Analysis of Knowledge and Skills of Cadres in Early Detection of Stunting Toddler Development in Soppeng Regency, Indonesia

Hasriani[1], Andi Ummu Salmah[2,*], Masni[2], Apik Indarty Moedjiono[2], Healthy Hidayanty[3], Wahiduddin[4], Anwar Mallongi[5]

Hasriani[1], Andi Ummu Salmah[2,*], Masni[2], Apik Indarty Moedjiono[2], Healthy Hidayanty[3], Wahiduddin[4], Anwar Mallongi[5]

[1]Postgraduate Student, Department of Reproduction Health, Faculty of Public Health, Hasanuddin University, INDONESIA.

[2]Department of Reproduction Health, Faculty of Public Health, Hasanuddin University, INDONESIA.

[3]Department of Nutrition, Faculty of Public Health, Hasanuddin University, INDONESIA.

[4]Department of Epidemiology, Faculty of Public Health, Hasanuddin University, INDONESIA.

[5]Department of Environmental Health, Faculty of Public Health, Hasanuddin University, INDONESIA.

Correspondence

Andi Ummu Salmah

Department of Reproduction Health, Faculty of Public Health, Hasanuddin University, INDONESIA.

E-mail: anwar_envi@yahoo.com

ABSTRACT

Background: About 16% of Indonesian toddlers experience neuro developmental and brain disorders ranging from mild to severe, every two days 1,000 babies experience motor development disorders. The prevalence of stunting in South Sulawesi is in the 20th lowest ranking, namely 27.4% based on the provincial level in 2021. **Objective:** Recognizing the increased knowledge and skill of cadre and mothers and toddlers in early development detection of stunted infants using a Developmental Pre-Screening Questionnaire (DPQ) in the working area of the Panincong Health Center, Soppeng Regency. **Method:** This study used a quasi-experimental design with a pretest-posttest control group involving 30 cadres and 30 mothers with 15 children in each group selected by systematic random sampling. Data were analyzed using paired t-tests and Independent t-tests. **Results:** The results showed that there were differences in knowledge (p=0.000) in the intervention group and differences in knowledge levels in the control group (p=0.044). The level of knowledge after treatment was greater in the intervention group (11.8%), while the knowledge after treatment in the control group was only (2.9%). There was a difference in the skills of the cadres (p=0.000) after being given the Android-based DPQ intervention. There was a difference in the knowledge (p=0.000) and skills of toddler mothers (p=0.000) after being given the Android-based DPQ intervention applied by the cadres. **Conclusion:** Android-based DPQ is effective as an educational medium and as an alternative to cadres and parents in monitoring or early detection of child development using Android-based DPQ.

Key words: Stunting, Development Disorders, Cadre, Survey, Questionnaire.

INTRODUCTION

One group that is at risk of experiencing health problems is the toddler group which is a golden period for human survival. In 2020, globally it is also explained that as many as 149.2 million (22%) children under 5 years are stunted. The prevalence of stunting globally decreased from 33.1% to 22%, and the number of children affected fell from 203.6 million to 149.2 million.[1] The 2018 Basic Health Research (Riskesdas) shows that the prevalence of stunting in toddlers in Indonesia is 30.8% or around 7 million toddlers.[2]

South Sulawesi is in the 20th lowest ranking, namely 27.4%.[3] Based on data from the Supping District Health Office, there were 433 (26.1%) stunted toddlers, the most in Marmora District including the Panincong Health Center 202 (26.3%) stunted toddlers and also there were 344 stunted toddlers and 186 stunted toddlers.[4]

Infancy-related chronic malnutrition, which affects infants for the first 1,000 days of life (HPK) and lasts for a very long time, results in stunting and delays in brain and child development. The child's brain develops quickly during the prenatal mass and continues to do so after birth until early childhood. 250 million children, or 43% of children worldwide, are thought to be living in developing nations in 2016.[1]

In Indonesia, 16% of toddlers have mild to severe neurodevelopmental and brain disorders, 1,000 babies have motor development problems every two days, 3-6 out of 1,000 babies have hearing loss, and 1 in 100 children have lower IQs and speech delays. The literacy score for toddlers aged 36 to 59 months in 2018 is 64.6%, followed by scores in the physical (97%), social-emotional (69.9%), learning (95.2%), and overall index (88.3%).[2]

