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Research Article

The Effectiveness of the PrimaKu Application on Parents Behavior in Monitoring the Growth of Toddlers

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Abstract

Background: Child development is an important factor. The success of each phase affects the child's ability in the next phase. The low level of knowledge, attitudes and actions of parents about growth, and development disorders can cause deviations in growth, development, and mental and emotional disorders.
Objectives: This study aims to determine the effectiveness of the PrimaKu application on the behavior (knowledge, attitudes, and actions) of parents in monitoring the growth and development of toddlers in the Panincong Health Center Work Area, Soppeng Regency.
Methods: The research design used a quasi-experimental design with a nonequivalent control group pre and post-test design. The sample consisted of 36 respondents who were divided into the intervention and control groups. Data were analyzed using T-test.
Results: The results showed that there was an effect of the PrimaKu application on the knowledge (p-value = 0.0001), attitudes (p-value = 0.0001) and actions (p value = 0.0001) of parents in monitoring the growth and development of toddlers, there was an average difference knowledge (p-value = 0.007), attitudes (p-value = 0.007) and actions (p-value = 0.028) of parents in the intervention group and control group (p-value = 0.0001).
Conclusion: Parents should be able to use the PrimaKu application to improve behavior (knowledge, attitudes, and actions) in monitoring the growth and development of toddlers.

Keywords: behavior, PrimaKu aplication, toddler development

Introduction

Growth and development are two distinct yet inseparable events. Every family hopes that their child can grow and develop optimally.[1] The growth and development of a child are crucial factors. The success of each phase affects the child's abilities in the subsequent phases.[2] According to the World Health Organization (2018), growth issues are not limited to just malnutrition but also include stunting (short stature) and overnutrition. The prevalence of malnourished toddlers is 7.3%, overnourished toddlers are 5.9%, and stunted toddlers (short stature) is 21.9%. Approximately 95% of children with developmental disorders live in low and middle-income countries.[3] The causes of growth and development disorders are influenced by factors such as inadequate nutrition intake, limited access to nutritious food, unaffordable healthcare services, poor environmental hygiene, and other contributing factors like education, income, economic circumstances, gender roles, and governance.[4] The parenting environment, including parent-child interactions, also significantly influences growth and development.[5]

In Indonesia, the number of malnourished toddlers is 3.9%, undernourished is 13.8%, and overnourished is 3.1%. A national survey in Indonesia indicates that around 30% of children aged 36-59 months fail to achieve adequate literacy and numeracy skills and social-emotional abilities.[6] Based on 2019 district/city data, there were 35,793 undernourished toddlers (weight-for-age), 53,421 stunted toddlers, and 17,142 wasted toddlers.[7]

According to research by Suriani et al. (2022), several factors that influence growth and development disorders in toddlers include parental knowledge, infectious diseases, diet, health services, number of family members, age, and education.[8] Research conducted by Amelia (2018) shows that family income is closely related to the type of work of parents. Families with low incomes below the Regional Minimum Wage (*Upah Minimum Regional* or UMR) are more likely to consume food whose nutritional content is inadequate for their family members, causing malnutrition and an increased risk of disease and growth and development disorders in children, however, the results of this research cannot yet explain clearly how to measure growth and development with an application that is accessible and easy for families to use.[9]

According to Winarto (2021), the Indonesian Pediatrician Association (*Ikatan Dokter Anak Indonesia* or IDAI) recommends the use of the PrimaKu application for child health. PrimaKu can be used by parents of toddlers to obtain necessary information about child growth and health conveniently and quickly at their fingertips. PrimaKu can also serve as an alternative to the Mother and Child Health (*Kesehatan Ibu dan Anak* or KIA) book for new mothers.[10] Based on the aforementioned issues, researchers are interested in studying the effectiveness of the PrimaKu application on the behavior (knowledge, attitudes, and actions) of parents in monitoring the growth and development of toddlers in the Panincong Community Health Center's working area.

Methods

This research is a quasi-experimental research with a pre-post nonequivalent control group research design. The population used in this study were all parents who have toddlers in the Panincong Community Health Center working area. The sampling technique used was nonprobability sampling. The sample in this study consisted of 36 respondents who were divided into two groups, namely 18 respondents in the intervention group who were given the PrimaKu application and 18 respondents in the control group without the PrimaKu application. This application can be downloaded from the Apple Store or Google Play Store. This number was obtained using the Feeder formula, with the result being 16 respondents for one group plus a 10% dropout possibility, resulting in a total of 18 respondents per group. Criteria for respondent inclusion are families with toddlers who are in the working area of the Panincong Community Health Center; The family owns and can

use an Android or iOS cellphone; Able to communicate well; Can read and write; Willing to be a respondent. the exclusion criteria are: The family has a toddler who has a congenital abnormality or chronic disease; Toddlers who experience a drastic decline in health status.

