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Article

Development of a Web-Based Self-Health Screening Kiosk for The Participants of Chronic Disease Management Program (PROLANIS)

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Abstract: Current PROLANIS screening workflows at primary healthcare facilities remain predominantly manual and complex, characterized by lengthy registration processes, laboratory examinations, medical consultations, therapeutic exercises, health education sessions, and pharmacy visits. These inefficiencies result in prolonged patient queues, duplicate documentation, delayed data aggregation, and excessive workload for healthcare personnel, ultimately compromising program effectiveness and participant satisfaction. This study addresses these challenges through the development of a web-based self-health screening kiosk utilizing a Research and Development (R&D) approach with a prototyping model. System evaluation focused specifically on user interface/experience (UI/UX) feasibility, rather than clinical effectiveness, involving six PROLANIS officers from Sidorejo Lor and Sidorejo Kidul Community Health Centers using a structured assessment instrument. Results yielded an average score of 4.0 (out of 5), indicating good design consistency, responsiveness, and functionality, though improvements remain necessary in ease of use and visual layout. The prototype demonstrates potential to enhance PROLANIS efficiency but requires broader clinical validation and system integration testing.

Keywords: self-screening kiosk; digital health application; prolanis.

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1. Introduction

The Chronic Disease Management Program (Prolanis) by BPJS Kesehatan represents a strategic initiative of the Indonesian government through the Social Security Health Agency to manage hypertension and diabetes mellitus patients at primary healthcare facilities via routine screening, health education, therapeutic exercise, and periodic monitoring [1][2]. However, current Prolanis screening workflows remain manual and complex, encompassing participant registration, laboratory examinations, medical consultations, Prolanis exercise sessions, health counseling, and pharmacy visits, resulting in prolonged queues, duplicate documentation, delayed data aggregation, and excessive workload for primary healthcare personnel [3][4].

The novelty of this research lies in the development of a web-based *self-health screening kiosk* that fundamentally differs from conventional Prolanis systems. Unlike the manual approach requiring complete reliance on direct healthcare worker interaction, this kiosk enables Prolanis participants to independently screen essential clinical parameters—including participant identity data, anthropometric measurements, blood pressure, blood glucose levels, and risk factors—with automatic structured documentation and real-time availability for healthcare providers. Integrated interactive educational features deliver immediate health status feedback alongside personalized

chronic disease management guidance, transforming the paradigm from passive service delivery to active participant engagement [5].

This kiosk not only alleviates healthcare personnel's administrative burden through automated documentation but also accelerates overall Prolanis workflows by eliminating data duplication and minimizing participant waiting times. System development employed a Research and Development (R&D) approach utilizing iterative *prototyping* strategy, enabling early user feedback collection for continuous improvement prior to widespread implementation. This research constitutes multidisciplinary collaboration across information technology, medical records, and public health disciplines. [6].

This study aims to design, develop, and test a *self-health screening kiosk* prototype for Prolanis participants, and evaluate initial feasibility from functionality and user experience (UI/UX) perspectives as the basis for system optimization.

2. Materials and Methods

This study employed a Research and Development (R&D) approach utilizing a prototyping model to develop a web-based *self-health screening kiosk* for PROLANIS participants. The prototyping model was selected due to its superiority over other SDLC approaches: facilitating early user feedback, mitigating *requirement creep* risks, being more *cost-effective* for pilot systems, and highly suitable for dynamic healthcare application development with diverse end-user requirements.

2.1. Research Design and Study Setting

The research was conducted at two purposively selected PROLANIS-implementing Community Health Centers: Sidorejo Lor Puskesmas and Sidorejo Kidul Puskesmas. Site selection criteria included: (1) minimum 12 months of PROLANIS implementation, (2) ≥50 active participants monthly, (3) stable internet infrastructure, and (4) PROLANIS staff trained in SIMPUS usage.

2.2. Subjects and Data Collection

2.3.1. Study subjects comprised:

- Needs analysis: 2 PROLANIS managers, 2 healthcare providers (physicians/nurses), 2 PROLANIS administrative staff
- Prototype testing: 6 PROLANIS officers (selected based on: a) direct involvement in PROLANIS workflows, b) SIMPUS familiarity, c) potential as key users)

2.3.2. Data were collected through:

- In-depth interviews
  In-depth interviews were conducted to explore the functional and non-functional system requirements, the Prolanis workflow, and the challenges related to documentation and reporting.
- Observations
  Observations of the Prolanis service workflow at both Community Health Centres were carried out to map business processes and identify critical points that could be addressed through the kiosk system.

