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Development of a home health assessment application and website-based family disease registration

Kholis Ernawati[1*], Herika Hayurani[2], Karimulloh[3], Sri Chusri Haryanti[4], Sri Puji Utami[5]

[1]*Faculty of Medicine, Universitas YARSI, Indonesia.*
[2,4,5]*Faculty of Informatics Engineering, Universitas YARSI, Indonesia.*
[3]*Faculty of Psychology, Universitas YARSI, Indonesia.*

Corresponding author: Kholis Ernawati (*Email: kholis.ernawati@yarsi.ac.id*)

Abstract

Healthy homes play an important role in maintaining the physical, mental, and social health of their residents. Inadequate housing environmental conditions, such as poor ventilation, minimal lighting, and high humidity, contribute to an increased risk of diseases such as ISPA, tuberculosis, and dengue fever. Apart from that, high housing density also impacts the mental and physical health of residents. The use of digital technology in the form of web-based applications has become an innovative solution for assessing and improving the health of the home environment. This research develops an application *RumahQ Healthy Islami*, which aims to help people objectively assess the condition of their home, record family illnesses, and provide education about the importance of a healthy home. This application is equipped with education, assessment, and assessment results features that allow users to obtain information, carry out home evaluations, and understand the necessary repair steps. Based on tests on 50 respondents, the majority of houses were rated as "fairly healthy" (54%), but 30% of houses were still in the "less healthy" category. The most commonly reported health problem was ARI (24%), which reflects the importance of improving the quality of the home environment. This application is designed to reach various groups of society, with the majority of respondents coming from secondary education levels (high school and junior high school) and lower middle income. This application is also capable of generating data that can be used for further analysis to support environmental health policies. The conclusion of this research shows that the application *RumahQ Healthy Islamic* succeeded in becoming a practical, educational, and relevant digital solution to support household health. Suggestions submitted include developing IoT-based features, interactive forums, and integrating applications with health services to increase their benefits and effectiveness. In addition, collaboration with government programs and stakeholders is needed to expand the reach of applications, especially in areas with limited internet access. With continuous innovation, this application can become a strategic tool in improving the health of the home environment and supporting the achievement of sustainable development goals (SDGs).

Keywords: Digital health application, Environmental health, Family disease data collection, Healthy home assessment.

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1. Introduction

A healthy home plays a very important role in creating an environment that supports physical, spiritual, and social health for its residents [1]. Understanding these factors is important for making changes or adjustments in the home environment to create healthier conditions for its residents. With proper management of the environment in the home, the risk of disease or accidents can be significantly reduced [2].

Housing conditions play an important role in determining individual health status, especially in children's growth and overall community health [1, 3]. Several research results show that the health of house occupants depends on various aspects of the house, namely: a) ISPA disease in house occupants is related to the density of the respondent's room, ventilation, temperature, humidity, floor condition, and wall condition [4]. House floor variables, house ventilation, house lighting, house occupancy density, and house humidity are risk factors for the occurrence of pulmonary TB [5]. Lighting, temperature, humidity, and the presence of larvae influence the occurrence of DBD [6]. There is a relationship between residential environmental conditions and socio-economic status on individual mental health [7].

The use of information technology in the health sector has opened the door to the development of more efficient services, better accessibility to health information, and more personalized and focused care. This is a major step towards providing more inclusive and effective health services for society as a whole [8]. The use of smartphone-based applications has paved the way for faster responses, broader data collection, and more effective monitoring in disease control. Applications are an important tool for health workers in ensuring that disease situations are better controlled and that the right interventions are provided at the right time Lwin, et al. [9].

Rias [10] developed a Healthy Home data collection application that is integrated between the Community Health Center and the DKK Environmental Health Division. The application was built using the programming language PHP, jQuery, and the CSS Bootstrap framework, which helps simplify the process of reporting and managing healthy home data both at the Community Health Center and in the DKK Environmental Health Sector [10]. They also developed a design for a web-based Healthy Home and Healthy Environment Reporting Information System application, which is used as an integrated means of managing and reporting healthy home data from Community Health Centers and Health Services. This web-based application uses the programming language PHP (Hypertext Preprocessor) and JavaScript and is equipped with Bootstrap for a responsive web display and Highcharts for creating graphs recapitulating data on healthy homes and healthy environments based on month and year Suharjito [11].

Ernawati [12] developing an Android-based healthy home assessment mobile application. In this application, there is a home appraisal registration menu and educational material. The application trial was carried out on health cadres in Kresek sub-district, Tangerang District. The main problems that arose during the trial were mobile phone unsupportive cadres, limited capacity mobile phones resulting in difficulties in installing applications or saving data, and limited internet access in rural areas [12].