The implementation procedure in this intervention group is a) The researcher selects respondents and obtains consent to participate in this research. b) Research for each intervention respondent was carried out at different times according to the time of sampling due to the COVID-19 outbreak so that before treating respondents, researchers applied 3M, namely using masks, washing hands, and maintaining distance to maintain the safety and comfort of respondents. c) Next, according to the contract, the researcher conducted a pre-test and intervention on the PrimaKu application on the first day through a home visit. Before the intervention was carried out, a pretest was carried out, then they were given instructions on using the application by installing it on the respondent's cellphone, then they were taught how to use the application for 30 minutes. A week later the researchers returned to the respondents to monitor whether the respondents could use the PrimaKu application. Next, the posttest was carried out one month after giving the intervention. This research will take place from April 15 to May 15, 2022.

The research procedure in the control group is: a) The researcher selects respondents and obtains consent to participate in this research. b) The research for each control respondent was carried out at different times due to the COVID-19 outbreak so before interacting with respondents, researchers applied 3M, namely using masks, washing hands, and maintaining distance to maintain the safety and comfort of respondents. c) In the control group, only a pretest was carried out by filling out a questionnaire. Next, the posttest was carried out 1 month after the first visit. The research was conducted from April 15 to May 15, 2022. Completing the questionnaire took ± 20 minutes.

Data collection was carried out for one month. The instruments used are knowledge, attitudes, and behavior questionnaires that have been validated. The inclusion criteria for this study were families who have toddlers in the Panincong Community Health Center working area, families who own and can use an Android or iOS smartphone, can communicate effectively, can read and write, and are willing to participate as respondents.

Results

Univariate Analysis

Table 1. Characteristics of Respondent Toddlers' Age

Variable	n	Mean	SD	Min-Max	95% CI
Toddler Age					
Intervention Group	18	40,17	17,60	5-60	31,41-48,92
Control Group	18	31,50	16,47	4-60	23,31-39,69

In Table 1, the average age of toddlers in the intervention group is 40.17 months with a standard deviation of 17.60. The youngest toddler is 5 months old, and the oldest is 60 months old. Based on the estimated interval, it can be concluded that with 95% confidence, the average age of toddlers falls between 31.41 months and 48.92 months. In contrast, the average age of toddlers in the control group is 31.50 months with a standard deviation of 16.47 months. The youngest toddler is 4 months old, and the oldest is 60 months old. Based on the estimated interval, it can be concluded that with 95% confidence, the average age of toddlers falls between 23.31 months and 39.69 months.

Table 2. Characteristics of Respondents (Toddler Gender, Parental Age, Education, Income, Number of Children, and Occupation)

Variable	Intervention Group		Control Group	
	n	%	n	%
Toddler Gender				
Male	4	22,2	9	50,0
Female	14	77,8	9	50,0
Parental Age				
17-25 Years	2	11,1	7	38,9
≥ 26 Years	16	88,9	11	61,1
Education				
Low (Elementary-Junior High School)	10	55,6	12	66,7
High (High School-University)	8	44,4	6	33,3
Income				
Insufficient < Regional Minimum Wage (UMR)	12	66,7	13	77,2
Adequate ≥ UMR	6	33,3	5	27,8
Number of Children	14	77,8	18	88,9
≤ 2	4	22,2	0	11,1
> 2				
Occupation	14	77,8	14	77,8
Unemployed	4	22,2	4	22,2
Employed				

Table 2 above shows the characteristics of respondents based on toddler gender. In the intervention group, the majority of toddlers were female, with 14 respondents (77.8%), while in the control group, there were an equal number of male and female toddlers, with 9 respondents each (50.0%). Regarding parental age, in the intervention group, the majority were aged ≥ 26 years, with 16 respondents (88.9%), and in the control group, the majority were also aged ≥ 26 years, with 11 respondents (61.1%). In terms of parental education, in the intervention group, the majority had low education levels (Elementary-Junior High School), with 10 respondents (55.6%), and in the control group, the majority also had low education levels, with 12 respondents (66.7%).

