



Implementation of Information Technology in Increasing the Effectiveness of Recording and Reporting the Nutritional Status of Stunted Toddlers at Community Health Centers

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ABSTRACT (10 PT)

This research aims to evaluate and implement information technology to increase the effectiveness of recording and reporting the nutritional status of stunted toddlers at Community Health Centers. Accurate recording and fast reporting are crucial in efforts to prevent and overcome stunting in children under five. By utilizing information technology, this research designs and implements an integrated system to facilitate the collection, storage and analysis of nutritional status data on stunted toddlers in real-time. The research methodology includes user needs analysis, system design, and implementation in several Community Health Centers. The use of information technology is expected to increase data accuracy, speed up the recording process, and provide information more quickly to related parties. Evaluation is carried out through measuring indicators of effectiveness, efficiency and user satisfaction. It is hoped that the research results will provide a clear view of the impact of using information technology in managing nutritional data for stunted toddlers at the Community Health Center level. The practical implications involve improving the recording system, faster reporting, and the use of information technology as a strategic tool in improving public health, especially in efforts to prevent stunting in toddlers.

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1. INTRODUCTION

Stunting in toddlers is a serious problem in various countries, including Indonesia, and has become the focus of world public health attention. The World Bank (2018) notes that the prevalence of stunting in Indonesia is still relatively high, reaching around 27.7% in 2018, indicating the need for serious efforts to prevent and handle it. Stunting not only impacts physical health, but can also affect children's cognitive development and learning abilities[1]

Community Health Centers (Puskesmas) play an important role in detecting and overcoming stunting at the local level. However, obstacles such as limited resources and lack of integration of information technology often become obstacles in the effectiveness of recording and reporting nutritional data for stunted toddlers at Community Health Centers[2].

The use of information technology in the health sector has become a global trend and has been proven to improve service quality[3]. According to WHO (2020), the implementation of information technology can speed up data collection and analysis, minimize human error, and increase the accuracy and timeliness of reporting. Therefore, this research will explore the potential for using information technology to increase the effectiveness of recording and reporting the nutritional status of stunted toddlers at Community Health Centers [4].

By looking at the global and local context, it is hoped that this research can contribute to the development of effective and sustainable solutions in dealing with the problem of stunting among children under five at the community level[5].

2. RESEARCH METHOD

2.1 Definition of Community Health and Nutrition Center

Puskesmas, short for Community Health Center, is a primary health service unit responsible for providing basic health services to the community at the community level. Community Health Centers act as coordination centers to carry out promotive, preventive, curative and rehabilitative efforts. The main functions of Community Health Centers include maternal and child health services, immunization, control of infectious diseases, and environmental health services[1].

Community Health Centers were established with the aim of increasing community accessibility to health services, especially in rural and urban areas that are far from larger health service centers. Puskesmas collaborates with various parties, including local health services, to improve the health status of the community in their area.

Nutrition refers to the nutritional intake needed by the body to maintain health and support growth and development. Adequate and balanced nutrition involves consuming a variety of nutrients, including carbohydrates, proteins, fats, vitamins and minerals, according to the body's needs. Good nutritional conditions play an important role in preventing various diseases and maintaining overall body health[6].

A person's nutritional status can be assessed through anthropometric examination, diet analysis, and evaluation of nutritional intake. Stunting is an indicator of nutritional status that is often used, indicating impaired growth in children due to a lack of adequate nutritional intake[7].

2.2 Definition of Community Health and Nutrition Center

The rapid development of information technology has had a very significant impact on human life today. Information technology has various elements that build it into a solid whole. One element of information technology is software[8]. Software is a collection of objects that form a configuration which can be programs, documents or data. Software is something that is developed, not manufactured like hardware. Software development requires appropriate, effective and efficient steps to ensure that user needs are met. For this reason, various software development methodologies have developed. Before the 2000s, we were familiar with the Waterfall methodology, Spiral Model, Rapid Application Development, and many others. All of these methodologies are formal methodologies, meaning that they all follow established standard rules[9].

In the 2000s, a new, very flexible methodology began to develop, namely Agile Methods. Agile methods are one of several methods used in software development. Agile method is a type of short-term system development that requires rapid adaptation by developers to changes in any form. In Agile Software Development interactions and personnel are more important than processes and tools, working software is more important than complete documentation, collaboration with clients is more important than contract negotiations, and responsiveness to change is more important than following a plan[8].

