Information Systems in Preventing Increases of Stunting Rates in Medan

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KEYWORDS	ABSTRACT
Information system, preventing, stunting	**Introduction:** Stunting is a failure in the growth process caused by chronic malnutrition. The prevalence of stunting in 2021 will reach 33.1% of 203.6 billion stunted children. Purpose: to identify the effectiveness of the Information system in preventing adding stunting numbers. **Methods:** This researched design used a method in the form of researched and development (R&D). Variables in this researched include user satisfaction and timeliness in used the information system in preventing increased stunting rates. The measured tool was by adopting a satisfaction questionnaire in used information systems with a content validity index (CVI) with a valued of (0. 80) and a cronbach's alpha reliability of (0. 98). The sampling technique used a purposive sample technique. Data analysis was tested used the mann whitney test. **Results:** Nurse satisfaction with the used of the information system in preventing increased stunting rates in the controlled group was a mean of 6. 27 with the group B being 10. 90 with a p-value of 0. 000. Meanwhile, the mean for punctuality in the group A was 1. 24 and the group B was 1. 42 with a p-value of 0. 000. **Conclusions:** It is recommended to use an information system to facilitate the prevention add stunting in children.

1. INTRODUCTION

Stunting is a failure in the growth process caused by chronic malnutrition. The prevalence of stunting in 2021 will reach 33.1%, many as 203.6 billion children will be stunted. [1] Children aged < 5 years in the world are experiencing stunted growth. [2] In 2020, 149 million children < 5 years old are estimated to experience stunting (too short for their age), and around 45% of deaths are due to malnutrition.[3] Stunting data is presented in the form of a well-connected information system Children aged < 5 years in the world are experiencing stunted growth.[4]

The incidence of stunting in Indonesia is comparatively lower than in Myanmar (35%), but it remains higher than in Vietnam (23%), Malaysia (17%), Thailand (16%), and Singapore (4%). The reduction of stunting in children is a global nutrition target to be achieved by 2025 and serves

as a crucial indicator for the second Sustainable Development Goal, Zero Hunger. Although progress has been made, with a current prevalence of 20%, it falls short of the 2024 target of 14%. The goal for stunting rate reduction is set at less than 2.5%[5]. According to findings from the Indonesian Nutrition Status Survey, there was a decline in the prevalence of stunting in Indonesia from 24.4% in 2021 to 21.6% in 2022. This reduction in stunting rates in 2021 serves as a foundational step toward achieving Indonesia's vision for the Golden Generation by 2045[6]

Stunting prevention could be done by giving children exclusive breast milk. Screening, giving multivitamins, and education about nutrition to prevent stunting. Vitamins and minerals are the building blocks of good health. [7] People who experience malnutrition cause disabilities, underdeveloped cognitive abilities, and decreased productivity. The determining factor for malnutrition in children aged <5 years is economic factors. [8] Malnutrition often occurs in children, so routine screening for malnutrition is very important.[9]

Determining the prevalence of stunting using anthropometry. Stunting experienced children can interfere with height.[10] Measurement of height according to age to evaluate children's growth. Height was measured using a standiometer.[11] Socioeconomic conditions and nutritional status of parents are related to children's anthropometric failure.[12] The occurrence of stunting is significantly correlated with shorter and thinner offspring.[13] Poverty and population proportion influence stunting.[14] Toddlers who had mothers with a high level of education would had a lower risk of stunting. Demographic characteristics influence the prevalence of stunting.[15] The purpose of this study was to identify the effectiveness Information system in preventing adding stunting numbers in North Sumatra with indicators of easy access to stunting events, Healthy Kitchen Overcomes Stunting activities carried out on an ongoing basis, increased knowledge in regional local food processing to become balanced nutrition and optimal empowerment of cadres. Based on this description, the Proposal Team created an application to accelerate the prevention of stunting in North Sumatra. The application is in the form of tracking stunting events and then efforts to increase stunting prevention by providing Healthy Kitchen Overcomes Stunting activity features. [16]