Bivariate Analysis

Table 3. The Differences in Parents' Knowledge, Attitudes, and Actions Before and After Being Given the Primaku Application in the Intervention Group

Variable	n	Mean	SD	SE	95% CI	p-value
Knowledge	18					
Before		72,94	11,275	2,657	67,34 – 78,55	0,000
After		92,50	5,565	1,312	89,73 – 95,27	
Attitude	18					
Before		106,61	9,574	2,257	101,85 – 111,37	0,000
After		120.06	3.702	0,873	118,21 – 121,90	
Action	18					
Before		23,94	1,662	0,211	23,12 – 24,77	0,000
After		26,72	0,895	1,662	26,72 – 27,17	

Table 3 reveals that the average knowledge of parents in the intervention group before receiving the PrimaKu application was 72.94 with a standard deviation of 11.275, and after using the PrimaKu application, their knowledge increased to 92.50 with a standard deviation of 5.565. The p-value obtained from the analysis is 0.000, indicating a statistically significant

difference. Similarly, the average attitude of parents in the intervention group before using the PrimaKu application was 106.61 with a standard deviation of 9.574, and after using the application, their attitude increased to 120.06 with a standard deviation of 3.702. The p-value is 0.000, indicating a statistically significant difference. Lastly, the average actions of parents in the intervention group before using the PrimaKu application were 23.94 with a standard deviation of 1.662, and after using the application, their actions increased to 26.72 with a standard deviation of 0.895. The p-value is 0.000, indicating a statistically significant difference. Therefore, it can be concluded that there is a significant difference in parents' actions before and after using the PrimaKu application.

Table 4. The Differences in Parents' Knowledge, Attitudes, and Actions Before and After Not Being Given the Primaku Application and the Control Group

Variabel	n	Mean	SD	SE	95% CI	*p value*
Knowledge	18					
Before		81,50	7,853	1,851	77,59 – 85,41	0,007
After		77,50	6,364	1,500	74,34 – 80,66	
Attitude	18					0,007
Before		102,78	7,519	1,772	99,04 – 106,52	
After		107,11	6,370	1,501	103,94 – 110,28	
Action	18					0,028
Before		24,33	1,495	0,353	23,59 – 25,08	
After		23,89	1,367	0,322	1,37- 7,30	

Table 4 indicates that in the control group, there was a decrease in parents' knowledge after not receiving the PrimaKu application, which decreased to 77.50. However, their attitude increased after not receiving the PrimaKu application to 107.11. Parental actions in the control group slightly decreased to 23.89. Therefore, there is a significant difference in parental behavior before and after not receiving the PrimaKu application in the control group.

Table 5. The Differences in the Average Knowledge, Attitudes, and Actions of Parents Before and After in the Intervention and Control Groups

Variable	Groups	Mean	Std. Deviation	p-value	Mean Difference	95% CI	
						Lower	Upper
Knowledge Difference	Intervention	19.56	8.431	0.000	23.556	18.723	28.388
	Control	-4.00	5.541				
Attitude Difference	Intervention	13.44	7.414	0.000	9.111	4.554	13.668
	Control	4.33	5.961				
Action Difference	Intervention	2.78	1.166	0.000	3.222	2.549	3.895
	Control	-0.44	0.784				

Table 5 reveals that the average increase in parental knowledge in the intervention group after receiving the PrimaKu application is 19.56, with a standard deviation of 8.431, while there is an average decrease in parental knowledge in the control group, which is -4.00, with a standard deviation of 5.541. The p-value obtained from the analysis is 0.0001. Similarly, the average increase in parental attitudes in the intervention group after receiving the PrimaKu application is 13.44, with a standard deviation of 7.414, while there is an average increase in parental attitudes in the control group, which is 4.33, with a standard deviation of 5.961. The p-value is 0.0001.

Furthermore, the average increase in parental actions in the intervention group after receiving the PrimaKu application is 2.78, with a standard deviation of 1.166, whereas there is an average decrease in parental actions in the control group, which is -0.44, with a

standard deviation of 0.784. The p-value is 0.0001. Therefore, it can be concluded that the PrimaKu application is effective in improving the knowledge, attitudes, and actions of parents in monitoring the growth and development of toddlers in the Panincong Community Health Center's working area.

