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Stunting Risk Prediction Application in Pendeglang Regency, Banten Province, Indonesia

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Abstract

Background: *The World Health Organization* (WHO) states that Indonesia is among the third countries with the highest prevalence of *stunting* toddlers in the Southeast Asian region. There is short-term *stunting* causing growth failure, motor and cognitive barriers, metabolic disorders, and non-optimal physical size of the body. In the long term, *stunting* affects brain development, thereby reducing intellectual capacity, impaired structure and function of nerves and brain cells that are permanent.
Purpose: To determine stunting risk prediction model
Methods: Used in stages 1 and 2 is a *mixed method* to determine the determinants associated with stunting events and is used as a basis for building a stunting risk prediction model, with a sample of 170 mothers who have children aged 24-59 months. In stages 3 and 4 there isala h stage of building the system and conducting trials to test the effectiveness of the application carried out on mothers who have children aged 6-24 months and analyzed using the Spearmank Rank test.
Result: This study shows that 60% of mothers who have children aged 6-24 months state that stunting risk prediction applications are effective. The average value of all variables is in the excellent category, namely system quality (23.53), information quality (21.97), service quality (22.30). User satisfaction (13.50) and net profit (13.33). The Spearman Rank test showed that there was a correlation between system quality (0.808), information quality (0.866), service quality (0.929), user satisfaction (0.890) and net profit (0.850) with application effectiveness. The strength of correlation across all variables is very strong with a positive direction.
Conclusion: The application has proven to be effective for stunting risk prediction. If it is good for the quality of the system, information, application services, the more effective the application is to use because it provides satisfaction and benefits for users.

Keywords: Application, Stunting

Introduction

Indonesia is one of the developing countries that has serious problems related to the next generation of the nation, namely children with disorders in body growth known as short or *stunting*. The Health Data and Information Center of the Republic of Indonesia in 2018 explained, that in 2017 it was found that 22.2% of toddlers in the world were *stunted* and more than half of them came from Asia (55%) [4,18]. The World Health Organization (WHO) stated that Indonesia is among the third countries with the highest prevalence of

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stunting toddlers in the Southeast Asian region with an average prevalence in 2005-2017 of 36.4% .[18]

Stunting is caused by chronic malnutrition and repeated infections during the First 1000 Days of Life (HPK). This condition can be found in pregnant women with pregnancy complications, such as chronic lack of energy (SEZ), anemia and having other infectious diseases, pregnant women are said to be at risk of SEZ if the results of measuring the circumference of the upper arm < 23.5 cm. Basic Health Research (Riskesdas) in 2018 showed that the prevalence of SEZ risk in pregnant women aged 15-49 years was 17.3%. SEZ is caused by insufficient energy and protein intake. The cause of malnutrition in pregnant women and children in Indonesia is inseparable from the economic level of the community which is still concerning. Especially now with the COVID-19 pandemic, there are many work stoppages and lack of sales levels, bringing families increasingly to the poverty line. This circumstance, of course, affects the family's ability to meet the nutritional needs of the body. The body with malnourished conditions is very vulnerable to various diseases, so it also affects the growth and development of children.[4,5]

The impacts that can occur in children who experience a lack of nutritional intake for 1000 HPK include low cognitive abilities and intelligence of children in the future. In the short term, *stunting* causes growth failure, motor and cognitive barriers, metabolic disorders, and non-optimal physical size of the body. In the long run, *stunting* affects brain development so that it decreases intellectual capacity, impaired structure and function of nerves and brain cells that are permanent causing a decrease in the ability to absorb lessons in school and affecting its productivity as an adult.[14]

Banten is a province with a high *stunting* rate. The results of Nutritional Status Monitoring (PSG) in 2017, the average stunting (combined stunting and *severe stunting*) in toddlers 0-23 months is 20% and Banten Province is at this threshold. In toddlers aged 0-59 months, Banten Province is also at the average threshold of *stunting*, which is 29.6% (Siswati, 20218). In 2018, the prevalence of *stunitng* toddlers was 33% (stunting 16.6%, *severe stunting* 16.4%) and the highest was in Pandeglang Regency at 38.6%. The purpose of this study was to find a stunting risk prediction instrument in the form of a website application as a promotional and preventive effort against *stunting* events.[5]

Methods

1. Research design

The overall research took place from September 2021 to July 2022. Phase 1 and 2 research using *mixed methods* was carried out in February-March 2022 in the Kaduhejo Health Center area and the Bangkonol Health Center area, Pandeglang Regency, Banten Province.

2. Setting and samples

Qualitative methods: The source of information consisted of 10 main informants, namely the main caregivers of toddlers aged 24-59 months who were stunted. The supporting informants are 10 nutrition officers, 1 village head, 10 cadres and 10 toddler families. As many as 10 key informants are village midwives in the main informant's residence.

Quantitative methods: The sample was a mother who had a toddler aged 24-59 months who used *purposive sampling.*

3. Measurement and data collection

Before the qualitative and quantitative research was carried out, the researcher had received a letter of approval from the Pandeglang Health Office and from respondents in the form of a signed approval sheet. Phase 3 and 4 research using the *cross sectional* method was conducted in May-July 2022 at the Wanakerta Health Center, Karawang Regency, West Java Province. In stage 3, an analysis was carried out using PLS-SEM to obtain determinants of stunting. This stage is the stage of designing and testing a *stunting* risk prediction model. The trial was conducted on 30 respondents, namely mothers who had toddlers aged 6-24 months. Respondents can enter the application through the www.mencegahstunting.com page, On the homepage there are some basic questions related to the age, gender and height of children under five. Furthermore, entering the consultation menu, there were 25 questions and the results provided conclusions in the form of stunting risk factors in the first 1000 days of life, namely from pregnancy to babies born two years old. At the end, the conclusion will come out that the results of the prediction of children are at risk of stunting or not at risk. Next is to assess the effectiveness of the application using a google form that contains questions about the quality of the system, the quality of information, the quality of service (5 questions each), user satisfaction and net profit (3 questions each).