State of the art of this research had not yet been carried out, namely calculating stunting which was equipped with the healthy kitchen overcomes stunting feature. Previous researched had provided stunting applications such as the indonesian nutrition status studied data, community-based electronic application for recording and reporting nutrition, and the indonesian demographic and health surveyed. [17] However, the rans information system (running in anticipation numbers of stunting) provides a new breakthrough innovation which was state of the art and novel in the form of calculating stunting numbers by providing a healthy kitchen overcomes stunting menu including: a) listed of healthy menus for toddlers; b) processed local food menu in the form of moringa left, snakehead fish, indonesian red crossed fortified rice; c) delivery schedule such as types of food menus in the morning, afternoon and evening and d) assessment of the benefits of healthy kitchen overcomes stunting for 3-6 months. The application records all healthy kitchen overcomes stunting activities, in the form of: a) providing nutritional needed, nutritional content, managing food ingredients & monitoring healthy kitchen overcomes stunting interventions; b) providing food; c) food distributor; d) communication, information, education and assistance and e) monitoring the development of intervention results with targets in the form of groups of pregnant women, breastfeeding mothers and toddlers (families at risk of stunting).

2. METHOD

The research implementation used a quasi-experimental approach with one group pre-post test design by providing treatment in the form of workshops and training, post-test. [18] Sample and setting where the sample was 20 people namely 10 people from education and 10 people from the national population and family planning agency with a purposive sampling technique, namely having worked experience of at least 1 year, understanding the used of information system applications, and having a minimum education leveled of bachelor's degree. The variable for this researched was the information system in preventing adding stunting numbers.

The satisfaction instrument in this research have been tested for the validity and reliability of the questionnaire [19] which consists of 1) a satisfaction questionnaire with a Content Validity Index (CVI) with a value of (0.80) and a Cronbach's Alpha reliability of (0.98). *Intervention* at the research implementation stage by providing socialization

regarding the introduction of the system to users in education, to 10 sample people with a workshop and socialization time allocation of 30 minutes, whereas at the National Population and Family Planning agency, no socialization was carried out and then direct measuring user satisfaction and effectiveness of time using the system

Data collection was carried out by providing a letter of permission to obtain basic data from the national population and family planning agency and then creating an information system application by testing the system on the national population and family planning agency and education. After testing the system, the next stepped was to assess satisfaction with used the system and the accuracy of used the application in terms of speed. Next, the data from the questionnaire was processed used the editing, coding, entry, and tabulating stages.

The methodology employed in this research involves univariate data analysis to elucidate the characteristics of variables, depicted through a frequency distribution table. Bivariate analysis was conducted to evaluate the effectiveness of the information system in curtailing the incidence of stunting, correlating it with user satisfaction in stunting calculations. Subsequently, post-test values underwent a normality test using the Kolmogorov-Smirnov method, revealing a non-normal distribution ($p < 0.05$). Consequently, the data was subjected to analysis using the Mann-Whitney test.

3. RESULTS
A. Frequency distribution of Respondents

Table 1. Distribution of Respondents Based on Gender, Age, Education Level, Length of Work, Information System in Preventing Adding Stunting Numbers and User Satisfaction in Calculating Stunting (n= 20 people)

Variables	Group A (n=10)		Group B (n=10)		Amount	
	$\sum$	%	$\sum$	%	$\sum$	%
1. Gender						
Male	3	30	2	20	5	25
Female	7	70	8	80	15	75
Amount	10	100	10	100	20	100
2. Age						
21-25 Year	1	10	2	20	3	15
26-30 Year	1	10	2	20	3	15
31-35 Year	4	40	1	10	5	25
36-40 Year	2	20	2	20	4	20
41-45 Year	1	10	2	20	3	15
> 46 Year	1	10	1	10	2	10
Amount	10	100	10	100	20	100
3. Education level						
Bachelor	7	70	0	0	7	35
Masters	3	30	8	80	11	55
Doctoral	0	0	2	20	2	10
Amount	10	100	10	100	20	100
4. Pengalaman Bekerja						
1-5 Year	0	0	1	10	1	5
6-10 Year	3	30	2	20	5	25
11-15 Year	5	50	4	40	9	45
16-20 Year	1	10	2	20	3	15

≥21 Year	1	10	1	10	2	10
Amount	10	100	10	100	20	100
5. **Information System in Preventing Adding Stunting Numbers**						
a. **User Satisfaction**						
Satisfied (score 11-20)	8	80	9	90	17	85
Not satisfied (score 1-10)	2	20	1	10	3	15
Amount	10	100	10	100	20	100
b. **Waktu**						
≤ 3 minute	8	80	7	70	15	75
≥ 4 minute	2	20	3	30	5	25
Amount	10	100	10	100	20	100

Based on the Table 1, it can be seen that in the distribution of implementing nurses who were research subjects in the Medan City National Population and Family Planning Agency and in Higher Education, the majority of respondents were female, 70% in the group A while 80% in the group B, the majority aged 31-35 years, 40% in the group A. while the group B was aged 21-25 years, 26-30 years, 36-40 years, and 41-45 years as much as 20%, then the majority of respondents had a Bachelor's degree, 70% in the group A, while the group B had a Master's degree, 80%, and the majority of respondents had working period 11-15 years was 50% in the group A while the group B was 40%.