Discussion

Characteristics of Respondents

The results of this research show that the majority of respondents have female toddlers. The results of research by Susanti & Septi (2019), show that there is no significant difference in growth and development achievements for boys and girls due to several factors that influence growth and development, not only gender but other internal factors such as (race). /ethnicity or nation, family, age, genetics) and outside/external factors such as (nutritional, mechanical, chemical, endocrine, radiation, infection, immunological disorders, anoxia, embryonic, and psychological).[11]

The results of this research are in line with research conducted by Santri et al (2014), that the factors that have a significant influence on growth and development are education and parental stimulation, while gender, nutritional status, and economic status do not have a significant influence.[12] The same results were also obtained from Maharani and Iwan's (2018) research, which said that children's growth and development were influenced by exclusive breastfeeding and nutritional status, while gender did not affect children's growth and development achievements.[13] According to Rahyubi (2014), gender is one of the factors that needs to be considered in stimulating children's development. Boys are more dominant in mastering gross motor skills and balance skills, while in development girls are more likely to master fine motor skills and visual and graph motor development (writing and drawing).[14]

The analysis revealed that the average age of toddlers in the intervention group ranged from 31.41 months to 48.92 months. According to research conducted by Meiuta Hening (2019), children at the age of 3 typically exhibit good communication skills with their peers, enjoy talking and storytelling with their families, and sometimes engage in singing and dancing. This highlights the significant influence of parents and family on the process of a child's growth and development.[15] Muhammad Hasbi et. al (2020) suggest that, in terms of development, toddlers aged 2-3 years who receive diverse vocabulary stimulation and are regularly read to by their parents tend to have better language abilities.[16] Therefore, parents should not underestimate simple activities with their children, such as storytelling, casual conversations, or playing guessing games. Emotional closeness, coupled with the introduction of new vocabulary from parents, can serve as stimuli for a child's mind and become a reference for their language expression. The age of the child is one of the factors influencing their development, as each child has unique characteristics in developmental activities.[14] The toddler period is a critical time that will determine the outcomes of the child's subsequent growth and development processes. Thus, a supportive environment is needed, including the fulfillment of the child's basic needs encompassing physical, emotional, affectionate, and stimulative requirements.[1]

The respondents in this study consist of 36 parents with toddlers. The results show that the majority of parents in both the intervention and control groups are aged ≥ 26 years. In theory, older individuals tend to be more constructive in coping with the problems they face due to their experience and age, allowing them to facilitate normal growth and development in toddlers.[17] The research results show that the majority of respondents have low education levels in Elementary School and Junior High School. Education level can affect knowledge, leading to positive behavioral changes. A person's education also influences their understanding of the material or knowledge they receive.[18] The research results show that the majority of respondents have monthly incomes below the Regional Minimum Wage. However, the geographical location of their residences in rural areas

allows for lower living costs compared to urban and suburban areas. Additionally, residents utilize their yards, gardens, and fields for food cultivation. Therefore, staple foods, vegetables, and fruits are produced locally, reducing the need to spend money on these necessities. The research findings indicate that the majority of respondents in both groups have ≤ 2 children. This aligns with research conducted by Susilawati et al (2017), suggesting that older mothers with two or more children tend to have higher knowledge and skills because they have experience in caring for their first child. The research results show that the majority of respondents do not work. This corresponds with research conducted by Susilawati et al (2017), which suggests that mothers who do not work have more time to spend with their children. This extra time allows for interaction, play, and activities that stimulate the child's growth and development (Mother-Child Relationship). Families with higher incomes will spend and allocate funds for their children's growth and development needs, such as meeting children's nutritional needs from pregnancy to childhood. In the developmental aspect, meeting children's needs such as educational games can stimulate growth and development.[19] In line with research conducted by Zuhri (2015), economic conditions as a family background are important in raising children considering that in families with a low economy, the head of the family (father) has to work hard, even the mother also works to find additional income so that the family's needs are met. This condition allows parents' moods and behavior in caring for their children to be affected.[20]

Differences in Parental Behavior (Knowledge, Attitude, and Action) in Monitoring Toddler Growth and Development

The research results indicate that there is an influence of the PrimaKu application on parental knowledge (p-value = 0.0001), attitude (p-value = 0.0001), and action (p-value = 0.0001) in monitoring toddler growth and development. The research shows that parents with good knowledge tend to have positive attitudes (supportive), which aligns with Notoatmodjo's theory (2014) that a person's knowledge is good if they receive good information, which, in turn, influences a person's knowledge level.[21] This is also consistent with Imelda's research (2017), which found a relationship between parental knowledge leading to behaviors that stimulate the motor skills, language, and social development of children in Banda Aceh.[22]