Agile Method can also be interpreted as a group of software development methodologies that are based on the same principles or short-term system development that requires rapid adaptation from developers to changes in any form. Agile Software Development also sees the importance of communication between team members, between technical people and businessmen, between developers and their managers. Another characteristic is that the client becomes part of the software development team. These traits are supported by the 12 principles set out by the Agile Alliance.

According to the Agile Alliance, these 12 principles are for those who want to succeed in implementing Agile Software Development:

1. Client satisfaction is the top priority by producing products early and continuously.
2. Accept changing needs, even at the end of development.
3. Delivery of results/software within a matter of weeks to months.
4. The business and developers must work together every day during development.
5. Build projects around highly motivated people who work in a supportive environment and who are trusted to be able to complete the project.
6. Face-to-face communication is effective and efficient
7. Functioning software is the primary measure of project progress
8. Steady support from sponsors, builders, and users is necessary to maintain continuous development
9. Attention to technical excellence and design good ones enhance the agile nature
10. Simplicity is important
11. Good architecture, requirements and design emerge from self-organizing teams
12. Periodically the team self-evaluates and looks for ways to be more effective and immediately does so.

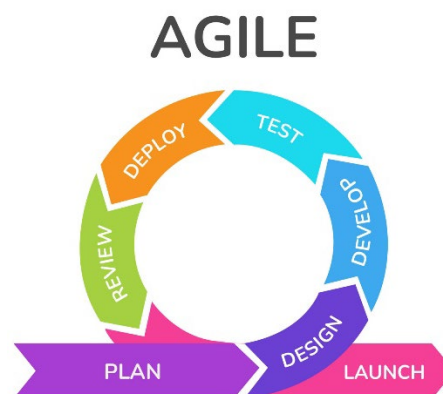


Figure 1. Agile Method

2.3 Extreme Programming Approach

Extreme Programming (XP) is a software development method that is adaptive and collaborative. Developed by Kent Beck in the 1990s, XP emphasizes values such as intensive communication, rapid feedback, and flexibility to changing customer needs (Beck, 1999).

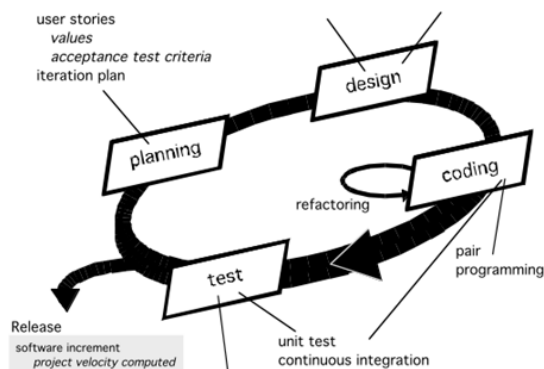


Figure 2. Extreme Programming

The following are the main characteristics and principles of the Extreme Programming approach:

1. Intensive Communication:

- XP team members interact directly and intensively with each other, including with clients or end users.
- Effective communication is prioritized to prevent misunderstandings and ensure a deep understanding of project requirements.

2. Pair Programming (Pair Programming):

- Two programmers work together on one computer, with one as the "thinker" and the other as the "code writer".
- The goal is to improve code quality, encourage collaboration, and spread knowledge among team members.

3. Automatic Testing (Automated Testing):

- XP emphasizes extensive automated testing, including unit, integration, and acceptance testing.
- Every code change should be tested automatically to ensure that it does not break existing functionality.

4. Simple Selection (Simple Design):

- Software design should be simple and easy to understand.
- The "You Aren't Gonna Need It" (YAGNI) principle emphasizes only implementing features that are needed now, not those that may be needed in the future.

5. Continuous Engineering (Continuous Integration):

- Code changes are continuously integrated into existing code.
- Ensures that the entire team is always working on the latest version and can detect integration issues early.

6. Adaptive Planning (Adaptive Planning):

- It is a planning approach that is flexible and can adapt to changing customer needs or priorities.
- Planning is carried out repeatedly in short cycles (iterations).