4. *Data analysis*

Qualitative data were analyzed using data triangulation and theory. Quantitatif data were analyzed using the Chi Square test with a meaningfulness level of 95%.

Result

Of the 30 respondents, 18 (60%) said that stunting risk prediction applications are effective. The assessment of the application is carried out on 5 items and the results are obtained:

Table 1.
Average Score of Application Assessment

Variable	N	Mean	Median	Std. Deviation	Minimum	Maximum
System Quality	30	23,53	25,00	2,013	19	25
Information Quality	30	21,97	21,00	2,341	18	25
Quality of Service	30	22,30	22,00	2,277	19	25
User Satisfaction	30	13,50	13,50	1,333	12	15
Net Profit	30	13,33	13,00	1,493	10	15

From table 2 shows that the average value of system quality is 23.53 with a standard deviation of 2.013, information quality of 21.97 (standard deviation of 2.341). Quality of Service 22.30 (Standard Deviation 2.277), User Satisfaction 13.5 (Standard

Deviation 1.333) and Net Profit 13.33 (Standard Deviation 1.493). It can be said that the overall stunting risk prediction application is considered effective and very useful.

Table 2.
Correlation of System Quality, Information Quality, Service Quality, Customer Satisfaction and Net Profit with Application Effectiveness

Variable	Application Effectiveness			
	Sig. (2tailed)	Correlation Coefficient	Correlation Value	Correlation Direction
System Quality	0,000	0,808	Very Strong	+
Quality of information	0,000	0,866	Very Strong	+
Quality of service	0,000	0,929	Very Strong	+
Customer satisfaction	0,000	0,890	Very Strong	+
Net profit	0,000	0,850	Very Strong	+

The results of the analysis using the Spearmank Rank test showed that all variables with a p value of < 0.05 which means that there is a correlation between all variables and the effectiveness of the application. All variables have a correlation strength value of > 0.80, which means that the correlation between system quality, information, service, customer satisfaction and net profit with application effectiveness is very strong and in a positive direction. It can be said that the better the quality of the system, the more effective the application used, the higher the user satisfaction, the more effective the application used.

Discussion

Based on the results of statistical analysis, it shows that the majority of mothers who have children aged 6-24 months who use stunting risk prediction applications state that the application is effective. For system quality, information, service, customer satisfaction and net profit the majority of the average is in the excellent category. The results of the correlation analysis show a correlation with a very strong correlation strength in a positive direction. This means that the better the quality of the system, the more effective the application, or the better the quality of information, the more effective the stunting risk prediction application will be.

Effectiveness is a way of assessing how well a program is performing by measuring predetermined indicators. A program is said to be effective if the established indicators are achieved. To find out the effectiveness of a program, it must measure how well it works. Measurement of the effectiveness of stunting risk prediction applications was only carried out in this study, because this application was newly created and did not exist before, so there are no previous studies that can support the results of research on the effectiveness of this application. [9]

The first indicator of stunting risk prediction applications is that the quality of the system is a combination of hardware and software in the information system. System quality is a measure that can be used to determine the success of an Indictaor system that is used to measure the quality of DeLone and McLean's systems, namely the convenience of access, the flexibility of the system, the reliability of user expectations. The next factor is the quality of information relating to the characteristics of the output produced as a result of the use of a system. The quality of information can be judged by accuracy, timeliness, ease of understanding, completeness, relevance, security and consistency.[9]

Another factor of the application is the quality of service with indicators of measuring service quality namely responsiveness, assurance, empathy. Next is user satisfaction which is determined by the user experience with satisfaction measurement i.e. effective efficiency. User satisfaction in terms of the quality of information provided in an application must be comprehensive since input-process-output. Another factor that becomes a series of applications is net benefits, namely the impact of the existence and use of information systems on the quality of user performance both individually and organizationally, including productivity, increasing knowledge and reducing the length of time for searching for information.[8,10]

In this study, the majority of users stated that they were very satisfied with the stunting risk prediction application used. This application is a new instrument offered as a promotional and preventive effort against stunting events. In this application, stunting risk predictions are assessed based on knowledge of nutrition during pregnancy, history of exclusive breastfeeding, history of supplementary feeding, support from health workers, socioeconomics, history of pregnancy, history of infectious diseases, height and age of the baby. This application is easily accessible with any smartphone and is easy to use so that it helps health workers and mothers who have children under 2 years old in getting information.

According to researchers, the resulting stunting risk prediction application is mostly good because there has not been a similar application before. In addition, the basic concept of this application is promotive and preventive so that mothers who have children identified as at risk of stunting can immediately improve the child's condition according to the remaining time span before reaching two years. For mothers who have children already before two years, if stunting has been identified, they can immediately take their children to health care facilities, so that the long-term impact of stunting is sought to be as minimal as possible.

Conclusion

From phase 1 and 2 research conducted in Pandeglang Regency, Banten Province, several determinants were found as a basis for designing a stunting risk prediction application model in stages 3 and 4. Furthermore, an application effectiveness test was carried out on 30 mothers who had children aged 6-24 months. It was obtained that the majority stated that the application predicted the risk of stunting effectively and the average value on the variables of system quality, information quality, service quality, user

satisfaction and net profit of the application showed good value. Bivariate analysis shows that there is a correlation between system quality, information quality, service quality, user satisfaction and net profit with the effectiveness of stunting risk prediction applications, with the strength of correlation across all variables is very strong with a positive direction.

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