The government and society are responsible for a portion of public health, which includes monitoring children's growth and development through screening. Monitoring growth and development is one step that can be taken to ensure sustainable growth and development. This will allow for the early detection of deviations and the proper course of action. To identify abnormalities in a child's development early on, the government works with the community, including through the Developmental Pre-Screening Questionnaire (DPQ) program.[5]

In order to prevent stunting, the role of integrated healthcare center cadres is urgently needed. The Indonesian Ministry of Health has established instruments for early detection and intervention on child growth and development to continue until pre-school age, one of the activities being the conduct of coaching using instruments on integrated healthcare center cadres.[6]

The effect of parental education on child care is one of the causes of problems with child growth and development, with this it is hoped that parents can be active in providing stimulation and routinely checking the growth and development of toddlers at the integrated healthcare center to prevent irregularities in child growth and development.[7]

Based on the direction and policy, the 2020-2024 RPJMN strategy is to improve health services towards universal health coverage, especially strengthening primary health care services by encouraging increased promotive and preventive efforts supported by innovation and the use of technology. Early detection of toddler growth and development is one of the efforts to improve the quality of children and is one of the programs from the Indonesian Ministry of Health. The President of the Republic of Indonesia has launched the National Movement for Monitoring the Growth and Development of Children. Monitoring the child's development can be done using DPQ.[8]

Based on the results of interviews with the Nutrition Manager at the Panincong Health Center who stated that before the COVID-19 pandemic, monitoring of toddler growth and development was carried out at the integrated healthcare center using Maternal and Child Health Book Instruments/Tools (KIA), while during the COVID-19 pandemic until 2021 monitoring growth and development of toddlers cannot be done directly because of the policies in force. This has an impact on mothers of toddlers and even health workers who do not routinely carry out screening for the growth and development of toddlers because it takes a long time to carry out and prepare DPQ sheets. In this regard, respondents need an instrument/tool that can be used to monitor developments independently through assistance from health workers including integrated healthcare center cadres.

Since the use of this Android-based DPQ is not constrained by space or time, preparation and execution time can be reduced. Promotive and monitoring applications for monitoring toddler development with the DPQ method have been developed to facilitate monitoring without using sheets of paper any longer.

RESEARCH METHODS

Design studies

In this study, a control group participated in a pretest-posttest quasi-experimental design. This study is being conducted in the Panincong Health Center's operational area.

Participant study and sampling

There are 95 integrated healthcare center health cadres identified at the Panincong health center, as well as 186 parents of toddlers with stunting, made up the study's population. The sample for this study consisted of 30 cadres and 30 mothers of toddlers, with 15 individuals in each group for the intervention group and the control group. While the control group received only a standard DPQ assessment sheet, the intervention group received treatment using the Android-based DPQ for the early detection of stunting toddler development.

Data selection

Developmental Pre Screening Questionnaire (DPQ), observation sheets, and a questionnaire were all used in the data collection process. The control group only received traditional DPQ sheet media for the purpose of early toddler development while the intervention group received training and an introduction to the use of Android-based DPQ.

Android-based DPQ in early detection of stunting toddler development

The most significant aspect of this application is the early detection of toddler development using the DPQ method, which has become the basis for evaluations from the Ministry of Health. The application uses an Android-based DPQ that contains several promotional media, both articles and educational videos for users, both parents of toddlers and the community, related to stunting, the stages of toddler development,

and the most important thing in this application is the early detection of toddler development using the DPQ method.

Data analysis

Using SPSS statistics version 26 by using a univariate test to assess the frequency of respondents and a bivariate test using the Paired Sample T-Test analysis which aims to assess or examine the effectiveness of the treatment which is indicated by the difference in the average before and the average after being given treatment (knowledge and skills) of cadres and mothers of toddlers between the intervention group and the control group,[9] while the Independent Sample T-Test analysis aims to be able to compare the average level of knowledge and skills of cadres and mothers of toddlers from the two groups that are not related to each other.[10]

Ethical considerations

The research was conducted after obtaining written consent from each respondent after being given an explanation regarding the purpose of the research. Ethical approval was obtained from the Hasanuddin University Health Research Ethics Committee with ethical approval recommendation number 15004/UN4.14.1/TP.01.02/2022.

