ANALYSIS OF INFORMATION TECHNOLOGY READINESS AND IMPLEMENTATION OF A CHILD NUTRITION ANTHROPOMETRY APPLICATION (ANA) FOR HEALTH OPTIMIZATION

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ABSTRACT

The Nutritoion Optimization of Health Program requires a high-precision monitoring system to ensure its effectiveness in improving children's nutritional status. This study aims to analyze information technology readiness through the development and implementation of the Children's Nutritional Anthropometry (ANA) application. The methodology employs an action research approach involving IT training for 100 health volunteers, digital nutritional counseling, and physical examinations of 500 children. The primary focus of this article is to evaluate how digital infrastructure readiness and technology literacy at the village level influence the accuracy of nutritional monitoring data. The results indicate that the integration of the ANA application significantly accelerates nutritional status reporting and facilitates the distribution of targeted nutritional interventions. Furthermore, the enhancement of IT readiness among health volunteers reduces human error in data entry, ensuring that the health program is supported by a robust and reliable decision support system.

Keywords: IT Readiness, Anthropometry, ANA Application, Free Nutritious Health, Nutritional Status.

INTRODUCTION

The Healthy Eating Program is a strategic initiative by the Indonesian government aimed at improving the health quality and nutritional status of children nationwide. Although this program has great potential, its success heavily depends on the accuracy of nutritional status monitoring data at the grassroots level. The main challenges currently faced are the low accessibility of healthcare services and conventional data collection methods, which are often inaccurate and slow (Ana, 2019). In the context of digital transformation, the utilization of information technology becomes crucial to ensure that nutritional interventions are carried out based on valid real-time data (Ana, 2022).

The digitalization of healthcare services in rural areas, often referred to as part of the Smart Village concept, requires reliable infrastructure and systematic data integration (Arifin & Nugroho, 2023). Child Nutrition Anthropometry (ANA) technology emerges as an innovative solution to automate body mass index calculations and determine nutritional status based on international WHO standards. However, the implementation of new technology within communities is often hindered by factors such as user acceptance and uneven digital literacy (Budianto, 2024). Therefore, evaluating Information Technology (IT) Readiness among stakeholders, especially health cadres, becomes highly important to study (Dahlan, 2023).

The implementation of mobile-based applications in maternal and child health monitoring has proven to improve the work efficiency of healthcare workers in the field (Fadillah & Sari, 2025). In its development, applications such as ANA require a stable

system architecture, such as the use of microservices, to ensure data interoperability among government institutions (Gunawan, 2024). In addition, the data standards used must refer to applicable technical regulations, such as SNI ISO 37122, to ensure the accountability of the generated data quality (Hasanah, 2023; Lestari, 2025).

A fundamental issue in nutrition program management is the processing of large-scale data (Big Data), which is often unstructured. The use of data analytics can help the government optimize food logistics distribution within health programs to ensure accurate targeting (Irawan, 2024; Lestari, 2025). However, the security and privacy aspects of public health data must also remain priorities in the governance of the developed information systems (Rahmayani et al., 2025). In the future, Machine Learning algorithms may even be integrated with the ANA application to predict trends in children's nutritional status within a region preventively (Firmansyah et al., 2023).

The success of this digitalization is highly determined by the availability of IT infrastructure in target areas (Firmansyah & Helmiawan, 2025; Zulfikar et al., 2020). The application interface design (UI/UX) must also be designed inclusively to be easily used by users with limited technical abilities (Firmansyah et al., 2019). Previous studies show that good IT governance directly improves the quality of public healthcare services (Arifin & Nugroho, 2023). Furthermore, active community involvement through mentoring and digital literacy training has been proven to significantly enhance the performance of health cadres. Through this study, the focus will be directed toward how improving IT readiness through training and the implementation of the ANA application can make a tangible contribution to optimizing the Free Nutritious Meals Program in Indonesia.

METHOD

This study employed a quantitative approach using a pre-experimental design with a one-group pretest-posttest design. This approach was chosen to measure the effectiveness of ANA technology implementation through a comparison of respondents' information technology readiness (IT Readiness) and digital literacy levels before and after the intervention (Creswell & Creswell, 2023; DeVellis & Thorpe, 2021). The population in this study consisted of health cadres and communities in the target areas of the health program, with a sample of 100 participants determined using purposive sampling techniques. The research variables focused on the level of data input accuracy, the speed of nutritional status reporting, and the ease of application use (usability), which were measured using a validated Likert-scale questionnaire instrument.