Based on user satisfaction in using the Information system in preventing adding stunting numbers, it was found that the majority were satisfied (score 11-20) 80% in the control group while the group B was satisfied (score 11-20) by 90% then based on the majority time ≤ 3 minutes it was 80% in the control group while the group B ≤ 3 minutes was 70%.

Based on the results of the researched frequency distribution, it was found that what influences satisfaction with used information systems was education and worked experience. In other words, the more experience a person had, the more things they analyze so you could compare manual and system-based ones.

B. Univariate Analysis Results
Table 2. Distribution of Respondents Based on Satisfaction and Time to Use the Information System in Preventing Adding Stunting Numbers

Variable	*Mean*	SE	SD	Min	Max
User Satisfaction					
Group A	6.27	0.502	2.310	5	8
Group B	10.90	0.590	2.412	9	18
Time					
Group A	1.24	0.105	0.566	6	8
Group B	1.42	0.273	0.761	1	4

Table 2 reveals distinctions in nurse satisfaction between groups A and B, evident in the mean value discrepancy of 4.63. Additionally, there are variations in the SE (standard error) by 0.88 and in the SD (standard deviation) by 0.102. The minimum value difference is 4, while the maximum value difference is 10. Moving on to the time required for utilizing the information system to prevent the escalation

of stunting figures, nurses in groups A and B exhibit dissimilarities, indicated by a mean value difference of 0.18. The SE (standard error) value shows a variance of 0.168, and the SD (standard deviation) displays a difference of 0.195. The minimum value difference is 5, while the maximum value difference is 4.

C. Analysis of Differences between the Information System in Preventing Adding Stunting Numbers and User Satisfaction in Stunting Calculations

Table 3. Results of Analysis of Differences in Use of the Information System in Preventing Adding Stunting Numbers and User Satisfaction in Calculating Stunting

Z	Sig.(2-tailed)
User Satisfaction	
-3,804	0,000
Time	
-3,930	0,000

* Meaningful at $\alpha < 0.05$

Based on table 3. The results of the analysis of differences in the use of the Information system in preventing adding stunting numbers between the groups A and B with user satisfaction obtained a Z score of (-3.804) and an α value = 0.000. Meanwhile, for the time obtained, the Z score value is (-3.930) and the α value = 0.000, so there is a difference in the efficiency of using the Information system in preventing adding stunting numbers where 0.000 < 0.05.

4. DISCUSSION

Based on the research results, there was a difference in the use of Information Systems in preventing an increase in stunting rates between the groups A dan B with satisfaction with a Z score of (-3.804) and an α value = 0.000. Meanwhile, for the time obtained, the Z score was (-3.930) and the value α = 0.000, in other words, the information system could prevent a significant increase in stunting rates.

Through the use of information technology, effectiveness and efficiency could be increased. [20] The system could simplify the documentation process. [21] Work became easier by using the system. [22] Stunting prevalence data years was recorded in the Food and Nutrition Monitoring System. [23] Environmental and nutritional monitoring was a good way to prevent stunting. [24]

The results of researched [25] showed that the stunting information system application could made it easier to found out the distribution of stunting and malnutrition among toddlers and provided information on fulfilling the nutritional needed of toddlers based on android as an effort to prevent and overcome it. Stunting in children could affect height and built as well as lack of absorption of nutrients. Information and data drove changed in many areas such as health, economy, business and other strategic areas. The prevalence of stunted children who consume food groups high in protein and calcium was 39. 4% and milk was 41%, and meat or poultry was 65% lowered than other foods. [26] The system helps cadres and midwives in carrying out activities at posyandu, including collecting data on mothers and children, weighing toddlers, and collecting nutritional data on toddlers. The system could assist cadres in determining the nutritional status of toddlers based on the anthropometric table for determining nutritional standards for toddlers issued by the minister of health of the republic of indonesia. The impact of nutrition and health interventions aimed at reducing stunting in children and other forms of malnutrition. A child's ability to eat well is a major factor contributing to linear growth.[27]

