

# Design and Implementation of a Web-Based Child Malnutrition Data Management System at Posyandu Cempaka, Central Lombok

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**ABSTRAK:** The System Information Management (SIM) website of Universitas Qamarul Huda Badaruddin BAGU serves as a digital platform designed to support academic and administrative services. This study aims to evaluate the quality of the website by combining functional testing using the Equivalent Partitioning technique and usability assessment through the System Usability Scale (SUS). Functional testing was performed on key features such as the login page, digital library (DILA), user profile, SSKA academic module, and e-money services. The results indicated that the login feature functioned as expected, while several weaknesses were identified in other modules, including the absence of input restrictions in DILA, incomplete validation in profile forms, and insufficient error handling in SSKA and e-money transactions. The usability evaluation involved 80 respondents from various study programs who completed the SUS questionnaire. The analysis yielded an average score of 46.91, corresponding to Grade D, which reflects low usability. While users appreciated the website's visual appearance and the ease of checking payments via e-money, concerns were raised regarding navigation, error handling, and the effectiveness of learning support features. Overall, the findings suggest that although the MIS website fulfills its basic functions, significant improvements are needed in terms of input validation, interface design, and user experience. This research contributes practical insights for enhancing the reliability and usability of university information systems and provides a foundation for future development aimed at creating more efficient and user-friendly platforms.

**Kata Kunci :** Equivalent Partitioning, SUS, Website, Testing, System Evaluation.

## I. INTRODUCTION

Child malnutrition remains a critical public health issue, particularly in developing countries where access to structured health information systems is limited. Nutritional status directly affects a child's physical growth, cognitive development, and long-term productivity. Inadequate monitoring of nutritional status often results in delayed intervention, increasing the risk of severe health outcomes [1], [2].

In Indonesia, Posyandu functions as a community-based healthcare service responsible for monitoring maternal and child health, including nutritional status assessment. However, many Posyandu units still rely on manual data recording systems. At Posyandu Cempaka, all data related to child growth, including weight and height measurements, are recorded manually in

notebooks. This practice introduces several inefficiencies, such as data redundancy, difficulty in retrieving historical records, and increased potential for human error .

The reliance on manual systems also limits the ability of cadres to perform timely analysis. Identifying malnutrition cases requires aggregation and interpretation of multiple data points over time, which becomes cumbersome without a digital system. As a result, decision-making processes are often delayed, reducing the effectiveness of early intervention strategies.

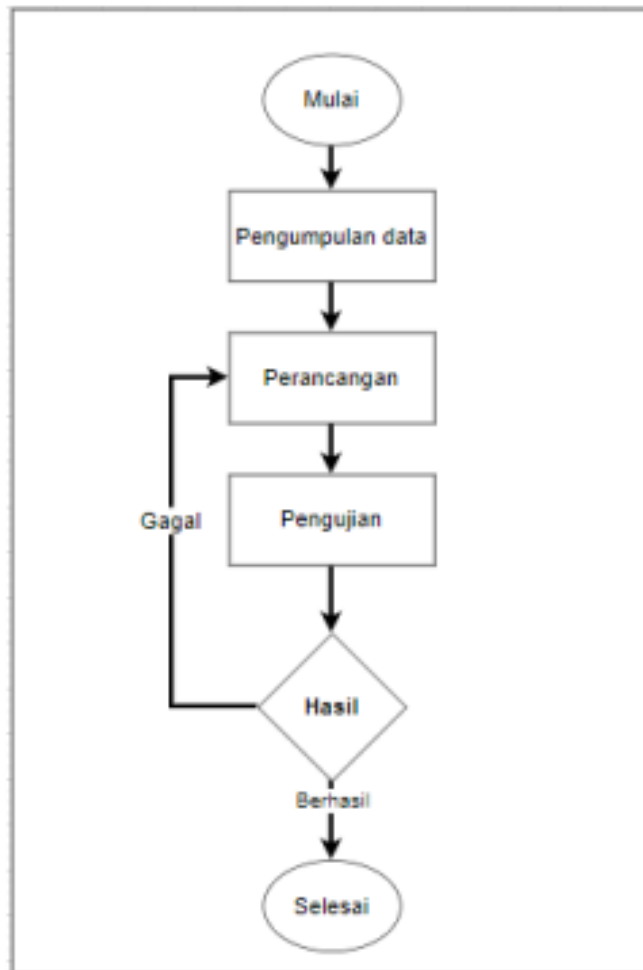
To address these challenges, this study aims to design and implement a web-based application for managing child malnutrition data at Posyandu Cempaka. The system is expected to improve data accuracy, streamline reporting processes, and enhance accessibility for stakeholders. By digitizing the workflow, the system supports more efficient monitoring and contributes to better healthcare outcomes..