7. Collective Design (Collective Code Ownership):

- All team members have responsibility for the entire code.
- Encourage collaboration and knowledge sharing among team members.
- The Extreme Programming approach is suitable for projects that require a high degree of flexibility, intensive customer involvement, and rapid response to change.

3. RESEARCH METHOD

The flow chart scheme for the research stages of creating this information application can be seen in the following picture:

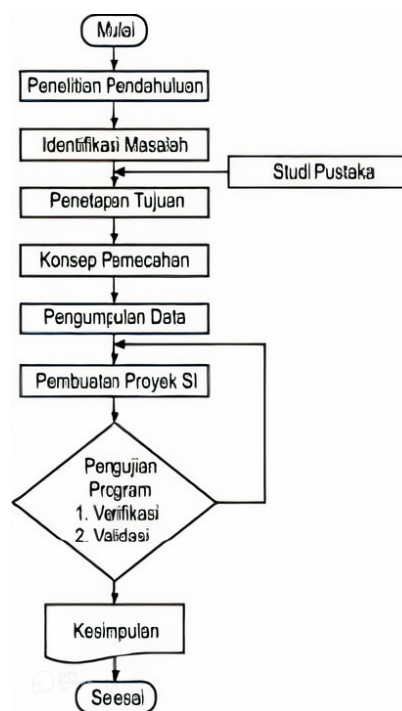


Figure 3. Research Method

The techniques used for data collection are as follows:

1. Field observation method.

Data collection method by directly observing activities, general conditions and events in the research object with automatic recording. Apart from that, this method can also be used to collect data. This is done by holding direct questions and answers on the problem being researched with trusted sources.

2. Literature Review Method

Data collection method that can be obtained through libraries or other book sources to obtain additional data related to research Provide a statement that what is expected, as stated in the "Introduction" chapter can ultimately result in "Results and Discussion" chapter, so there is

compatibility. Moreover, it can also be added the prospect of the development of research results and application prospects of further studies into the next (based on result and discussion).

4. RESULTS AND DISCUSSION

4.1 Problem

The problems that arise from the discussion above are:

1. When searching for child data, nutritionists will experience difficulties because there may be children who have the same name, considering that the total number of children from each village is almost hundreds and if combined at one sub-district level the number reaches thousands. This can slow down the process because the nutritionist must first look for the child's data one by one in the filing cabinet.
2. There is less precision in assessing the nutritional status of each child, because it is still done manually with the help of the WHO-NHCS/Z-SCORE (BB/U) standard reference table, so errors can occur in determining a child's nutritional status.
3. There are often delays and lack of accuracy in making FI/PSG and FII/PSG forms.
4. Archives of child data and results of assessments of children's nutritional status may be lost or damaged, because the storage space is full, and can result in difficulties in knowing a child's nutritional development.

To overcome the problems above, the author offers a computerized system using databases and applications that can help overcome these problems, including:

1. A village code was created that can make it easier to find data on children in each village.
2. Created a child code that can make it easier to search, edit, delete and add child data. And avoid mistakes in searching for children's data due to similar names.
3. When the TPG Puskesmas carries out a weigh-in, the TPG puskesmas must ask the child's mother to always carry a KMS (health card) which will then be filled in with a child code for each child according to the child code made by the puskesmas nutritionist. Apart from that, the child's mother can know the development of her child's nutritional status.
4. Created a display and program to print FI/PSG and FII/PSG reports, so that there are no difficulties and delays in providing information.

4.2 Database Design

Figure 3 shows the Document Flow Diagram of application development as follows:

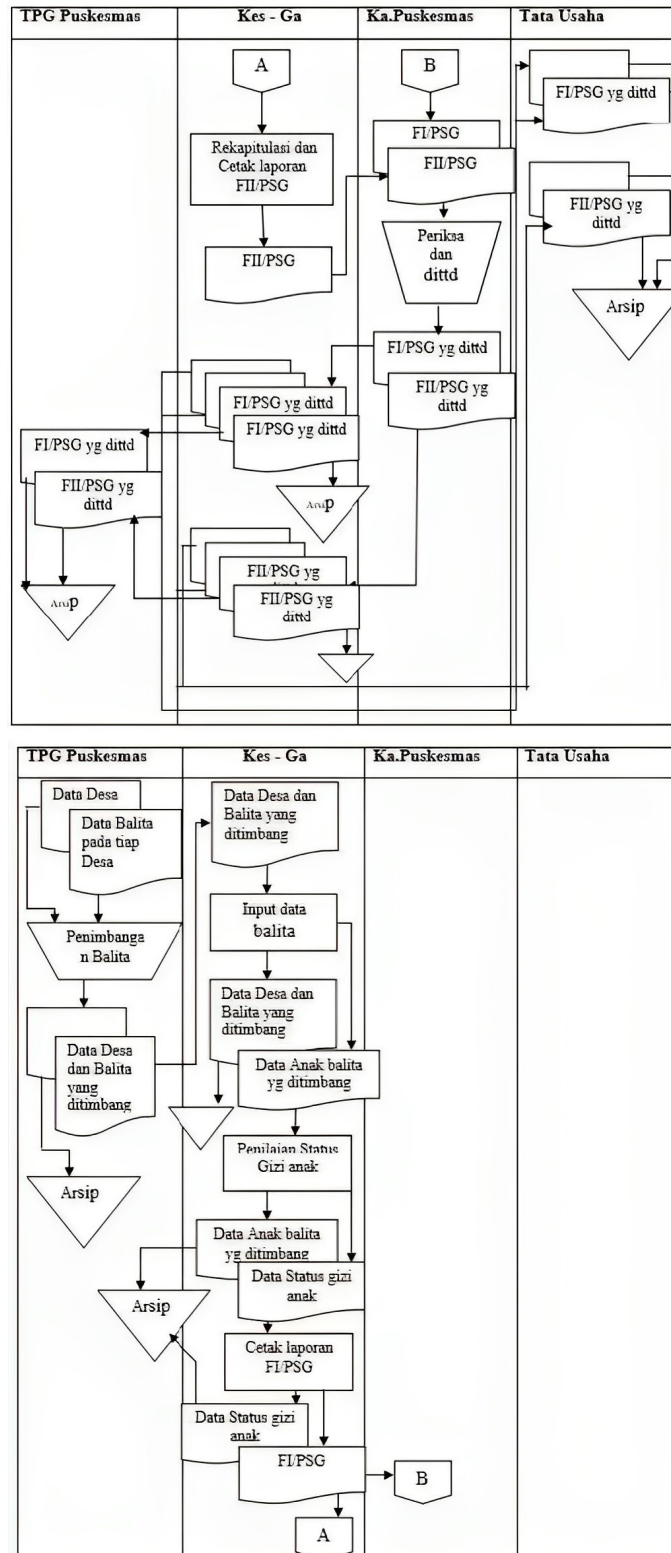


Figure 4. Document Flow Diagram

The Data Flow Diagram in designing the information application for monitoring the nutritional status of children under five can be seen in Figure 5 below:

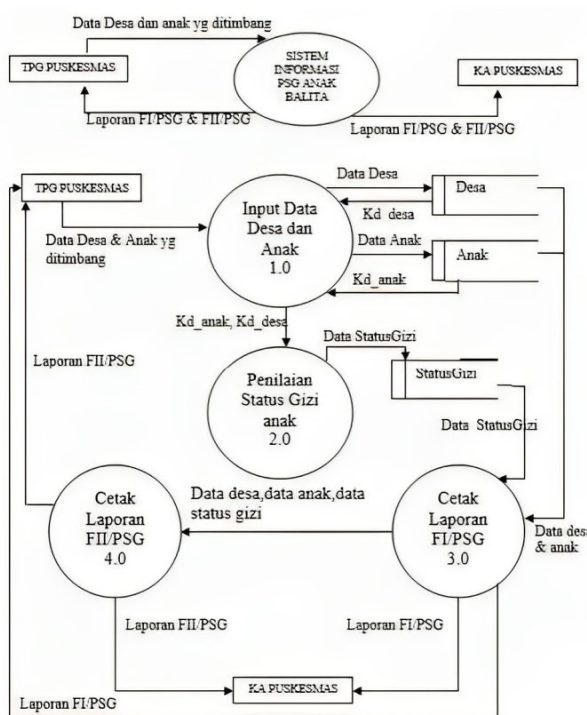


Figure 5. Data Flow Diagram

4.3 Result

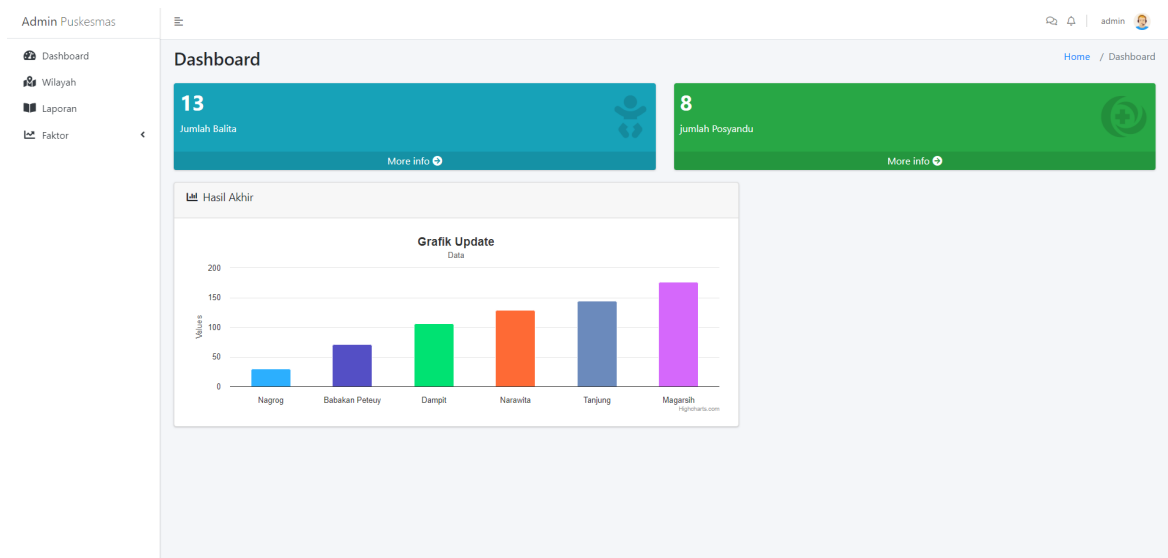


Figure 6. Dashboard

The display above is a visual representation of the user interface presented by the information system for Reporting the Nutritional Status of Stunting Toddlers at Community Health Centers,

reflecting how users can interact and access information related to the nutritional status of stunted toddlers using this platform.

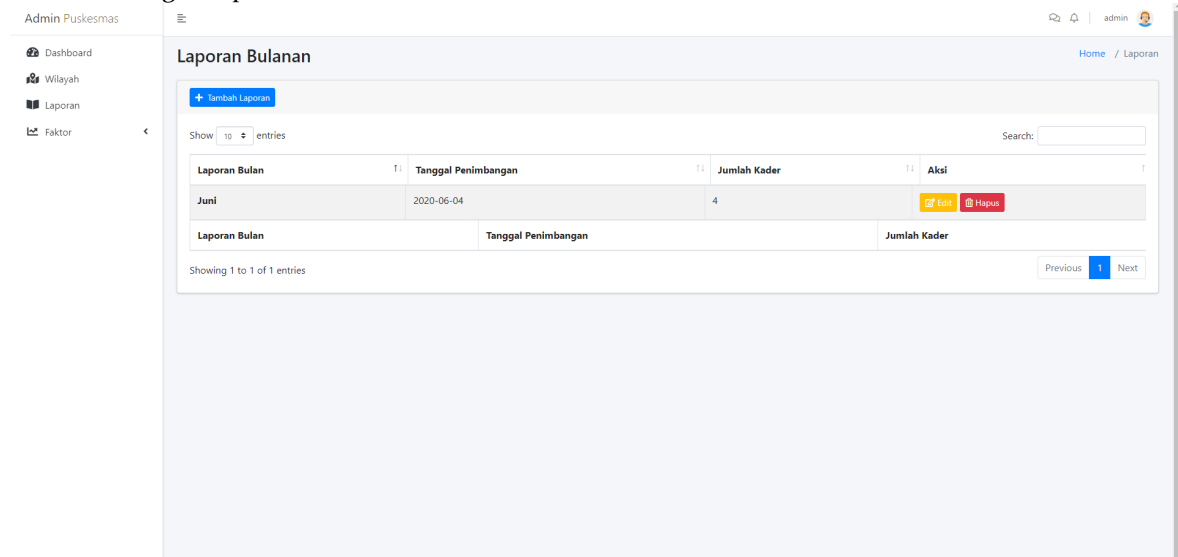


Figure 7. Report

The display shown above shows the report page interface provided by the information system for Reporting the Nutritional Status of Stunting Toddlers at the Community Health Center, providing a visual representation of how information regarding the nutritional status of stunted toddlers is summarized and presented in the form of a report via that page.