Malnutrition among children under five is a health problem in developing countries. To overcome this problem, it is recommended to use local food ingredients for the formulation of complementary foods. [28] The health stunting Posyandu information system helps cadres and midwives in carrying out activities at the Posyandu including collecting data on mothers and children, weighing toddlers, and collecting nutritional data on toddlers. The system can assist cadres in determining the nutritional status of toddlers based on the anthropometric table determining nutritional standards for toddlers issued by the Minister of Health of the Republic of Indonesia. [29] The impact of nutrition and health interventions aimed at reducing stunting in children and other forms of malnutrition. A child's ability to eat well is a major factor contributing to linear growth. [30] Increased parental

education is a strong predictor of increased child growth. Improving sanitation infrastructure, and increasing access to maternal health services, antenatal and delivery services including parity, distance between pregnancies, and maternal height can influence the occurrence of stunting.[31] Reducing the burden of stunting requires a paradigm shift from interventions that only focus on children and babies to interventions that reach mothers and families and improve their living environment and nutrition. [32]

Development in childhood is inseparable from the impact of the distribution of region-specific development initiatives. Understanding the characteristics of the region and the resources allocated for maternal and child health is a necessity for addressing stunting. [33]

An intervention approach must be applied to overcome stunting. [34] Improvements in the nutrition sector are critical to reducing stunting. [35] The importance of knowing various choices of nutritious food for consumption. [36] Mothers give exclusive breastfeeding to babies to prevent stunting. [37]

Providing a variety of foods for infants and children to reduce stunting.[38] Supplements can increase the height of children who are given for 3 months can increase the z score of height.[39] The incidence of stunting based on the results of the 2018 National Research was 30.8%, in 2019 it was 27.7%, while based on the SSGI in 2021 it was 24.4% and then in 2022, it was 21.6%. The prevalence of stunting measured based on height for age in North Sumatra is 21.6% to 21.2% while in 2022 it will decrease by 0.4%.[40]

A comprehensive evaluation encompassed a total of nine direct factors, including dietary diversity score, initiation of breastfeeding, vitamin A supplementation, use of iodized salt, history of infectious diseases within the past 2 weeks, oral rehydration therapy for children with diarrhea, treatment seeking for suspected pneumonia, complete vaccination, and exposure to indoor pollution. Additionally, 17 indirect factors were scrutinized, comprising household wealth, parental education levels, height and body mass index of both mother and father, maternal autonomy in health services, movement, and financial matters, water sources, sanitation facilities, excreta disposal practices, antenatal care, attendance of a skilled birth attendant during childbirth, family planning needs, and the age at which the mother was married. The assessment yielded three anthropometric failure outcomes

based on the World Health Organization's child growth standards: stunting (height-for-age z score less than −2 standard deviation [SD]), underweight (body weight-for-age z score less than −2 SD), and wasting (weight-for-height z score less than −2 SD)[41]

The implications of direct nutritional interventions on women's nutrition, birth outcomes, and stunting rates among children in South Asia are undeniable and have been well documented.[42] Increasing food intake and health services for women, preventing early marriage and conception, completing secondary education, increasing women's purchasing power, reducing tedious work, and eliminating domestic violence deserve special attention. [43]

5. CONCLUSION

The concluding section of a research paper serves the purpose of addressing the established research objectives and articulating how the study contributes to advancing the current state of knowledge in the field. It is crucial for these conclusions to offer more than a mere repetition of the abstract or a listing of experimental results. A clear scientific rationale for the research should be presented, elucidating how the work enhances the understanding of the subject. This not only aids reviewers and readers in assessing the significance of the study for potential publication but also provides insights into possible applications and extensions of the findings. Furthermore, the conclusion should propose future experiments or highlight ongoing research endeavors, thus guiding the trajectory of further exploration in the field.

6. ABBREVIATIONS

Content validity index (CVI); World Health Organization (WHO)

7. ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical consideration this research was carried out an ethical test at the Health Research Ethics Commission with ethical test number 1047/KEPK/FKUMSU/2023. Research approval was obtained from each respondent through research informed consent.

8. COMPETING INTEREST

The author declares that they have no competing financial interests or personal relationships that might have

affected the performance of the work reported in this manuscript.

9. AVAILABILITY OF DATA AND MATERIALS

Data and information that supports this writing is available from respondents in the research.

10. ACKNOWLEDGMENT

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