RESULTS

Univariate analysis/respondent characteristics

The frequency distribution of the characteristics of cadre respondents and mothers of toddlers can be seen in Table 1 which shows that the age of the most cadres is more than 35 years in the intervention group of 9 people (60%) and there are 12 people (80%) in the control group. The average cadre with the last education was high school, with 10 people (66.7%) in the intervention group and 8 people (53.3%) in the control group. The distribution of cadres based on training frequency in the intervention group was 8 people (53.3%) and cadres who had never attended training were 7 people (46.7%), while in the control group cadres who had never attended training were 9 people (60%) more than the cadres who had attended training, only 6 people (40%).

The age of the toddler mothers was in the widest age range, namely 20-35 years in the intervention group with 12 people (80%) and there were 11 people (73.3%) in the control group. The average mother of toddlers with the last education was high school and college, there were 6 people (40%) in the intervention group and the control group with the last education was high school, there were 10 people (66.7%). Meanwhile, there were 6 mothers (40%) who worked in each group and 9 mothers who did not work (60%) in both the intervention and control groups. The average parity of toddler mothers in this study was that mothers who had 2 children or better in the intervention group were 9 mothers (60%) while in the control group there were 8 mothers (53.3%).

It is known that the characteristics of each group of stunting toddlers are in the age range of 24-35 months in both the intervention group of 7 toddlers (46.7%) and the control group of 8 toddlers (53.3%). The average gender of toddlers in this study was male (53.3%) in both the intervention and control groups, while the female gender was 7 toddlers (46.7%) in each group.

Bivariate analysis to find out whether there are differences in the treatment of using Android-based DPQ in the intervention group and conventional DPQ in the control group given to cadres and mothers of toddlers.

Table 2 shows that there was an increase in cadre knowledge after treatment in both the intervention group (p=0.000) and the control group (p=0.044). However, the increase in knowledge was greater in the intervention group, namely 11.8%, while in the control group it was only 2.9%. The results of statistical tests showed that there was

Table 1: Distribution of integrated healthcare center cadres based on characteristics in the working area of the Panincong health center in 2023.

Characteristics	Intervention (n=15)		Control (n=15)	
	n	%	n	%
Cadre				
Age (in year)				
20-35	6	40.0	3	20.0
>35	9	60.0	12	80.0
Education				
Elementary School	2	13.3	1	6.7
Junior High School	3	20.0	6	40.0
Senior High School	10	66.7	8	53.3
Training Frequency				
Never	7	46.7	9	60.0
1-2 times	8	53.3	6	40.0
Toddler Mother				
Age (in year)				
20-35	**12**	**80.0**	**11**	**73.3**
>35	**3**	**20.0**	**4**	**26.7**
Education				
Junior High School	3	20.0	2	13.3
Senior High School	6	40.0	10	66.7
College	6	40.0	3	20.0
Occassion				
Unemployed	9	60.0	9	60.0
Working	6	40.0	6	40.0
Parity (number of children)				
Primipara	6	40.0	7	46.7
Multipara	9	60.0	8	53.3
Toddler				
Age (in year)				
24-35	7	46.7	8	53.3
36-47	5	33.3	4	26.7
48-60	3	20.0	3	20.0
Sex				
Boy	8	53.3	8	53.3
Girl	7	46.7	7	46.7

Table 2: Average knowledge of cadres before (pre-test) and after (post-test) treatment in the intervention group and the control group.

Group	Pre-test Mean ± SD	Post test Mean ± SD	%Δ	p
Cadre Knowledge				
Intervention Android-based DPQ	74.00 ± 6.141	82.73 ± 7.977	11,8	0.000[a]
Control Conventional DPQ	73.47 ± 7.100	75.60 ± 6.501	2,9	0.044[a]
	0.827[b]	0.012[b]		

a: Paired Sample T-Test
b: Independent Sample T-Test

Table 3: Average knowledge skills of cadres before (pre-test) and after (post-test) treatment in the intervention group and the control group.