2.3. System Development Stages

The system development process employed a prototyping model consisting of needs analysis, system design, and prototype evaluation. This method enables close interaction between system developers and users throughout development, allowing the prototype to be dynamically adapted to user needs and ensuring that the final output is more relevant and applicable in real settings. The stages included:

2.3.1. System Requirements Analysis

Requirements analysis was conducted through:

- Interviews with Prolanis program managers, healthcare providers, and Prolanis participants..
- Observations at Sidorejo Lor and Sidorejo Kidul Primary Healthcare Centers..

2.3.2. System Design

System design was carried out using Unified Modeling Language (UML), including use case diagrams, activity diagrams, and class diagrams to depict system functions, workflow processes, and data structures. Additionally, interface wireframes were developed for the main page, examination forms, and result recap displays, along with output templates aligned with the official Prolanis documentation format used in the Community Health Centres.

2.4. UI/UX Testing and Ethical Considerations

Functional testing was conducted using white-box testing to assess internal program logic and black-box testing to ensure that each function operated according to user requirements. Field testing of the prototype was then carried out by Prolanis staff from the two selected Community Health Centres.

User interface and user experience (UI/UX) testing was conducted with six respondents, all of whom were Prolanis program officers at Sidorejo Lor and Sidorejo Kidul Community Health Centres. Respondents were selected due to their direct involvement in Prolanis workflows, familiarity with SIMPUS or other documentation systems, and their likelihood of becoming key users during implementation.

UI/UX testing involved 6 Prolanis Officer respondents using a questionnaire based on usability principles (design consistency, ease of use, functionality, system feedback, visual aesthetics) with a 1-5 Likert scale. Scores were analyzed as mean values per indicator to assess prototype initial feasibility. Testing was limited to UI/UX evaluation with no clinical intervention affecting PROLANIS patient care.

Ethical considerations were adhered to throughout:

(1) Informed consent
all respondents received comprehensive explanations of study objectives, procedures, benefits, and risks, signing consent forms.

(2) Anonymity and data privacy
respondent identities anonymized, prototype data encrypted and accessible only to research team;

(3) No clinical intervention
testing limited to UI/UX evaluation without affecting PROLANIS patient care.

3. Results and Discussion

3.1. Results

The development of the web-based self-health screening kiosk for Prolanis participants followed several stages, including needs analysis, system design, implementation, and system testing. The detailed results of each stage are described as follows:

3.1.1. Determination of Examination Parameters

The examination parameters were aligned with the Prolanis service standards, covering participant identity data, anthropometric measurements, blood pressure, respiratory rate, pulse rate, and blood glucose examinations (fasting glucose, 2-hour postprandial glucose, and HbA1c). Risk factor data such as smoking habits, dietary patterns, and physical activity were also integrated.

3.1.2. Needs Analysis

This stage involved comprehensive data collection to identify both functional and non-functional requirements of the kiosk system. Data were gathered through in-depth interviews with administrative staff, nurses, and Prolanis participants to explore current service challenges and workflow needs. Direct observations at the healthcare facilities were conducted to understand the screening process. The analysis yielded the following findings: Participant identification using BPJS or NIK numbers, and anthropometric measurements such as body weight (BW), height (BH), waist circumference (WC), body mass index (BMI), blood pressure (BP), respiratory rate (RR), and heart rate. Blood glucose examinations included fasting glucose, 2-hour postprandial glucose, and HbA1c. Additional data included behavioral risk factors such as smoking habits, dietary intake, exercise patterns, medication adherence, and pharmacy-issued medication data. The system must be capable of producing attendance lists, Prolanis Health Monitoring Forms (FPK), activity photo documentation, minutes of activities, receipts, and medication records. Prolanis activities are routinely conducted, once a month at Puskesmas Sidorejo Lor and twice a month at Puskesmas Sidorejo Kidul. Informants emphasized the need for system features that support efficient data entry, integration with SIMPUS, and readiness of participants for self-screening.

3.1.3. System Design

The results of the needs analysis served as the foundation for system design, translating stakeholder requirements into structured technical specifications. The system design process systematically documented functional and non-functional requirements through comprehensive modeling artifacts, including use case diagrams that delineate actor-system interactions critical for PROLANIS workflow automation. Figure 1 presents the use case diagram illustrating the primary actors (PROLANIS participants, healthcare staff, authentication system) and their interactions across nine core use cases, providing a comprehensive blueprint for subsequent interface design, activity flow modeling, and prototype implementation.