## II. RELATED WORK

Several studies have attempted to improve child nutrition monitoring through the development of information systems. Fahmi et al. [3] developed an Android-based application that enables real-time monitoring of child nutritional status. Their system improves communication between healthcare providers and parents, allowing faster response to nutritional issues. Jusuf and Prabowo [4] proposed a web-based Posyandu information system designed to digitize child health records, including immunization and nutrition data. Their findings indicate that digital systems significantly enhance data organization and reporting efficiency compared to manual methods.

In addition, Sari and Hayuningtyas [5] introduced a system that incorporates forward chaining techniques to support decision-making in identifying malnutrition conditions. This approach highlights the potential of integrating expert systems into healthcare applications. Azhariyah et al. [6] focused on developing a web-based system for rural healthcare settings, emphasizing usability and accessibility for non-technical users. Meanwhile, Niga et al. [7] utilized geographic information systems to visualize the distribution of malnutrition cases, providing a broader analytical perspective. Despite these advancements, many existing systems are either too complex or not tailored to the operational context of local Posyandu. Some systems require advanced technical knowledge, while others lack flexibility in adapting to specific workflows. Therefore, this study contributes by developing a system that is simple, practical, and aligned with the needs identified at Posyandu Cempaka, ensuring ease of use and effective implementation.

### III. METHOD



#### 3.1 Research Location and Duration

This research was conducted at Posyandu Cempaka, which is located in Dusun Tanak Beak Barat 1, Tanak Beak Village, North Batukliang District, Central Lombok Regency. The selection of this location was based on its reliance on manual data recording practices and the identified need for system improvement. The research activities, including data collection, system design, and implementation, were carried out over a period of approximately three months, from May to July 2024 . This timeframe allowed for a comprehensive understanding of existing workflows and the development of a tailored system solution.

#### 3.2 Research Type

The study adopts a qualitative case study approach, focusing on an in-depth analysis of the specific conditions and challenges faced by Posyandu Cempaka. This approach enables the researcher to capture contextual insights that may not be evident through quantitative methods alone. By examining real-world practices and user experiences, the study aims to develop a

system that is both relevant and applicable to the target environment. The qualitative nature of the research also allows for flexibility in adapting system requirements based on stakeholder feedback.

### **3.3 Data Collection Methods**

Data collection was conducted using multiple techniques to ensure comprehensive and reliable information. The primary methods included observation and interviews, both of which played a crucial role in understanding user needs and system requirements.

Observation was carried out during routine Posyandu activities to examine how data is recorded, processed, and stored. This method provided direct insight into operational inefficiencies, such as delays in data retrieval and inconsistencies in record-keeping. Interviews were conducted with Posyandu cadres and community members to gather qualitative feedback regarding system expectations. The respondents emphasized the need for a user-friendly system that supports data input, retrieval, and reporting functionalities. Additionally, they highlighted the importance of restricting access to authorized users to maintain data integrity .

### **3.4 System Development Method**

The system development process follows the Waterfall model, which is a structured and sequential approach commonly used in software engineering. The model consists of several stages, including requirement analysis, system design, implementation, testing, and maintenance. Each stage must be completed before proceeding to the next, ensuring a systematic development process.

The requirement analysis stage involved identifying user needs based on data collection results. The design stage translated these requirements into system models, including UML diagrams and database structures. Implementation involved coding the system using PHP and MySQL, while testing ensured that all functionalities operated as intended. Finally, the maintenance stage focuses on future improvements and system updates. The use of the Waterfall model is suitable for this study due to its clarity and ease of documentation .

### **3.5 System Design**

The system design phase utilizes Unified Modeling Language (UML) to provide a visual representation of system architecture and workflows. Several diagrams were developed to ensure a comprehensive understanding of system functionality.

The use case diagram illustrates the interaction between different actors and the system, including admin, cadre, and user roles. Activity diagrams describe the flow of operations such as login, data input, and report generation, providing a clear sequence of actions. The Entity Relationship Diagram (ERD) defines the structure of the database and relationships between

tables, ensuring data consistency and integrity. Class diagrams represent the system's object-oriented structure, while sequence diagrams depict the interaction between system components during execution. These design tools collectively ensure that the system is well-structured and logically coherent.

### **3.6 System Implementation**

The implementation phase translates the system design into a functional application. The system is developed using PHP as the primary programming language, supported by HTML and CSS for the user interface. MySQL is used as the database management system, while XAMPP serves as the local server environment.

The hardware requirements include a minimum of an Intel Core i3 processor and 4 GB of RAM, ensuring that the system can run efficiently on standard devices. The software environment includes Windows 10 as the operating system and Google Chrome as the recommended browser. Visual Studio Code is used as the code editor to facilitate development. The implementation process focuses on ensuring system stability, usability, and compatibility with existing workflows .