5. CONCLUSION

The application of information technology in recording and reporting the nutritional status of stunted toddlers at Community Health Centers has had a positive impact in increasing the effectiveness of this process. Through the integration of information technology, there has been an increase in accuracy, speed and efficiency in collecting data and presenting information related to the nutritional status of stunted toddlers.

The research results show that the information system implemented allows the health team to record more easily and accurately, while reporting data becomes faster and can be accessed in real-time. This has a positive impact on efforts to prevent and overcome stunting in children under five, because more timely information can support strategic decision making by related parties.

The importance of integrating information technology in the context of public health, especially in Community Health Centers, becomes increasingly apparent through this research. The existence of a paradigm shift in recording and reporting the nutritional status of stunted toddlers opens up opportunities to improve the quality of health services at the community level. Thus, this research makes a positive contribution in supporting digital transformation in the health sector and empowering communities to face children's health challenges.

REFERENCES

- [1] Y. Sharif *et al.*, "Association of vitamin D, retinol and zinc deficiencies with stunting in toddlers: findings from a national study in Iran," *Public Health*, vol. 181, pp. 1-7, Apr. 2020, doi: 10.1016/j.puhe.2019.10.029.
- [2] A. Marastuti *et al.*, "Development and Evaluation of a Mental Health Training Program for Community Health Workers in Indonesia," *Community Ment Health J*, vol. 56, no. 7, pp. 1248-1254, Oct. 2020, doi: 10.1007/s10597-020-00579-7.
- [3] F. Li, H. Lu, M. Hou, K. Cui, and M. Darbandi, "Customer satisfaction with bank services: The role of cloud services, security, e-learning and service quality," *Technol Soc*, vol. 64, p. 101487, Feb. 2021, doi: 10.1016/j.techsoc.2020.101487.
- [4] Y. Kurnia and G. Aditya, "Online Learning Service Application Design Using Flutter and Laravel Framework," *bit-Tech*, vol. 4, no. 3, pp. 109-115, Jun. 2022, doi: 10.32877/bt.v4i3.423.
- [5] I. Dwi Lestari, S. Samsugi, and Z. Abidin, "RANCANG BANGUN SISTEM INFORMASI PEKERJAAN PART TIME BERBASIS MOBILE DI WILAYAH BANDAR LAMPUNG," *TELEFORTECH : Journal of Telematics and Information Technology*, vol. 1, no. 1, Jul. 2020, doi: 10.33365/tft.viii.649.
- [6] S. Syofian and A. Winandar, "Aplikasi Helpdesk Mendukung Sistem Ticketing," *Jurnal Teknologi Informasi*, vol. 3, no. 1, p. 8, 2017.
- [7] N. Zahira, A. Z. Azran, N. Wahid, and S. Arshad, "Design and Development of a Web-Based System using Laravel Framework: A Competition Management System," *Applied Information Technology And Computer Science*, vol. 3, no. 2, pp. 514-532, 2022, doi: 10.30880/aitcs.2022.03.02.033.
- [8] R. Saini and G. Mussbacher, "Towards Conflict-Free Collaborative Modelling using VS Code Extensions," in *2021 ACM/IEEE International Conference on Model Driven Engineering Languages and Systems Companion (MODELS-C)*, IEEE, Oct. 2021, pp. 35-44. doi: 10.1109/MODELS-C53483.2021.00013.
- [9] T. Bin Tahir, Muh. Rais, and Moch. Apriyadi HS, "Aplikasi Point OF Sales Menggunakan Framework Laravel," *JIKO (Jurnal Informatika dan Komputer)*, vol. 2, no. 2, pp. 55-59, Oct. 2019, doi: 10.33387/jiko.v2i2.1313.