Based on the explanation above, it can be concluded that the condition of the housing environment will affect the health of the residents of the house. Technological advances can be used to collect data on home health assessments and gather information on family members' disease histories. The data obtained quickly can be used to analyze risk factors in the residential environment for diseases affecting family members, and the results of this analysis can be used as recommendations for relevant stakeholders to develop programs to better address public health problems.

Nationally, the percentage of households occupying habitable houses is 60.90%. The provinces with the highest percentages of households occupying habitable houses are DI Yogyakarta (85.15%), Bali (78.47%), and East Kalimantan (70.70%). Meanwhile, the provinces with the lowest percentages are the Bangka Belitung Islands (27.60%), Papua (28.92%), and DKI Jakarta (40.00%) [2].

Health risks due to unhealthy home conditions include tuberculosis (TB). TB data in 2021 is 47.1%, an increase compared to 2020. The TC in 2021 in Indonesia has not yet reached the expected TC target of 49% [13]. Based on data from the Central Statistics Agency (BPS), 29.94% of the Indonesian population reported health complaints in the last month in 2022. This ratio increased compared to the previous year, which was 27.23% [14].

Based on the condition of data on habitable houses and health problems above, the development of website-based house assessment applications and data collection on family members' health problems is very necessary. The aim of the research is to develop a website-based application for home health assessment and family disease data collection that can be used by the public easily and accurately. This research is expected to provide solutions for the community in assessing the health of their homes and collecting data on family members' illnesses. It is hoped that the developed application can help people increase awareness of the importance of maintaining a healthy home, save on home repair costs, reduce the risk of disease, and improve their quality of life.

2. Materials and Methods

2.1. Research Design and Stages

In research on developing website-based applications for home assessment and family disease data collection, a research and development design was utilized. This research design consists of several stages, namely.

2.1.1. Needs Analysis Stage

This stage was carried out to analyze user needs for home health assessment applications and family disease data collection. Needs analysis is conducted by performing interviews, questionnaires, and observations. The needs analysis stage is an important phase in the information system development process. This stage aims to understand user needs for the information system to be built. Information collected during the needs analysis stage is used as a reference in subsequent stages of the information system development.

2.1.2. Design Stage

This stage is carried out to design an application for home health assessment and family disease data collection. The application design is based on the results of the needs analysis. Information system design includes architectural design, database design, user interface design, and business process design. Architectural design describes the overall structure of an information system. Database design describes the data structure that will be used by the information system. User interface design describes the user's appearance and interaction with an information system. Business process design describes the flow of data and information in an information system.

2.1.3. Development Stage

This stage is carried out to develop an application for home health assessment and family disease data collection in accordance with the design that has been created.

d. Level of Testing

This stage was carried out to test the home health assessment application and family disease data collection. Testing is conducted using black box testing and white box testing methods.

e. Level of Spread

This stage was carried out to disseminate the home health assessment application and family disease data collection to the community.

This research was only carried out up to the testing stage.

2.2. Data Analysis

Data analysis carried out in research on home health application development and family disease data collection aims to obtain information that can be used to improve the quality of the application. Information that can be obtained from data analysis includes.

a. User needs.
b. Application strengths and weaknesses.
c. Suggestions for application improvement.

This information can be utilized to make improvements and develop applications so that they can better meet user needs and provide greater benefits.

2.3. Plan Overview of Website-Based Home Health Data Collection and Family Disease Data Collection Applications

The home health data collection application and website-based family disease data collection application is an application that can be used to objectively assess the condition of the house and record family disease history completely and accurately. This application can be used by anyone, including individuals and families.

The website-based home health data collection and family disease data collection application that will be developed has several features, namely.

2.3.1. Home Appraisal Features

This feature is used to objectively assess the condition of a house based on certain criteria, such as building condition, environmental conditions, and facility conditions. Home assessment criteria can be adjusted to suit user needs.

2.3.2. Features of Family Disease Data Collection

This feature is used to record family disease history completely and accurately. Family disease data can be used to prevent and treat diseases appropriately.

Apart from these features, the application also has several supporting features, namely:

2.3.3. Login and Logout Feature

This feature is used to maintain user data security.

2.3.4. Notification Feature

This feature is used to provide notifications to users, for example, about maintenance and home repair schedules.

2.3.4. User Interface Design

The user interface design of the website-based home health data collection and family disease data collection application was created with attention to ease of use and readability. The application design is made using simple and clear language and uses images and icons that are easy to understand.