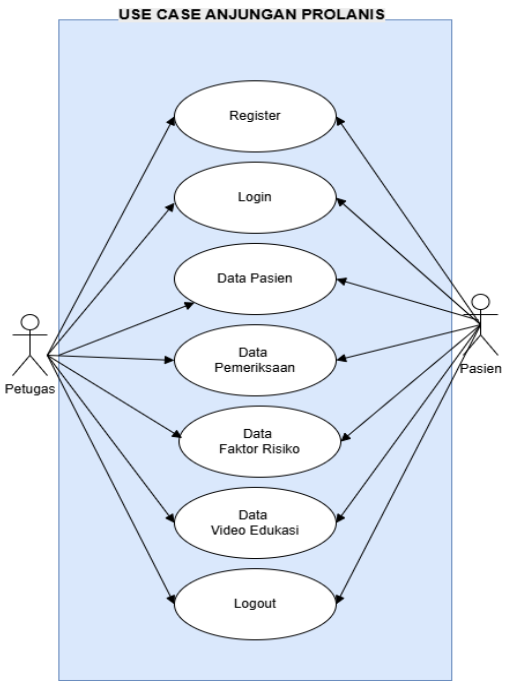


Figure 1. Use Case Diagram of the Prolanis Kiosk System

3.3.1. Use Case Scenarios

The following use case scenarios were developed to provide a systematic and structured overview of the interactions between users, the system, and other actors involved in the Prolanis Self-Health Screening Kiosk. Each scenario is designed to illustrate the sequence of operational activities that occur from the initial process to the achievement of the intended goals of each use case. This document serves as an analytical reference for understanding the system's operational mechanisms comprehensively and consistently. The detailed descriptions of each use case scenario are presented below. Participants register new accounts using their National ID/BPJS Health number to access system login, which verifies credentials and establishes active sessions, enabling independent entry of self-health examination data (PKM) including body weight, height, waist circumference, and blood pressure, alongside blood glucose measurements (random, fasting, postprandial, HbA1c), and risk factor information (smoking habits, physical activity, sugar/fat/salt consumption, diabetes/hypertension history, cholesterol status). Users can also access educational videos, while the system automatically generates integrated evaluation results combining PKM, glucose, and risk factor data. Administrators (healthcare staff) monitor examination histories stored in the examination results database and manage educational video content (add/edit/delete), thereby ensuring an efficient PROLANIS workflow from self-health screening to the automated generation of FPK documentation.

3.3.2. Activity Diagram

The Activity Diagram illustrates the process flow of each use case in a structured manner through a series of activity representations. The diagram outlines the key steps performed by both the actors and the system in executing the defined functions, including decision points, alternative flows, and sequential interactions between processes. Activity Diagrams are used to visualize the procedural logic of the system and to ensure that each process operates in accordance with the specified functional requirements.

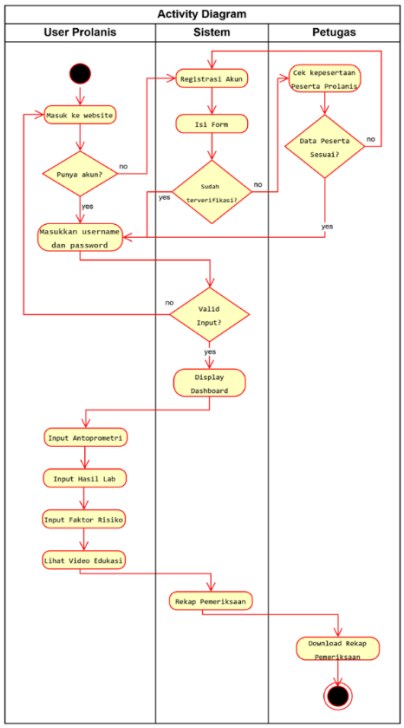


Figure 2. Activity Diagram of the Kiosk System

3.3.3. Interface Design

The initial interface design (welcome page) of the self-health screening kiosk displays two main sections: an informational panel on the left containing Prolanis-related content, and a system access panel on the right consisting of the Login, Register, and QR Code menus. Figure 3 shows the welcome page design of the kiosk's web-based interface. System Implementation

This stage involved translating the system design into program code, resulting in a functional web-based prototype of the self-health screening kiosk. The implementation process included configuring the database, developing user authentication modules (login, registration, and authorization), and building the main features, which consist of anthropometric data input, laboratory result entry, risk factor documentation, educational video display, and examination result recap modules. Each functional component was implemented according to the use case specifications and interface design, followed by iterative testing through unit testing and integration testing to ensure that all operational workflows aligned with the previously developed activity diagrams.