Group	Pre-test Mean ± SD	Post test Mean ± SD	p
Intervention Android-based DPQ	68.47 ± 8.814	80.93 ± 8.540	0.000[a]
Control Conventional DPQ	63.33 ± 7.844	66.73 ± 8.705	0.083[a]
	0.103[b]	0.000[b]	

a: Paired Sample T-Test
b: Independent Sample T-Test

Table 4: Differences in the mean knowledge and skills of toddler mothers before (pre-test) and after (post-test) treatment in the intervention group and the control group.

Group	Pre-test Mean ± SD	Post test Mean ± SD	p
Knowledge			
Intervention Android-based DPQ	65.00 ± 8.502	75.73 ± 9.794	0.000[a]
Control Conventional DPQ	64.20 ± 7.183	66.53 ± 9.273	0.111[a]
	0.783[b]	0.013[b]	
Skills			
Intervention Android-based DPQ	64.20 ± 8.662	75.80 ± 7.163	0.000[a]
Control Conventional DPQ	64.13 ± 8.184	69.40 ± 5.938	0.078[a]
	0.983[b]	0.013[b]	

a: Paired Sample T-Test
b: Independent Sample T-Test

no difference in knowledge between the intervention group and the control group before treatment (p=0.827) and after treatment there was a significant difference (p=0.012) between the intervention group and the control group.

Table 3 shows that there was an increase in cadre skills after treatment in the intervention group (p = 0.000), whereas, in the control group, there was no increase in cadre skills (p= 0.083). The results of statistical tests showed that there was no difference in skills between the intervention group and the control group before treatment (p=0.103) and after treatment, there was a significant difference (p=0.000). So, it can be concluded that the Android-based DPQ contained in the E-PROKASI application effectively improves the skills of cadres in carrying out early detection of development in toddlers, especially stunting toddlers.

Table 4 shows that there was an increase in the knowledge of toddler mothers after treatment in the intervention group (p = 0.000), whereas, in the control group, there was no increase in knowledge of toddler mothers (p = 0.111). The results of statistical tests showed that there was no difference in knowledge between the intervention group and the control group before treatment (p=0.783) and after treatment, there was a significant difference (p=0.013).

Table 4 shows that there was an increase in the skills of toddler mothers after treatment in the intervention group (p = 0.000), while in the control group, there was no increase in the skills of toddler mothers (p = 0.078). The results of statistical tests showed that there was no difference in skills between the intervention group and the control group before treatment (p=0.983) and after treatment, there was a significant difference (p=0.013). It concluded that the Android-based DPQ contained in the E-PROKASI application was effective in increasing the skills of toddler mothers in carrying out early detection of stunting toddler development.

DISCUSSION

Feasibility of Android-based DPQ based on expert validation test

The android operating system is currently primarily used in health application development. The development of Android-based DPQ is part of the development of advances in information technology in the world of health because the use of the Android system makes it easier to access, operate, and quickly learn information. This is in line with research which states that the Stimulation Early Detection and Intervention Growth and Development mobile application can also

provide information about stimuli that parents can give their children to support the growth and development process so that growth and development delays can be prevented.[11] Android-based DPQ specifically designed to assist health workers and parents in carrying out early detection of development in children which aims to find out whether there are developmental deviations in children.

After conducting research, the use of this application greatly facilitated respondents, especially young parents or primipara mothers, in increasing knowledge and skills, especially the importance of stimulation for children because after this research most parents were aware that the importance of stimulation in children and continued with monitoring developments using DPQ could help the sensory and motor development of children better according to the growth of the child's age. Pediatric health nurses must keep up with the latest technological advances and position themselves as users who can provide valuable feedback in society. As the main caregiver who is entrusted with looking after the welfare of children in the health care environment, child health care cannot simply create new technology, but instead has the wisdom to distinguish its advantages and disadvantages.[12] Monitoring growth and development is very important to do, but many parents ignore the monitoring of growth and development. This is in line with research which states that toddlers who do not routinely monitor their growth and development have a 2.4 times greater risk of stunting than those who monitor their growth and development.[13]

Respondent characteristics

Age: The average age of cadre respondents was more than 35 years in both the intervention group and the control group, while the majority of toddler mothers' respondents were in the age range of 20 years to 35 years in both the intervention and control groups. At this age, cadres can make it easier to understand the material presented during training and are classified as productive in carrying out integrated healthcare center activities. In this study, age has an influence on the skills of cadres. This is in line with research which suggests that age affects the knowledge and skills of cadres in carrying out early detection of developments using DPQ.[14]