### **3.7 Database Design**

The database is designed to support efficient data storage and retrieval. It consists of three main tables: `tb_kader`, `tb_anak`, and `tb_login`. Each table serves a specific purpose within the system.

The `tb_kader` table stores information about Posyandu cadres, including their identity and contact details. The `tb_anak` table contains child-related data such as name, date of birth, weight, height, and nutritional indicators. The `tb_login` table manages user authentication, ensuring that only authorized individuals can access the system. The database design emphasizes normalization to minimize redundancy and maintain data integrity. Relationships between tables are defined to enable seamless data integration and retrieval.

## **IV. RESULT AND DISCUSSION**

### **4.1 System Features**

The developed system provides several key features that enhance the efficiency of data management at Posyandu Cempaka. One of the main features is the multi-level login system, which differentiates access rights between admin, cadre, and general users. This ensures that sensitive data is protected while still allowing relevant stakeholders to access necessary information.

The admin module allows for the management of user accounts and system data, including adding, editing, and deleting records. The cadre module enables the input and management of child and nutritional data, as well as report generation. Meanwhile, the user module provides read-only access to nutritional information, allowing community members to monitor child health status. These features collectively improve system usability and functionality.

## 4.2 Nutritional Data Processing

The system includes an automated mechanism for processing nutritional data based on input parameters such as weight and height. The Body Mass Index (BMI) is calculated to determine the nutritional status of each child. This automation reduces the risk of calculation errors and ensures consistency in data analysis.

| Posyandu Cempaka            |            |                   |                  |                    |             |       | Kembali | Logout |
|-----------------------------|------------|-------------------|------------------|--------------------|-------------|-------|---------|--------|
| Data Kader posyandu cempaka |            |                   |                  |                    |             |       |         |        |
| No                          | Nama Kader | Tanggal Tglada    | Nama Posyandu    | Alamat             | NO HP       | Jenis | Alat    |        |
| 1                           | Hudaib     | 11 September 2024 | Posyandu cempaka | Tanah baik Barat 1 | 08533317932 | Pegun | Lisak   |        |

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| Posyandu Cempaka |               |                   |                   |                    |                    |               |      |                  |              |              |      | Kembali | Logout |
|------------------|---------------|-------------------|-------------------|--------------------|--------------------|---------------|------|------------------|--------------|--------------|------|---------|--------|
| Data Anak        |               |                   |                   |                    |                    |               |      |                  |              |              |      |         |        |
| No               | No. KK/RF/JS  | Tanggal Posyandu  | Nama Orangtua     | Nama Anak          | Alamat             | Jenis Kelamin | Umur | Tanggal Lahir    | Peny. Haiden | Tinggi Badan | Lila | Alat    |        |
| 1                | 5202122072938 | 11 September 2024 | Sapriah alhabiera | Rangga prasidya    | Tanah baik Barat 1 | laki-laki     | 44   | 20 April 2019    | 13           | 96           | 15   | Udah    | Pegun  |
| 2                | 5202122052122 | 11 September 2024 | Sumali            | Rafan arha maulana | Tanah baik Barat 1 | laki-laki     | 50   | 01 January 1976  | 11           | 90           | 15   | Udah    | Pegun  |
| 3                | 5202122072938 | 11 September 2024 | Selak             | Mikhal Karimah     | Tanah baik Barat 1 | perempuan     | 55   | 23 April 2019    | 20           | 98           | 15   | Udah    | Pegun  |
| 4                | 5202122072912 | 11 September 2024 | Rozali            | Diana Putri        | Tanah baik Barat 1 | perempuan     | 55   | 20 May 2019      | 14           | 98           | 16,2 | Udah    | Pegun  |
| 5                | 5202122072926 | 11 September 2024 | Ahdanussolikh     | IrfanRahmi         | Tanah baik Barat 1 | laki-laki     | 50   | 26 November 2011 | 12           | 96           | 16,2 | Udah    | Pegun  |