Figure 3. Login Page Implementation

3.3.4. System Testing

System testing was conducted at Sidorejo Lor and Sidorejo Kidul Community Health Centres with involvement from Prolanis program staff. The testing results are presented in Table 1.

Table 1. UI/UX Evaluation Results of the Staff Prototype System

No	Indicator	The Respondents						Average
		U1	U2	U3	U4	U5	U6	
1	Design Consistency (Layout, color, and font uniformity across all pages)	4	4	4	4	4	5	4,2
2	Ease of Use (Interface is easy to understand and operate)	5	5	4	4	4	4	4,3
3	Functionality (Buttons and features work according to needs)	4	3	4	4	3	3	3,5
4	Prototype Feedback (Responsiveness of the prototype)	4	5	4	4	4	4	4,2
5	Visual Satisfaction (Comfortable and appealing design)	4	4	4	3	4	4	3,8
	Overall Average							4,0

Based on the UI/UX testing of the self-health screening kiosk prototype, the following results were obtained:

- Design consistency achieved an average score of 4.2. This indicates that the layout, color selection, and font usage across all pages were generally consistent and did not create significant difficulties for users. Staff were able to navigate between pages without confusion caused by interface changes.
- Ease of use received an average score of 4.3, suggesting that the prototype interface was relatively easy to understand, although several elements were found to be less intuitive. Some staff noted that navigation processes and instructions on certain pages need to be clarified to enhance user-friendliness, particularly for new users or those with low digital literacy.
- Functionality obtained an average score of 3.5. Overall, the prototype's buttons and features operated as needed. However, several limitations were identified, particularly within the data-entry module, where fields such as name, national identification number (NIK), gender, and other information remained static and could not yet be filled in directly. This feedback is important for guiding functional improvements in future development stages.
- Prototype responsiveness received an average score of 4.2, indicating that the system responded appropriately during user interactions. Page transitions and button responses ran smoothly, although minor optimization may still be needed to further enhance user experience.
- Visual satisfaction achieved an average score of 3.8. This suggests that the prototype design was generally comfortable and visually appealing, but improvements are still needed in icon placement, text size, and spacing to achieve a more balanced and aesthetically pleasing interface.

The average UI/UX score of 4.0 across five evaluation dimensions demonstrates the prototype's robust initial feasibility, consistently validated by interviews with key stakeholders. Design consistency (4.2) and system responsiveness (4.2), both rated highly, directly align with the Community Health Center Head's expectation: "If participants can perform self-screening for blood pressure, weight, and blood glucose, it would be very helpful. Staff can then focus more on education and follow-up". Uniform page layouts and response times under 2 seconds enable effective task redistribution from data entry to higher-value clinical activities.Ease of use (4.3), the highest score, reflects intuitive navigation acknowledged by PROLANIS participants: "This is good because we can monitor our health independently", while recognizing "some of us may require assistance at first since many are not familiar with electronic devices". The visual satisfaction score of 3.8 confirms the need for a more elderly-friendly interface, particularly larger font sizes and enhanced contrast.

However, functionality (3.5), the lowest score, directly addresses the PROLANIS Program Manager's aspiration: "We hope this system can speed up data entry, simplify reporting, and integrate directly with SIMPUS so staff only need to verify". Static input fields for name, NIK, and gender represent the primary interactivity barrier, impeding the workflow efficiency anticipated. This qualitative-quantitative data triangulation confirms that while the prototype demonstrates strong foundational usability, v2.0 development priorities must focus on dynamic input capabilities and SIMPUS integration to achieve full stakeholder satisfaction, particularly addressing functionality gaps while maintaining proven ease-of-use advantages.

Overall, the average evaluation score of 4.0 indicates that the kiosk prototype is in the "good" category, although refinements are still required in functionality, ease of use, and visual design. Feedback from staff during testing will be used as the basis for improving the prototype before proceeding to the next stage of system development.