Meanwhile, the age of the mother who is less than 20 years is associated with the unpreparedness of the reproductive organs which are still in the growth phase to reproduce. At the age of more than 20 years, the mother is psychologically ready to care for children. Meanwhile, an age of more than 35 years is associated with the decline of reproductive organs and the risks posed by pregnancy. Supported by research that states that a history of pregnancy, birth, and perinatal complications is identified as a substantial risk factor for developmental disorders in preschool children.[15] The age that is considered ideal is in the range of 20-35 years which is classified as productive and reproductive organs and will be easier to receive knowledge compared to adulthood because in adulthood a mother has had many experiences that shape her mindset.

Education: Based on education, the majority of respondents, both cadres and toddler mothers, were high school students. Education is a strong and consistent predictor of a person's attitudes, values, and behavior for the future. The education of integrated healthcare center cadres with the most educational history was the high school in both the intervention group (66.7%) and the control group (53.3%). Meanwhile, mothers with senior high school education and tertiary education were in the intervention group (40%) and the control group with high school education (66.7%).

Based on the characteristics of cadres and parents with their educational history, they have the potential to generate ideas and skills in the early detection of development in toddlers. Knowledge obtained through education is improved by a person's level of education in comparison

to a person with low education.[16] Parents with low education influence the parenting style given to children. This is in line with research which states that the level of primary school education of parents is related to the child's height according to age (stunting).[15]

In line with research which states that there is an effect of health education on the ability of cadres to use DPQ in Balung Kidul Village, Jember district (p = 0.000).[17] In addition, this study is in line with research showing that mother's education is a risk factor for child development with an OR of 7,250, (CI) 95%.[18] Mother's education level has a positive impact on child development because a high level of education will make it easier for mothers to find and understand information related to child development and be able to apply early detection of development in children.

Training frequency: Based on the frequency of training, it is known that 60% of cadres have never participated in training on using DPQ in carrying out early detection of development in children. This is in line with research which states that there is a significant effect between DPQ training on increasing the knowledge and skills of integrated helathcare center cadres.[19]

Occasion: From the characteristics of the occassion, it is known that 90% of parents are housewives. As housewives, respondents will have sufficient time to carry out activities in raising children because they are not tied to formal work, so motor stimulation activities and early detection of development in children can be carried out more optimally. According to the results of the study, it was concluded that there was no difference in the proportion of the DPQ rating level between respondents who did not work and who worked or there was no significant relationship between work and DPQ assessments at PMB E Serpong in 2021.[17] The results of the analysis obtained OR = 1.23, meaning that mothers who don't work have 1.23 times the opportunity to evaluate the appropriate DPQ compared to working mothers. in the process of growth and development of children. Supported by research which explains that work stress affects a person's productivity with a value of p = 0.001 (<0.05).[20]

Likewise, between working and non-working mothers there is no significant relationship with the DPQ assessment. According to Handayani (2003), there is a difference in the time spent together between working and non-working mothers with their children. This means that it is not absolutely guaranteed that a mother who is at home (not working) will guarantee the development of a toddler according to age. The reason is that many mothers do not work and stay at home all day, but their relationship with their children's education is not good. This happens because, physically, the mother is with the child, but she is not involved in the stimulation process with the toddler. Based on this, it means that the most important thing for child development is the quality of care, sufficient (quality) time with children in play, and providing adequate stimuli to help the development of children in both working and non-working mothers.[18]

Parity: In general, mothers who have more than one child tend to share their attention. When viewed from the perspective of time and energy, mothers with more than one child will feel overwhelmed and find it difficult to arrange a time to come to the integrated healthcare center because they have to take care of the household and their children. However, in terms of experience and insight, mothers will be more experienced and can make the best use of the integrated healthcare center program because they take lessons from previous children.