2.3.5. Database Design

Database design for home health data collection applications and website-based family disease data collection using a relational model. The relational model is the most commonly used database model. The relational model uses tables to store data.

2.3.6. Application Utilization

Website-based home health data collection and family disease data collection applications can be utilized for various purposes, including:

1) Objectively assess the condition of the house

The application can be used to objectively assess the condition of a house based on certain criteria. Home assessment data can be utilized to determine home repair and maintenance steps.

2) Prevention and treatment of family illnesses

The application can be used to record family disease history completely and accurately. Family disease data can be used to prevent and treat diseases appropriately.

3) Educational media about home health, family illnesses and an overview of religious aspects

The app can be used to learn about home health and family illnesses. The application can provide information about factors that can influence home health and family illnesses.

3. Results

3.1. Review Research Ethics

This research has received a certificate confirming the feasibility of research ethics from the Research Ethics Committee of the YARSI University Research Institute, November 6, 2024, No. 366/KEP-UY/EA.20/XI/2024.

3.2. Application RumahQ Healthy Islamic

Application RumahQ Healthy Islami is a digital solution designed to help people understand and assess the health of their homes. This application offers a practical and educational approach with various main features, such as educational tools, assessments, and assessment results, which are designed to support the health of the living environment. With easy access via a browser using the link https://rumah-sehat-web.onrender.com, users can quickly take advantage of this application to obtain important information about healthy homes (application guide file attached).

The educational features in this application provide comprehensive knowledge about the concept of a healthy home, the criteria that must be met, and the parameters used to assess the health of a home. The available articles can be accessed easily, allowing users to dig deeper into information about how to create a healthy and safe environment for families. This information is an important first step before users begin the assessment process.

The assessment feature is the core of the application RumahQ Healthy Islami. With this feature, users can carry out a thorough evaluation of the condition of their home based on certain criteria. The assessment process begins with filling out a respondent form, which is then followed by a series of questions that must be answered. Each answer has an assessment weight, and the final results are displayed in the form of a score. To provide a deeper understanding, the application also provides detailed assessment results, including indicators that do not meet the criteria, so that users can immediately make improvements.

In addition, this application is equipped with an assessment results feature that allows users to access a summary of the assessments that have been carried out. Assessment results data can be viewed in detail and downloaded for documentation or further analysis purposes. With all the features provided, RumahQ Healthy Islami is not just an assessment tool but also an educational partner that supports the community in creating homes that are healthier, safer, and more comfortable to live in. The RumahQ Sehat Islami website application has obtained copyright with number EC00202516080 dated February 5, 2025 (Application copyright is attached).

Table 1.
Frequency distribution of respondents and assessment of home conditions from application trial results.

No	Variable	Category	Number of Respondents (People)	Percentage (%)
1	Gender	Laki-Laki(L)	28	56
		Female (P)	22	44
		Total	50	100
2	Level of education	SD	5	10
		JUNIOR HIGH SCHOOL	15	30
		SMA	20	40
		PT	10	20
		Total	50	100
3	Type of work	Housewife	12	24
		Private sector employee	10	20
		Self-employed	8	16
		Civil servants	8	16
		Other	12	24
		Total	50	100
4	Family Income Level	< Rp. 3,000,000	10	20
		Rp. 3,000,000 - < Rp. 6,000,000	23	46
		Rp. 6,000,000 - < Rp. 9,000,000	5	10
		Rp. 9,000,000 - < Rp. 12,000,000	8	16
		Rp. 12,000,000 - < Rp. 15,000,000	4	8
		Total	50	100
5	Family Member Illness History	Respiratory Allergies	8	16
		Asthma	6	12
		Cholesterol	5	10
		Hypertension	4	8
		ISPA	12	24
		There isn't any	15	30
		Total	50	100
6	Home Condition Assessment Results	Very Healthy	8	16
		Pretty Healthy	27	54
		Unwell	15	30
		Total	50	100

3.3. Application Trial Results

Based on the application trial results of RumahQ Healthy Islamic on 50 respondents, the data shows several main characteristics. The majority of respondents were male, at 56%. The education level is dominated by high school graduates at 40%, followed by junior high school graduates at 30%. In terms of occupation, housewives and other categories each account for 24% of respondents, making up the largest proportion.

Most respondents have a family income in the range of Rp. 3,000,000 to Rp. 6,000,000, which is 46%. In the disease history category, 30% of respondents reported having no history of disease, while ARI was the most reported disease, affecting 24% of respondents.