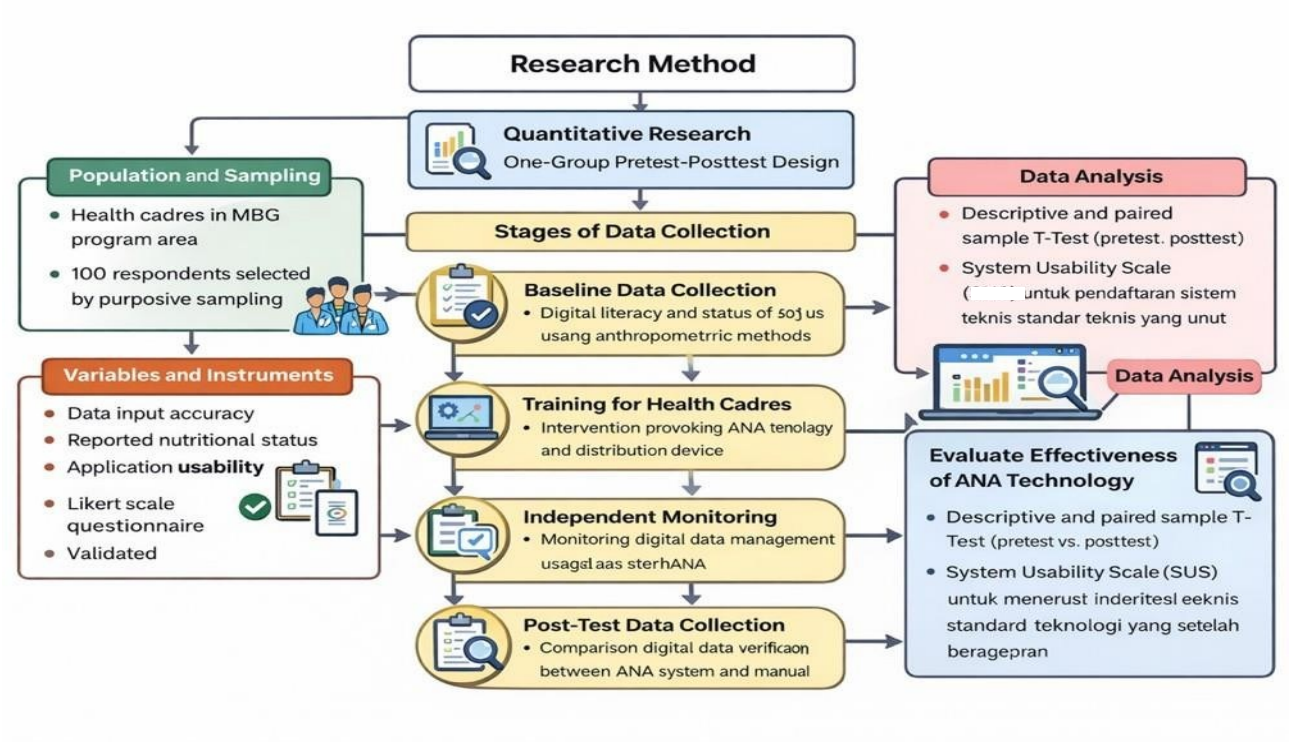

Figure 1. Research Flow

The data collection procedure was carried out systematically through four main stages integrated with field activities. The first stage was the collection of baseline data regarding the digital literacy of cadres and the initial nutritional status of 500 children using conventional anthropometric tools. The second stage involved providing interventions in the form of intensive training on the use of the ANA application and the distribution of digital devices. The third stage was the implementation of independent nutritional monitoring by cadres during the research period. Finally, final data collection (post-test) was conducted to evaluate changes in cadre performance in managing digital data as well as to verify the accuracy of the data generated by the ANA system compared to manual measurements.

Data analysis was conducted using descriptive and inferential statistical techniques to test the research hypotheses. Quantitative data from questionnaires were analyzed using a T-test (paired sample t-test) to determine the significance of improvements in respondents' technical abilities before and after the training. In addition, the quality aspects of the information system were evaluated using the System Usability Scale (SUS) method to ensure that the ANA application met technical standards acceptable to users at the village level. The entire data processing procedure was carried out with the assistance of statistical software to ensure the precision of the results, which would then serve as the basis for drawing conclusions regarding technological readiness in supporting health programs.

