Stunting Prevention Efforts Through Mentoring the Use of the SCATION (Stunting Care Application) for Mothers of Toddlers in the Medan City Community Health Center Work Area

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ARTICLE INFO	ABSTRACT
Keywords: Mothers of Toddlers, SCATION Application, Stunting.	**Background**: Stunting is still one of the main health problems in Indonesia that has an impact on physical growth, cognitive development, and the quality of human resources in the future. The use of digital technology, especially mobile-based health applications, is one of the innovative strategies in supporting stunting prevention efforts. This study aimed to analyze the effect of assistance in the use of SCATION (Stunting Care Application) applications on improving the knowledge, attitudes, and behaviors of mothers under five in stunting prevention. **Methods**: The study used a quasi-experimental design with a one group pretest-posttest with control group design. The sample amounted to 128 mothers under five who were divided into an intervention group (64 people) and a control group (64 people) using the proportionate simple random sampling technique. **Results**: Data was collected through knowledge questionnaires, early interventions, digital literacy, and application usage logs, then analyzed using the Chi-Square bivariate test and the differential test (t-test/Wilcoxon). The results showed that assistance in the use of the SCATION application had a significant effect on increasing maternal knowledge about stunting ($p < 0.05$), changes in stunting prevention attitudes and behaviors, and the sustainability of application use after the intervention period. Mothers with good digital literacy, family support, and adequate internet access were more consistent in using apps and showed better preventive behaviors than the control group. **Conclusion**: SCATION application assistance has proven to be more effective and efficient than conventional methods in improving stunting prevention efforts in mothers under five. Digital technology-based interventions are worthy of being used as an innovative strategy in supporting the national program to accelerate stunting reduction.

I. Introduction

Malnutrition is a condition in which children do not receive adequate nutritional intake according to their age-specific needs. Stunting in children remains a major global problem. Stunting not only impacts a child's height but is also associated with impaired brain development, reduced cognitive function, and a reduced quality of human resources in the future (United Nations-World Health Organization-The World Bank Group 2019). Effective interventions during the First 1,000 Days of Life (HPK) are key to preventing stunting. The quality of human resources (HR) is crucial for national development, and nutrition plays a crucial role in determining intelligence and productivity. Indonesia still faces serious nutritional challenges, including stunting and wasting in toddlers, as well as anemia and chronic kidney disease (CED) in pregnant women, which lead to low birth weight (LBW) babies and malnutrition in children. The causes are diverse, ranging from inadequate dietary intake to poverty,

poor sanitation, limited food access, poor parenting practices, and suboptimal health services (Kemenkes 2023)

Good nutrition can maximize children's growth, development, learning, play, participation, and contribution – while malnutrition damages children's futures and makes their lives unhealthy. Stunting is a devastating consequence of poor nutrition from conception and early childhood. Children who suffer from stunting will not reach their maximum height and brain development will not be optimal (UNICEF (United Nations Children's Fund) 2023). Children have difficulty socializing with friends, they face learning difficulties in school, earn lower incomes as adults, and face barriers to participation in society (UNICEF 2019). Data from the 2023 Indonesian Health Survey states that the current prevalence of stunting in Indonesia is 21.5 percent, a decrease of 0.1 percent from the 2022 Indonesian Toddler Nutrition Status Survey of 21.6 percent. However, UNICEF and WHO data show that Indonesia's stunting prevalence is the 27th highest out of 154 countries with stunting data, placing Indonesia in fifth place in Asia. One of the efforts recommended by the Ministry of Health to reduce stunting rates is to increase public education about the importance of the first 1000 days of life in preventing stunting.