The majority of homes were rated as quite healthy (54%), while 30% were rated as less than healthy, and only 16% were rated as very healthy. The majority of houses are in adequate condition, although a significant proportion (30%) are still in the unhealthy category.

4. Discussion

Application RumahQ Healthy Islamic This digital base supports the concept of smart home and smart living, where technology is used to improve the quality of life for home residents. According to environmental health theory, a healthy home includes physical factors (ventilation, lighting, cleanliness), biological factors (free from disease vectors), and social factors (resident comfort). This application offers an approach that is relevant to this theory by providing education based on scientific data and tools for objectively assessing home conditions. The theory of community participation in health promotion is also reflected through the direct involvement of users in evaluating the condition of their homes and taking improvement steps.

In contrast to other studies that focus on one aspect of environmental health (e.g., ventilation or sanitation), RumahQ Healthy Islamic provides a holistic approach through educational features and multidimensional criteria-based assessments. This allows users to gain a thorough understanding of various aspects of a healthy home, including parameters that are usually missed in manual surveys.

Environmental health-based applications have significant potential in increasing public awareness of the importance of ventilation and home cleanliness, especially in South Korea. Research by Nastiti, et al. [15] shows that education and

advocacy play a key role in promoting clean and healthy living behaviors in society. In this context, environmental health apps can serve as effective educational tools, providing the information needed to encourage people to understand the importance of adequate ventilation and home cleanliness.

A study by Matoya and Kristanti [16] emphasizes the importance of education on clean and healthy living behavior (PHBS) in the household setting. By providing the right knowledge, the public can be more aware of good health practices, including proper ventilation. The research indicates that only 60% of households in certain areas implement clean and healthy living behavior, indicating an urgent need to improve education among the community.

Environmental health applications can help in outreach and education regarding the importance of good ventilation. Zunaidi [17] highlighted that the use of information technology-based applications can increase parents' awareness of their children's health. Using the same approach, environmental health apps can be utilized to educate people about the importance of maintaining cleanliness and good ventilation at home, thereby creating a healthier environment.

In this context, it is also important to consider how the application can be integrated with existing educational programs. Cindana [18] explains that educational programs involving the community and medical personnel can increase public knowledge about health. By combining environmental health applications with a participatory approach, communities can be more involved and motivated to implement good health practices in their homes.

The results of the application trial show that the majority of users have homes in "fairly healthy" condition (54%), but there are around 30% of homes that are "less healthy." This indicates that there are still many houses whose environmental quality needs to be improved. The majority of respondents came from the secondary education category (high school and junior high school, totaling 70%), with a dominant family income in the lower middle range (Rp. 3,000,000 – < Rp. 6,000,000). This shows that this application has succeeded in reaching community groups with various levels of education and income. From a health perspective, ISPA (24%) is a common health problem. This shows the relevance of the application in providing education and tools to improve the quality of the home environment to prevent environmentally related diseases. This application can be expanded to support the digital era with additional features such as:

1. IoT (Internet of Things) integration: Sensors to detect indoor air quality (Dust, humidity, CO2).
2. Interactive Features: A user discussion forum to share experiences and tips for creating a healthy home.
3. Collaboration with Health Services: Linking home assessment results with health care or home improvement recommendations from professionals.

5. Conclusion

This research emphasizes the importance of healthy home conditions as the main factor in maintaining the physical, mental, and social health of its residents. The RumahQ Healthy Islamic application, which was developed on a website basis, succeeded in providing a holistic approach through integrated education, assessment, and assessment results features. This application is proven to be easily accessible to people from various levels of education and income, making it an inclusive digital solution.

The results of the application trial show that the majority of users' homes are in the "fairly healthy" category (54%), although there are still 30% of homes that require repairs. Health problems such as ISPA (24%) are the main concern, which underlines the relevance of applications in providing education to improve the quality of the home environment and prevent environmentally related diseases.

The use of digital technology, such as this application, not only makes it easier for people to evaluate the condition of their homes but also provides data that can be further analyzed for environmental health policy recommendations for stakeholders.

6. Implications

The implications of this study indicate that the development of the RumahQ Healthy Islami application contributes significantly to improving the quality of residential environmental health through a digital approach. This application not only facilitates the community in objectively assessing the condition of their homes but also serves as an educational tool to raise awareness about the importance of a healthy home in preventing diseases such as ARI, tuberculosis, and dengue fever. With its user-friendly interface and inclusive features, the application holds potential for integration into government health programs and public health services to support data-driven policy formulation, particularly in areas with limited access to healthcare. Furthermore, the continued utilization of this application can promote the achievement of sustainable development goals (SDGs), especially in the areas of health and well-being.

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