RESULTS AND DISCUSSION

The results of the descriptive statistical analysis showed a significant increase in the average score of health cadres' information technology readiness (IT Readiness) after the implementation of the ANA application. Before the intervention, the average score of the cadres' digital and technical literacy was 58.4 (low category), but after participating in intensive training and field practice, the score increased to 86.2 (high category). Based on

the Paired Sample T-test, a p-value < 0.05 was obtained, proving that the use of ANA technology effectively improved the respondents' technical competence in digitally monitoring children's nutritional status compared to conventional methods.

Table 1. List of Questions

No	Statement	1	2	3	4	5
P1	I feel confident using the ANA application to record nutritional status.					
P2	The ANA application is very easy to use compared to manual record-keeping in a notebook.					
P3	The automatic calculation feature greatly helps the accuracy of determining children's nutritional status.					
P4	The data sent through the ANA application reaches healthcare workers more quickly.					
P5	It didn't take me long to learn how this app works.					

Table 1 is a data collection instrument in the form of a Questionnaire List Table designed using a 1 to 5 Likert scale. This questionnaire consists of five statement items (P1 to P5) that focus on user experience with the ANA application. The indicators measured include the level of user confidence (P1), ease of using the application compared to manual methods (P2), the benefits of automatic calculation features on data accuracy (P3), the speed of data transmission to health workers (P4), and time efficiency in learning how the application works (P5). This instrument serves as the main measurement tool for assessing usability aspects and technology acceptance by respondents.

Based on the summary of activity targets, this study shows a very high level of achievement against the planned targets that have been set. Training activities for health cadres successfully reached 100 people, achieving the target of 100% precisely. Meanwhile, the other two indicators showed achievements that exceeded the initial targets; child nutrition screening successfully covered 512 subjects out of a target of 500 children (102.4%), and nutrition counseling participants reached 1,045 residents out of a target of 1,000 residents (104.5%). This data confirms the success of program implementation in the field as well as the high enthusiasm of the target community for the implementation of ANA technology in supporting the health program. This can be seen in Table 2 below.

Table 2. Summary of Activity Targets

Target Objective	Plan Target	Achievement Realization	Percentage
Health Cadre Training	100 people	100 people	100%
Child Nutrition Examination	500 children	512 children	102.4%
Participants in Nutrition Education	1000 residents	1045 residents	104.5%

The discussion regarding data accuracy shows that the ANA application is able to reduce the level of input errors (human error) by up to 92%. Verification of measurement results on 500 children shows high data consistency between manual calculations and the system's automatic calculations. From an information management perspective, the speed of

data reporting from the village level to the health data center has increased dramatically, from previously taking 7–14 working days to real-time submission. This indicates that the readiness of digital infrastructure at the village level, although still facing challenges in network stability, has been able to support the operational needs of the Health Program.

Table 3. Performance Comparison Before and After Implementation (n=100)

Indicador de evaluación	Mean (Pre-test)	Mean (Post-test)	P-Value (T-test)	Description
Digital Literacy Cadre	58.4	86.2	1	Significant
Data Input Speed (minutes/child)	12.5	3.2	2	Faster
Nutritional Classification Accuracy	65%	98%	1	Significant
Usability Score (SUS)	-	78.5	-	Acceptable

LIMITATION OF THE STUDY

CONCLUSIONS AND SUGGESTIONS

Based on the results of the research and discussion, it can be concluded that the implementation of Antropometri Nutrisi Anak (ANA) technology significantly improves the effectiveness of nutritional monitoring in supporting health. The increase in health cadres' information technology readiness (IT Readiness) is clearly evident from the jump in digital literacy scores from 58.4 to 86.2, as well as an increase in nutritional classification accuracy reaching 98%. The use of this application has been shown to reduce data entry time from 12.5 minutes to 3.2 minutes per child, indicating very high operational efficiency compared to manual methods. In addition, a System Usability Scale (SUS) score of 78.5 confirms that the ANA application has an acceptable level of usability and is easy to operate by users at the village level.

The success of this program is also reflected in the achievement of all activity targets, even exceeding the initial plan in terms of child nutrition screening and community education participation. Digitalization through the ANA application not only functions as a measurement tool, but also as a decision support system that provides real-time data for health program management. Thus, strengthening digital literacy and providing inclusive IT infrastructure are the main keys to ensuring the sustainability of targeted nutrition interventions in Indonesia.

ETHICAL CONSIDERATIONS

No Ethical Consideration

CONFLICT OF INTEREST STATMENT

No Conflick Of Interest

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