Technology makes it easier for humans to support human performance, for example smartphones. To help parents' independence in detecting their children's growth and development, technological advances are used, namely by incorporating growth and development applications into smartphones. Therefore, the SCATION (stunting care application) Application Assistance is in line with the government's program in digitizing health services. With structured assistance in the use of this application, it is hoped that there will be an increase in knowledge, changes in attitudes, and positive behavior of mothers in preventing stunting. This strategy is in line with SDGs), namely goal 2: End Hunger, Achieve Food Security and Good Nutrition and Promote Sustainable Agriculture, especially target 2.2, which is to end all forms of malnutrition including stunting in children under five by 2030. And SDGs Goal 3: Ensure Healthy Lives and Promote Well-Being for All Ages, especially target 3.2, which is to end preventable deaths in children under five. An initial survey at the Kampung Baru Community Health Center showed that out of 10 mothers with toddlers, 3 admitted to not knowing about stunting or its interventions, 3 had never received mobile phone-based health education, and 4 had only heard the term stunting but did not fully understand its impact on children. In addition, 2 toddlers were found to be stunted, with a total of 8 cases of stunting in the Kampung Baru Community Health Center's work area. Meanwhile, at the Medan Area Selatan Community Health Center, there were 2 toddlers with stunting and 15 children experiencing malnutrition. Based on these findings, researchers are interested in conducting research on stunting prevention efforts through mentoring the use of the SCATION (Stunting Care Application) application for mothers of toddlers in the Medan City Community Health Center's work area in 2025.

II. METHODS

This study used a quantitative quasi-experimental design with a one-group pretest-posttest and control group. This design was chosen because full randomization is difficult to implement in the population of mothers of toddlers in the Community Health Center (Puskesmas) work area, both due to ethical and practical limitations. The quasi-experiment evaluates the effectiveness of the intervention in real-world conditions through a pre- and post-treatment comparison (Sugiyono 2017) . Its limitations lie in the potential for selection bias and the presence of external variables that are difficult to control, but this design remains relevant for assessing the effectiveness of the SCATION application in preventing stunting in mothers of toddlers. This study will also integrate a mixed-method approach by adding qualitative components in the form of in-depth interviews and focus group discussions (FGDs) to obtain data on the experiences of SCATION application users. The total sample size was 128 mothers of toddlers divided into 2 groups, namely 64 as the intervention group, 64 as the control group. The sampling used in this study was Proportionate simple random sampling, a simple random sampling method where each member of the population has an equal chance of being selected as a sample.

III. RESULTS

Univariate analysis to describe the research subjects, including age, education, and digital literacy. The results are presented in a table that summarizes the research findings. Respondents in this study consisted of two groups: the intervention group and the control group

Table 1. Characteristics of Respondents in the Medan City Community Health Center Work Area in 2025

Characteristics		Intervention		Control		Total	
		N	%	N	%	N	%
Age	Young Reproductive Age (<20 years)	7	10,9	3	4,7	10	7,8
	Reproductive Age (20-35 Years)	51	79,7	23	35,9	74	57,8
	Older Reproductive Age (>35 Years)	6	9,4	38	59,4	44	34,4
	Total	64	100	64	100	128	100
Education	Elementary School	2	3,1	1	1,6	3	2,3
	Middle School	9	14,1	7	10,9	16	12,5
	High School	44	68,8	47	73,4	91	71,1
	University	9	14,1	9	14,1	18	14,1
	Total	64	100	64	100	128	100

Source: Results Processed Data, 2025

Based on table 4.1.1 Based on the table above, in the intervention group, the majority of respondents were at a healthy reproductive age (20–35 years) of 51 people (79.7%), followed by young reproductive age (<20 years) of 7 people (10.9%), and old reproductive age (>35 years) of 6 people (9.4%). While in the control group, the majority of respondents were at an old reproductive age (>35 years) of 38 people (59.4%), then healthy reproductive age (20–35 years) of 23 people (35.9%), and young reproductive age (<20 years) of 3 people (4.7%). Overall, of the 128 respondents, the majority were at a healthy reproductive age (20–35 years) of 74 people (57.8%), followed by old reproductive age (>35 years) of 44 people (34.4%), and young reproductive age (<20 years) of 10 people (7.8%). In the intervention group, the majority of respondents had a high school education level, namely 44 people (68.8%), followed by college 9 people (14.1%), junior high school 9 people (14.1%), and elementary school 2 people (3.1%). In the control group, the majority also had a high school education, namely 47 people (73.4%), then college 9 people (14.1%), junior high school 7 people (10.9%), and elementary school 1 person (1.6%). Overall, of the 128 respondents, the highest level of education was high school, namely 91 people (71.1%), followed by college 18 people (14.1%), junior high school 16 people (12.5%), and elementary school 3 people (2.3%)

Normality Test

To determine whether the data is normally distributed or not, a statistical test using the Kolmogorov-Smirnov test was performed. The data normality test in this study is required as a prerequisite for analyzing the data used. The results of the data normality test in this study were in the pre-post intervention and control groups. The results of the normality test using Kolmogorov-Smirnov obtained a p value of $0.000 < 0.05$, so it can be concluded that the data is not normally distributed, therefore the data was analyzed using Mann-Whitney.