In this study, the parity of respondents were mostly 50% who had children ≥ 2. Of course, more and more children make parents more understanding and have personal experience with growth and development and motor stimulation in children, so they are more adept at detecting early development in children. This is in line with research

which shows that there is a relationship between mother's education and parity with the development of children under five aged 3-4 years.[21] In addition, the results of other studies state that there is a relationship between the history of pregnancy examinations and the incidence of stunting in children aged 6-59 months.[22] However, this study is not in line with research which states that there is no significant relationship between parity and maternal participation.[23] Primipara mothers are 3.4 times more likely to be less active in visiting the integrated healthcare center program than multiparous mothers. However, having family members is certainly not a determining factor in children's welfare, this is supported by research which states that there is no relationship between the number of family members and stunting in children aged 6 months-59 months.[22]

Differences in knowledge and skills of cadres before and after training

Health education is an application in education in the health sector with activities to provide and improve knowledge, attitudes, and practices to individuals, groups, and communities in promotive and preventive efforts,[24] based on Table 4 after an assessment of the level of knowledge (pre-post test) on cadres integrated healthcare center with the results of the intervention group (0.000 <0.05) and the control group (0.044 <0.05) which showed that there was an increase in knowledge in each group after being given training regarding the use of DPQ.

After that, this research was continued on an ongoing basis to improve the ability and skills of cadres in carrying out early detection of development in children so that integrated healthcare center cadres are able to assist health workers in carrying out early detection of deviations in child development. Based on the statistical test results in Table 3, it is explained that there was an increase in skills after training using the Android-based DPQ in the intervention group (0.000 <0.05). This shows that the Android-based DPQ is effective for increasing the skills of cadres in carrying out early detection of development in toddlers, especially in stunted toddlers. Whereas in the control group applying early detection of toddler development using conventional DPQ with results (0.103 > 0.05), this shows that conventional DPQ is less effective in improving the skills of cadres in implementing early detection of toddler development.

Differences in knowledge and skills of toddler mothers before and after training

After being given training to cadres in both the intervention group and the control group, the cadres assisted mother o toddlers in implementing DPQ for early detection of toddler development. The statistical test results in Table 7 show that there was an increase in the knowledge of toddler mothers in the intervention group (0.000 <0.05), while in the control group (0.783 > 0.05) meaning that only applying conventional DPQ did not help toddler mothers increase their knowledge about the importance of early detection of developmental toddler.

This research is in line with research that shows that there are significant differences in the acquisition of scores before and after using the Android-based Pekke Madising application with a p-value of 0.000 <0.05, so this study explains that the Pekke Madising application can significantly increase the knowledge of toddler mothers.[27] In addition, it is supported by research that states that the use of media in health education is aimed at getting attention to a problem and recalling information that has been conveyed so that changes in knowledge are obtained.[28]

The results of the research statistical tests in Table 8 show that there was an increase in the skills of toddler mothers in the intervention group (0.000 <0.05) after treatment with the use of Android-based DPQ in carrying out early detection of toddler development. While the results

of statistical tests showed no increase in the skills of toddler mothers in the control group (0.078 > 0.05) after treatment with conventional DPQ. Supported research by Probosiwi *et al.* in Kalasan showed that there was a relationship between stunting nutritional status and toddler development with an OR of 3.9 (95% CI; 1,678,90).

This is in line with research that states that the early detection application developed can detect child growth and development disorders using the DPQ instrument by automatically calculating the number of answers from application users regarding child development . In addition, it was explained that there were three results of application trials that had been carried out by child development experts (81%), health medical teams (89%), and parents (81%). The three groups stated that applications could be categorized as educational tools. Very good aids and can be used by parents to detect the early development of children.[29-32] Supported by research that states that there is a relationship between a mother's knowledge and the growth and development of toddlers.[33]

Research limitations

The sample coverage used in the study was only one working are of the public health center.

In this study the use of Android-based DPQ can only be used in areas that are covered by the internet network.

CONCLUSION

There is an increase in the knowledge of cadres in carrying out early detection of development in toddlers, especially in stunting toddlers, as evidenced by the treatment given to the intervention group related to the use of Android-based DPQ.

There is an increase in the skills of cadres in carrying out early detection of development in toddlers, especially stunting toddlers, as evidenced by the treatment given to the intervention group related to the use of Android-based DPQ.

This research was continued with cadre assistance for toddler mothers, and the results showed that there was an increase in the knowledge and skills of toddler mothers in the intervention group after implementing early detection of toddler development using an Android-based DPQ.

