development of android-based nutrition education media and websites and their influence on the behavior of elementary school students' balanced nutrition, where android-based nutrition education media showed better results when compared to websites and other media. There are positive changes in the knowledge, attitudes, and practices of elementary school children after nutrition education. Therefore, in the current millennial era, electronic media is the right choice in balancing the level of needs in order to make changes in the level of knowledge that is better to obtain all the information needed (Perdana, 2017b).

Efforts to increase the level of parental knowledge in children can be done by providing health education. This has the aim of increasing parental knowledge and optimizing child growth and development in reducing the incidence of stunting. Health education media has been widely developed and Android-based educational media is more effective than other media in increasing knowledge and behavior related to nutrition (Yuni, 2022) in adolescents about stunting (Yuni, 2022)

Another study stated that counseling using the android application media abbreviated as SIDIMES significantly increased respondents' knowledge (pv = 0.005) (Fahmi, 2020). Health education that has been carried out by health workers and public health services has been good, this is proven by the level of knowledge between the groups that were given treatment and those that were not, the results showed no difference in the proportion of knowledge levels. However, with application education, it still provides opportunities for increasing knowledge. This is in line with the opinion that the ease of mothers or respondents in accessing information that media that uses an electronic basis will spread news or information faster, especially in terms of the time needed (Rahayu, 2021)

Effectiveness of Android Application Media CETING (Prevent Stunting) on Body Weight, Waist Circumference Upper Arm and Hb Levels of Pregnant Women

Research result obtained that the Android Application Media CETING is effective can increase mother 's weight pregnant (p-value 0.000) and hemoglobin levels (p-value 0.003). While No There is The effectiveness of the CETING Android Application Media on circumference arm on Mother pregnant (p-value 0.186). The results of the study This in line with results study Nurlatifah (2020) who got results that Factors that influence stunting are pregnant women with anemia, pregnant women with KEK (LILA <23.5), weight gain during pregnancy <9 kg, babies born with BBL <2500 grams and/or PBL <47 cm, babies who receive breast milk <6 months, babies who do not receive complete immunization, parenting patterns and food diversity (Nurlatifah, 2020). Children from mother who at the time pregnant experience anemia have opportunity For suffer from stunting 3,761 times compared to Mother pregnant who is not anemia (Hastuty, 2020)

Education about nutrition through the use of media is very important because it plays a role in realizing the behavior of choosing to consume healthy foods such as fruits and vegetables

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(Prasetya, 2022). In addition, pregnant women often forget or even do not take iron tablets so that it will affect their hemoglobin levels. The absence of information through applications that are easily accessible to everyone who has a smartphone could be one of the factors in cases of anemia in pregnant women (Karina).

Android application media CETING can effectively control the weight and hemoglobin levels of pregnant women because the Android media is easier to understand and there is an application menu that makes it easier for mothers to understand how to control nutrition during pregnancy because there is a daily nutritional intake control in CETING application(Mukodri, 2024).

While the results that the CETING application is not effective in increasing the Lila of pregnant women because the size of the upper arm circumference (LILA) of a person takes a long time to change, unlike weight which can change quickly. In this study, the study was only conducted within a period of 3 months (Suparni et al., 2020)

The Effectiveness of the CETING (Prevent Stunting) Android Application Media on Compliance Consumption of Fe Tablets in Pregnant Women

Research result obtained that the Android Application Media CETING is effective can increase compliance consumption of Fe tablets (p-value 0.001) because There is a reminder alarm that makes it easier Mother pregnant setting a reminder alarm consumption of Fe tablets, and in the application this is also there features summary that can checked by midwife For follow up was conducted . Research results This in line with results research by Putri Febriyanti (2023) which was obtained results that Efforts are needed to increase compliance among pregnant women regarding the importance of consuming Fe tablets during pregnancy and health promotion regarding iron supplementation, one of which is with remainder.(Putri Febriyanti Ludin et al., 2023)

Consumption of Fe tablets is very important during pregnancy in an effort to prevent anemia and the adverse effects it causes if anemia occurs during pregnancy, so it is necessary to increase education, motivation, and monitoring of pregnant women in consuming Fe tablets during pregnancy. This monitoring can be seen in the CETING Application (Prevent Stunting). This study is in line with the research of Annisa Raufiah Fertimah et al. (2021) that the use of media can increase the compliance of pregnant women in consuming Fe Tablets (Fertimah, 2021).

(Fang KY, 2016) suggested that increasing medication adherence through a reminder system is one type of intervention that is beneficial for patients who accidentally forget to take their medication. Mobile phone applications are also becoming increasingly popular as an effective and convenient way to provide reminders. This is in accordance with the research of (Fenerty S, 2012) that reminder-based interventions can improve medication adherence. This is also in line with the research of (Boeni F, 2015) through a *systematic review method* of 30 journal articles which showed that there was a positive effect of medication reminder devices on medication adherence. Similar research has been conducted by (Alvionita I., 2017) which used posters and SMS *reminders* as a medium for delivering material and reminders to take iron tablets. The results of this study showed that pregnant women who received posters and SMS *reminders* were more compliant than the control group.

CONCLUSION

There is an effectiveness of the CETING (Prevent Stunting) application media on pregnant women's knowledge about stunting (p-value 0.000), weight gain of pregnant women (p-value 0.000), hemoglobin levels (p-value 0.003) and compliance with Fe tablet consumption (p-value 0.001, While there is no effectiveness of the CETING (Prevent Stunting) application media on the upper arm circumference of pregnant women (p-value 0.186).

SUGGESTION

The CETING application can be used for pregnant women to be able to monitor and evaluate pregnant women's knowledge about stunting, weight gain of pregnant women, hemoglobin levels, and compliance with Fe tablet consumption.

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