Table 2. Differences in Knowledge of Mothers of Toddlers after Intervention in the Intervention and Control Groups

Group	N	Mean rank	Sum Of Ranks	p-value
Intervention (SCATION)	64	84,10	5382,50	
Kontrol (Coventional book)	64	44,90	2873,50	0,001

Source: Results Processed Data, 2025

Based on the results of the analysis using the Mann-Whitney U test, a p value of 0.001 (p < 0.05) was obtained, which means there was a significant difference between the intervention group (using the SCATION application) and the control group (conventional). The mean rank value in the intervention group (84.10) was higher than that of the control group (44.90), indicating that the use of the SCATION application was more effective than the conventional method

Table 1. The influence of age on the effectiveness of using the SCATION application in preventing stunting in the Medan City Community Health Center Work Area

Variable	Aplication SCATION						Total	p-value
Age	Effective			Ineffective				
	f	%	f	%	F	%		
Young Reproductive Age	7	5,5	3	2,3	10	7,8		
Reproductive Age	61	47,7	13	10,2	74	57,8		
Older Reproductive Age	26	20,3	18	14,1	44	34,4		0,021
Total	94	73,4	34	26,6	128	100		

Based on the Chi-Square test, a p value of 0.021 (p < 0.05) was obtained, indicating a significant relationship between maternal age and the effectiveness of using the SCATION application. Mothers of healthy reproductive age (20–35 years) used the SCATION application most effectively. Mothers of older reproductive age (>35 years) had a lower level of effectiveness, possibly due to adaptation factors to technology. Younger ages (<20 years) were quite effective (70.0%), but the number of respondents was relatively small. This indicates that the productive age group of 20–35 years is the most optimal group in utilizing the SCATION application for stunting prevention.

Table 4. The Influence of Education on the Effectiveness of Using the SCATION Application in Preventing Stunting in the Medan City Community Health Center Work Area

Variable	Aplication SCATION						p-value
Education	Effective		Ineffective			Total	
	f	%	f	%	f	%	
Elementary School	0	0	3	2,3	3	2,3	
Middle School	9	7,0	7	5,5	16	12,5	
High School	69	53,9	22	17,2	91	71,1	0,004
University	16	12,5	2	1,6	18	14,1	
Total	94	73,4	34	26,6	128	100	

Based on the Chi-Square test, a p-value of 0.004 (p < 0.05) was obtained, indicating a significant relationship between maternal education and the effectiveness of SCATION application use. Respondents with a university education showed the highest effectiveness of application use. This indicates that the higher the level of education, the better the effectiveness of using the SCATION application. Higher education likely makes it easier to understand information and adapt to digital technology.

IV. DISCUSSION:

Chi-square test results indicated a significant relationship between respondent age and the effectiveness of using the SCATION app (p = 0.021). Of the 128 respondents, the majority of users in the reproductive age group (20–35 years) demonstrated higher effectiveness (82.4%) compared to younger age groups (<20 years, 70.0%) and older age groups (>35 years, 59.1%). This indicates that young adults tend to be more adaptable in utilizing digital health apps compared to other age groups. This research aligns with the Theory of Cognitive Development, which states that individuals in young adulthood are in the formal operational stage, characterized by the ability to think abstractly and logically, making them more receptive to new technology. This also aligns with the Theory of Diffusion of Innovations (Rogers and Everett n.d.), which emphasizes that young to early adult age groups are more likely to be early adopters of technological innovations, including health apps.