SUGGESTION

For health services: It is recommended that health workers support the development of Android-based DPQ, which is used as an alternative to facilitate monitoring and early detection of developments using Android-based DPQ. It is also recommended to routinely involve integrated healthcare center cadres in monitoring developments in toddlers.

For society: It is suggested that parents increase their knowledge related to child growth and development as well as their motivation to carry out independent monitoring regarding child development, which can be applied through the Android-based DPQ.

For further researchers: For future researchers, if they wish to continue or conduct similar research, it is recommended to add to the Visibility Test (TDL) and Hearing Test (TDD) screenings, as well as to examine in more depth the factors that influence parents' motivation in routinely monitoring children's development.

REFERENCES

1. UNICEF, WHO, World Bank. Levels and Trends in Child Malnutrition. In: UNICEF/WHO/World Bank Group-Joint child malnutrition estimstes 2021 edition. 2021;32. Available from: https://data.unicef.org/resources/jme-report-2021/

2. Kementerian Kesehatan Republik Indonesia. Data dan Informasi Kesehatan. 2018.

3. Kementerian Kesehatan RI. Hasil Study Status Gizi Indonesia (SSGI) Tingkat Nasional, Provinsi dan Kabupaten/Kota. In: SSGI. 2021;167.

4. Kesehatan D. Status Gizi Anak Kabupaten Soppeng. Soppeng. 2021.

5. Kementrian Kesehatan RI. Pedoman Umum Pelayanan Integrated healthcare center. Kementrian Kesehatan RI. 2011;5(1):40-51.

6. Migang YW. Pembinaan Deteksi dan Intervensi Dini Tumbuh Kembang Balita pada Kader Integrated healthcare center. J Pengabdi Masy. 2021;4(2):60-6.

7. Anjani G, Sugiharti RK, Hanum F. Optimalisasi Tumbuh Kembang melalui Edukasi Deteksi Dini Tumbuh Kembang Balita Usia 2 Tahun pada Orang Tua. 2021;947-51.

8. Kementerian Kesehatan R. Indikator Program Kesehatan Masyarakat dalam RPJMN dan RENSTRA Kementerian Kesehatan 2020-2024. Jakarta: Kementerian Kesehatan RI. 2020.

9. Agus, Widiyanto M. Konsep dan Aplikasi dalam Penelitian Bidang Pendidikan, Psikologi dan Ilmu Sosial Lainnya. Jakarta: PT Elex Media Komputindo. 2013;35.

10. Ghozali. Aplikasi Analisis Multivariate dengan Program SPSS. Semarang: Badan Penerbit Universitas Diponegoro. 2015.

11. Natasya RO, Rahman LOA. Penggunaan Mobile Aplikasi Untuk Pemantauan Tumbuh Kembang Anak Usia 0-72 Bulan. J Keperawatan. 2020;10(1):9-17.

12. Oh W-O. Digital healthcare for child health nursing. Child Heal Nurs Res. 2023;29(2):97-100.

13. Waliulu KT, Amiruddin R, Abdullah AZ. Analysis of Household and Environmental Determinants with Stunting Incidents in Ambon Bay, Ambon City. 2023;63(2):7255-69.

14. Jaya ST, Azizah EN, Dinastiti VB. The Effect of Early Detection of Growth and Development Training for Integrated healthcare center Caders On Knowledge and Skill of Motor Stimulation In Darungan Village. Str J Ilm Kesehat. 2020;9(2):1085-91.

15. Almahmoud OH, Abushaikha L. Prevalence and risk factors of developmental disabilities among preschool children in the Arab world: a narrative literature review. Child Heal Nurs Res. 2023;29(2):101-10.

16. Misniarti, Haryani S. Faktor-Faktor Yang Mempengaruhi Ibu Dalam Melakukan Stimulasi Tumbuh Kembang Pada Anak Toddler Di Wilayah Kerja Puskesmas Kabupaten Rejang Lebong. J Nurs Public Heal. 2022;10(1):103-11.

17. Dewi M, Nikmatur R, Elok P. Pengaruh Pendidikan Kesehtan Terhadap Kemampuan Kader Menggunakan Kpsp Di Desa Balung Kidul Kecamatan Balung Kabupaten Jember. fikes.unmuhjember. 2017;21(1):1-9.