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| Posyandu Cempaka  |               |                   |                   |                    |                    |               |      |                  |              |              |         | Kembali                | Logout |
|---|---------------|-------------------|-------------------|--------------------|--------------------|---------------|------|------------------|--------------|--------------|---------|------------------------|--------|
| Data Gizi Anak  |               |                   |                   |                    |                    |               |      |                  |              |              |         |                        |        |
| Cari Berdasarkan Nomor KK/RF/JS <input type="text"/> Cari |               |                   |                   |                    |                    |               |      |                  |              |              |         |                        |        |
| No  | No. KK/RF/JS  | Tanggal Posyandu  | Nama Orangtua     | Nama Anak          | Alamat             | Jenis Kelamin | Umur | Tanggal Lahir    | Peny. Haiden | Tinggi Badan | Lila    | Status Gizi            |        |
| 1   | 5202122072938 | 11 September 2024 | Sapriah alhabiera | Rangga prasidya    | Tanah baik Barat 1 | laki-laki     | 44   | 20 April 2019    | 13 kg        | 96 cm        | 16 cm   | Kurus                  |        |
| 2   | 5202122072938 | 11 September 2024 | Selak             | Mikhal Karimah     | Tanah baik Barat 1 | perempuan     | 55   | 23 April 2019    | 20 kg        | 98 cm        | 16 cm   | Normal                 |        |
| 3   | 5202122072912 | 11 September 2024 | Rozali            | Diana Putri        | Tanah baik Barat 1 | perempuan     | 55   | 20 May 2019      | 14 kg        | 98 cm        | 16,2 cm | Kurus                  |        |
| 4   | 5202122072926 | 11 September 2024 | Ahdanussolikh     | IrfanRahmi         | Tanah baik Barat 1 | laki-laki     | 50   | 26 November 2011 | 12 kg        | 96 cm        | 16,2 cm | Kurus                  |        |
| 5   | 5202122072911 | 01 September 2024 | Sumali            | Rafan arha maulana | Tanah baik Barat 1 | laki-laki     | 50   | 12 November 2019 | 22 kg        | 90 cm        | 15 cm   | Kekurangan Berat Badan |        |

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The results are displayed in a structured format, allowing users to quickly identify children who may be at risk of malnutrition. Additionally, the system provides reporting features that enable data export in PDF format. This functionality supports documentation and facilitates communication with healthcare authorities.

### **4.3 System Testing**

System testing was conducted using both black box and white box testing methods to ensure functionality and reliability. Black box testing focuses on evaluating system outputs based on given inputs without examining internal code structures. The results indicate that all major functions, including login, data input, and report generation, operate correctly.

White box testing examines the internal logic of the system, ensuring that all execution paths are properly tested. Two main scenarios were evaluated: successful login and failed login followed by retry. The results confirm that the system behaves as expected under different conditions, indicating a robust implementation.

### **4.4 User Validation**

User validation was carried out by involving five respondents who interacted directly with the system. The evaluation focused on several aspects, including system performance, ease of use, functionality, accessibility, and interface design.

The results show that the system performs well in terms of functionality and meets user expectations. However, some respondents indicated that improvements are needed in interface design and accessibility. This feedback highlights the importance of user-centered design in system development and provides direction for future enhancements .

### **4.5 Discussion**

The implementation of the web-based system demonstrates a significant improvement over manual data management practices. The system reduces the time required for data entry and retrieval, minimizes errors, and enhances reporting capabilities. These improvements contribute to more effective monitoring of child nutritional status.

However, the study also identifies several limitations. The system currently lacks advanced analytical features and is not optimized for mobile devices. Additionally, the interface design requires further refinement to improve user experience. Addressing these limitations will be essential for scaling the system and increasing its impact.

## V. CONCLUSION

This study successfully designed and implemented a web-based application for managing child malnutrition data at Posyandu Cempaka. The system addresses key challenges associated with manual data recording and provides a more efficient and reliable solution. The application enhances data management, improves reporting efficiency, and supports better decision-making. Despite its current limitations, the system provides a strong foundation for further development. Future work should focus on enhancing user experience, integrating mobile platforms, and incorporating advanced analytical features to maximize its utility.

## REFERENCE

- [1] World Health Organization, *Malnutrition*, Geneva, Switzerland, 2023.
- [2] Kementerian Kesehatan Republik Indonesia, *Profil Kesehatan Indonesia 2022*, Jakarta, Indonesia, 2022.
- [3] Fahmi, et al., "Development of an Android-Based Application for Monitoring Child Nutritional Status," *Journal of Health Informatics*, vol. 5, no. 2, pp. 45–52, 2020.
- [4] Jusuf and Prabowo, "Web-Based Posyandu Information System Design," *Indonesian Journal of Information Systems*, vol. 4, no. 1, pp. 12–20, 2019.
- [5] Sari and Hayuningtyas, "Application of Forward Chaining Method for Malnutrition Detection," *Journal of Computer Science Applications*, vol. 7, no. 3, pp. 101–108, 2021.
- [6] Azhariyah, et al., "Web-Based Nutritional Monitoring System in Rural Areas," *Journal of Information Technology*, vol. 6, no. 2, pp. 67–75, 2020.
- [7] Niga, et al., "Geographic Information System for Mapping Malnutrition Distribution," *International Journal of GIS Applications*, vol. 3, no. 1, pp. 23–30, 2018.