Knowledge can be acquired by parents through internet-based media and applications.[23] The PrimaKu application is a new concept for the respondents in this study, which piqued their interest in using it to monitor the growth and health of their children from birth regularly and continuously. Through this application, parents can input their child's medical data, such as height, weight, and head circumference, enabling parents to determine if their child is growing normally for their age and gender. Medical record data is presented in a single, easily understood graph. Saadah et al. (2021) conducted a study on improving knowledge and early detection skills of child growth and development using the PrimaKu application, and the results showed that respondents could independently open and use the PrimaKu application, perform child growth measurements through the application, and interpret the results accurately.[24]

There are differences in the average knowledge (p-value = 0.007), attitude (p-value = 0.007), and action (p-value = 0.028) of parents in the control group. The utilization of the Mother and Child Health Booklet (KIA) by mothers and midwives has not been optimal. The KIA booklet's coverage is only 72.34%, which is below the Minimum Service Standard target. Many KIA booklets are incomplete in terms of documentation, making it challenging for midwives to make informed decisions when monitoring the growth and development of toddlers, ultimately affecting the quality of future generations.[25]

There are differences in parental behavior between the intervention and control groups (p-value = 0.0001). Research by Breland et al (2013) explained that using

applications can improve user skills.[26] Similarly, research by Hawkes et al (2013) explained that the use of m-Health applications improves knowledge and skills.[27] This is in line with the literature study by Bert et al (2014), which suggested that m-Health application use can be a means of promoting health. m-Health applications contain health information that users can use as a source of information.[28] The results of this study are consistent with what Klansja & Pratt (2012) conveyed, that smartphones are effective in healthcare services due to their widespread use, portability, and ability to provide personal information, enabling effective information delivery and increasing user knowledge.[29] In line with the research by Susilawati et al. (2017), it is highlighted that parents who receive information about child health applications are capable of understanding, accepting, and applying knowledge effectively. This application assists parents in monitoring the growth and development of their toddlers.[19]

The interaction between parents and children occurs when parents engage in stimulation, detection, and early intervention to monitor the development of their children. Appropriate stimulation must be based on parents' knowledge as caregivers regarding the stages of child development. Barnard stated that one of the functions of parents is as caregivers, involving cognitive growth fostering activities. Parents can provide stimulation according to the child's level of understanding. To fulfill this role, parents must know their child's abilities, and they must have the energy to apply their expertise to prevent disruptions in the child's growth and development.[30]

This research aligns with the study by Suryanto et al. (2014), which emphasizes that family roles and social support influence the growth and development process. The growth and development of toddlers require useful stimuli/stimulation for their potential to develop. The development of children is significantly influenced by the environment and parent-child interactions. The main goal is to maintain physical well-being, improve the child's health, and facilitate the child in developing their abilities.[31]

Early intervention in growth and development disorders is expected to increase the likelihood of a child's success in maintaining optimal quality of life as a responsiveness to caregivers.[30] Therefore, an easy and practical information system that can be accessed at any time is needed. Klasnja & Pratt (2012) mentioned that smartphones are effective in healthcare services due to their widespread use, portability, and ability to provide personal information.[29] Thus, information is conveyed effectively, enhancing user knowledge. The PrimaKu application is one way to improve parents' behavior in monitoring the growth and development of toddlers. A person needs time to improve behavior, so knowledge alone is not enough; repeated practice is required for parents to become accustomed to performing independent stimulation, detection, and early intervention as a form of monitoring the growth and development of toddlers.

Conclusion

The results of this study reveal significant differences in parents' knowledge, attitudes, and actions when monitoring the growth and development of toddlers before and after the implementation of the PrimaKu application. Specifically, noteworthy variations exist in both the knowledge and attitudes of parents when utilizing the PrimaKu application. Furthermore, substantial differences are observed in the actions of parents before and after incorporating the PrimaKu application.

The efficacy of this application is also evident in enhancing parents' knowledge concerning the monitoring of toddlers' growth and development. Consequently, the utilization of the PrimaKu application demonstrates a positive influence on enhancing parents' knowledge, attitudes, and actions when monitoring the development of children under five. This underscores the potential of the application as an effective tool in supporting parents' roles to ensure optimal growth and development in their children.

Conflict of Interest Declaration
There is no conflict of interest in this research.

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