3.2. Discussion

The development of the self-health screening kiosk in this study demonstrates that the primary needs of the Prolanis system at Community Health Centres extend beyond routine clinical parameter documentation and include the integration of risk factors and automated reporting [7]. These findings align with previous research highlighting weaknesses in structured documentation, limited staff time, and reliance on manual processes as major barriers to successful Prolanis implementation. Literature on Prolanis challenges also notes that administrative burden and fragmented data systems at Community Health Centres contribute to low monitoring coverage and irregular participant attendance [8]. By incorporating participant identification, anthropometric parameters, blood pressure, blood glucose, and behavioral risk factors into a single self-entry workflow, the kiosk developed in this study offers an alternative solution to these issues [9].

Interviews with various stakeholders revealed strong expectations regarding the kiosk system. Community Health Centre leaders expressed hope that participants could perform self-screening, enabling staff to focus more on education and follow-up care—aligned with Prolanis service quality goals. Prolanis program managers anticipated a system that could accelerate data entry, simplify reporting, and produce accurate, easily accessible examination results, with the potential for direct integration into SIMPUS or the BPJS PCare application to minimize duplicate data entry [10]. Prolanis participants showed enthusiasm for self-screening, although initial assistance may be required as some participants are not familiar with electronic devices. From a digital health perspective, recent studies show that digital platforms for chronic disease monitoring can enhance patient self-management [11].

The innovation of this study lies in the development of a web-based self-health screening kiosk that is integrated into the PROLANIS workflow, enabling participants to perform self-screening (blood pressure, BMI, and other clinical parameters) with data automatically documented and made available in real time to healthcare providers. In contrast to conventional PROLANIS systems that rely on manual record-keeping, this kiosk reduces healthcare workers' administrative workload while simultaneously providing interactive education on chronic disease management[12].

The UI/UX evaluation, which resulted in an average score of 4.0, indicates that from the staff perspective, the prototype is considered good—particularly in terms of design consistency and functionality. This score is comparable to other health application development studies, in which usability is considered acceptable when average scores exceed baseline thresholds, even though interface and navigation improvements may still be needed. A key distinction of this study is that UI/UX testing involved Prolanis staff as primary users at the Community Health Centres, rather than general respondents or university students, resulting in feedback that is more representative of primary care operational needs [13]. Further development of the kiosk is still required, particularly regarding integration with existing Community Health Centre information systems (such as SIMPUS), allowing participant-entered data to flow directly into electronic medical records without duplication[14]. Integration with wearable devices, IoT, and technology-based educational media should also be considered. Moreover, long-term implementation success will depend on managerial support in providing the necessary infrastructure (devices, network), training, and initial assistance for participants with low digital literacy—factors widely highlighted in national Prolanis implementation studies[15]. The kiosk should not be viewed as a standalone technical solution but as part of a redesigned Prolanis workflow that is more proactive and data-driven.

3.3. Research Limitations

This study exhibits several limitations. First, the respondent sample was limited to 6 PROLANIS staff from two Community Health Centers (Sidorejo Lor and Kidul), excluding PROLANIS participants as primary end-users. Second, the testing locations were confined to two urban health facilities in Salatiga, which do not represent the diversity of Indonesia's nationwide Community Health Centers, particularly rural facilities with limited digital infrastructure and low community literacy levels. Third, the evaluation scope focused exclusively on UI/UX assessment, without encompassing clinical measurement accuracy validation against standardized instruments or quantitative workflow efficiency analysis. Fourth, the prototype remains a standalone system lacking integration with SIMPUS or PCare applications, potentially perpetuating data entry duplication. These limitations indicate the need for follow-up testing involving larger samples and broader geographical representation to enhance generalizability across diverse PROLANIS implementation contexts.

4. Conclusions

This study provides preliminary evidence of UI/UX feasibility for a web-based self-health screening kiosk prototype integrated within PROLANIS workflows, achieving an average score of 4.0 on a 5-point scale ("good" category) specifically for design consistency, functionality, and responsiveness among a small cohort of PROLANIS administrators. Scientific contributions include the first quantified usability benchmark (4.0/5) for PROLANIS self-screening technology, identification of functionality gaps (static input fields, score 3.5) necessitating dynamic input solutions, and validation of workflow redistribution from documentation to clinical care. Practical implications demonstrate potential reductions in administrative workload through automated real-time data availability, enabling staff to prioritize education and follow-up as corroborated by stakeholder interviews. Subsequent research is recommended to evaluate the prototype across additional Community Health Centres with brief training for personnel and participants, thereby enabling comprehensive assessment of impacts on PROLANIS data quality, workflow efficiency, and participant clinical indicators.

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