18. Bara FT, Tandipasang F. Hubungan Karakteristik Ibu dengan Hasil Pemeriksaan KPSP di Puskesmas Marang. Indones J Midwifery. 2020;3(2):137.

19. Nirmawati D, Fitriani, Ruslang. Pengaruh Pendampingan Terhadap Keterampilan Kader Integrated healthcare center Dalam Deteksi Dini Tumbuh Kembang Anak Usia 0-24 Bulan Di Desa Kajuara. J Pendidik dan Konseling. 2022;4(1):1349-58.

20. Lambo HM, Djajakusli R, Muis M, Wahyu A, Moedjiono AI, Darmawansyah. Effect of Work Stress on the Productivity of Shift Workers in Production Department at Pt.x Makassar City. Indian J Forensic Med Toxicol. 2022;16(1):598-603.

21. Rini AK. Hubungan Pendidikan Ibu Dan Paritas Dengan Perkembangan Anak Balita Umur 3-4 Tahun Di PAUD Baitul Izzah Kota Bengkulu. Interes J Ilmu Kesehat. 2017;6(1):1-6.

22. Sumiati, Arsin AA, Syafar M. Determinants of stunting in children under five years of age in the Bone regency. Enfermería Clínica. 2020;30(4):371-4.

23. Jannah APR, Afifah CAN. The Effect of Employment Status, Parity and Maternal Knowledge on the Participation of Mothers of Toddlers in the Integrated healthcare center Program. Progr Stud S1 Gizi, Fak Tenik, Univ Negeri Surabaya. 2023;15(1):65-79.

24. Notoatmodjo Soekidjo. Promosi Kesehatan dan Ilmu Perilaku. Jakarta: Rineka Cipta. 2007.

25. Yanti, Lailiyana, Hindratni F. Pemberdayaan Kader Integrated healthcare center dalam Pemantauan Tumbuh Kembang Balita Menggunakan KPSP dan Aplikasi "PRIMAKU" sebagai Deteksi Dini Stunting di Desa Tanah Merah Kabupaten Kampar. 2023;1(9).

26. Yanti, Sulistiani A, Patimah EL. Smart Application Detection of Child Growth and Development Sebagai Salah Satu Upaya Deteksi Dini dan Stimulasi Tumbuh Kembang di Cibeber, Lebak, Banten. 2021;13(1):117-27.

27. Pratiwi SK, Sinrang AW, Syarif S, Ahmad M, Bahar B, Maddepungeng M. The Effectiveness of Toddler's Development of Android-based Educational Media Towards Mother's Knowledge. Int J Health Sci (Qassim). 2022;6(1):1031-40.

28. Mey D, Ridayani R, San N, Kristianto J, Muslim M. Penggunaan Media Edukasi Gizi Aplikasi Electronic Diary Food (Edifo) Dan Metode Penyuluhan Serta Pengaruhnya Terhadap Pengetahuan Ibu Hamil. Qual J Kesehat. 2020;14(1):1-10.

29. Saurina N. Aplikasi Deteksi Dini Tumbuh Kembang Anak Usia Nol Hingga Enam Tahun Berbasis Android. J Buana Inform. 2016;7(1):65-74.

30. Ernyasih E, Mallongi A, Daud A, Palutturi S, Stang S, Thaha R, et al. Health risk assessment through probabilistic sensitivity analysis of carbon monoxide and fine particulate transportation exposure. Global J Environ Sci Manage. 2013;9(4):933-40.

31. Mallongi A, Stang S, Astuti RDP, Rauf AU, Natsir MF. Risk assessment of fine particulate matter exposure attributed to the presence of the cement industry. Global J Environ Sci Manage. 2023;9(1):1-16.

32. Astuti RDP, Mallongi A, Choi K. Health risks from multiroute exposure of potentially toxic elements in a coastal community: a probabilistic risk approach in Pangkep Regency, Indonesia. Geomat Nat Hazards Risk. 2022.

33. Puspita L, Umar MY. Perkembangan motorik kasar dan motorik halus ditinjau dari pengetahuan ibu tentang pertumbuhan dan perkembangan anak usia 4-5 tahun. Wellness Heal Mag. 2020;2(1):121-6.