This research aligns with several previous studies that confirm the influence of age on technology acceptance. (Alhuwail and Abdulsalam, 2019) showed that younger patients use digital health applications more frequently than older patients and also reported that students aged 18–25 years have better digital literacy in using mobile learning applications. Research (Widianawati et al. 2023) states that age, education, and duration of mobile phone use influence the acceptance of health applications. Similarly, research (Liu et al. 2021) shows that older users face challenges in adopting and using digital

health applications due to sensorimotor limitations, low motivation, and limited computer literacy. This means that implicitly, younger age groups are usually more consistent in using digital applications than older adults. Thus, it can be concluded that age is an important factor in the effectiveness of using the SCATION application. The younger the respondents, especially those in the reproductive age group (20–35 years), the higher the effectiveness of using this application. These findings strengthen previous theories and research that age factors need to be considered in developing strategies for implementing digital health applications. The results of the analysis using the Chi-Square test showed a significant relationship between education level and the effectiveness of using the SCATION application (p = 0.004). Of the 128 respondents, those with a college education (PT) had the highest application effectiveness (88.9%), followed by those with a high school education (75.8%) and those with a junior high school education (56.3%). Conversely, respondents with a primary school education (SD) tended to be ineffective in utilizing this application (100% ineffective).

This finding aligns with Becker's (1964) Human Capital Theory, which states that the higher a person's education level, the greater their ability to utilize skills and resources, including technology. Furthermore, the Diffusion of Innovation Theory (Rogers and Everett n.d.) also emphasizes that groups with higher education levels are typically early adopters of technological innovations. The results of this study are supported by a study (Algifari et al. 2024) which found that the digital health literacy indicator (digital health literacy) was significantly influenced by education level (p < 0.001)—the higher the education, the higher the respondents' digital literacy and skills. Research (Widianawati et al. 2023)found that formal education is a significant factor in the acceptance of health applications. Individuals with a higher educational background tend to be more prepared and more receptive to innovations such as chronic disease detection applications. Meanwhile, research (Eka Falentina Tarigan, 2022) showed that respondents with high school and college education were more likely to use e-health applications than respondents with lower education. Another study by (Pangaribuan et al. 2023) in Langkat Regency showed that education level significantly influences the adoption of mobile health applications, with students and college graduates more active in using them. (Hutagalung et al. 2024) also found that education plays a significant role in the acceptance of community-based health applications in rural communities in Indonesia. Furthermore, (Widianawati et al. 2023) revealed that respondents with higher education had a higher success rate in using health apps for chronic disease management. Therefore, it can be concluded that the higher a person's education level, the more effective their use of the SCATION app. Education is a crucial factor in supporting digital literacy, acceptance of innovation, and the successful implementation of digital health apps in the community. The Mann-Whitney test results showed a significant difference in knowledge levels between the intervention group (using the SCATION app) and the control group (conventional method), with a p-value of 0.001. The intervention group had a higher mean knowledge rank (Mean Rank = 84.10) than the control group (Mean Rank = 44.90). This suggests that using the SCATION app significantly improved respondents' knowledge compared to conventional methods. This underscores the importance of social interaction and technology as scaffolding in the learning process. Furthermore, the diffusion of innovation theory by (Rogers and Everett n.d.) explains that the adoption of new technologies, such as the SCATION app, can accelerate the dissemination of information and increase knowledge within the community. This research is supported by a study (Ameyaw, Amoah, and Ezezika, 2024) that found the use of digital health apps effective in improving mothers' knowledge regarding reproductive health. Adusei-Mensah et al. 2025 also reported that app-based media significantly improved health knowledge compared to conventional methods. (Pangaribuan et al. 2023) showed that the use of mobile health applications can improve mothers' knowledge about stunting. (Hendryani and Susana, 2020) in their study stated that app-based interventions were more effective in increasing parental knowledge about stunting and confirmed the effectiveness of mobile health technology in improving public health literacy at large. Thus, the results of this study confirm that the SCATION app-based intervention is more effective in improving knowledge than conventional approaches.

V. CONCLUSION

Based on the results of the study "Efforts to Prevent Stunting Through Assistance in the Use of the SCATION Application (Stunting Care Application) for Mothers of Toddlers in the Medan City Health Center Work Area in 2025", several conclusions were obtained as follows: Based on the results of the

study, maternal characteristic factors were significantly related to the effectiveness of the use of the SCATION application with significance based on maternal age (p = 0.021), maternal education (p = 0.004), The younger the reproductive age, the higher the education, and the better the digital literacy, the more effective the use of the SCATION application and There was a significant difference in knowledge between the intervention group (SCATION application) and the control (KIA Book) with a value of p = 0.001, where the intervention group had a higher increase in knowledge.

VI. ACKNOWLEDGMENTS:

VII. CONFLICTS OF INTEREST
No conflict of interest was found during the research.

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