SCREENING SASTRIC PAIN LEVELS USING THE CASE BASED REASONING (CBR) METHOD BASED INTERNET OF THINGS (IoT)

Qorry Denessha[1*], Candra Saputra[1], Ezalina[1], Donny Hendra [1]
[1] Program Study Profesi Ners, Faculty of Nursing, Institut Kesehatan Payung Negeri, Pekanbaru, Indonesia.
***Corresponding author:** bpinkys008@gmail.com

Abstract

Background: The increasing incidence of gastric diseases in adolescents, such as gastritis and GERD, requires innovative solutions to support early detection and appropriate treatment. This research tries to overcome this problem through the development of a prototype based on Internet of Things (IoT) technology. Methods: developed using the Case Based Reasoning (CBR) method. This system is basically designed as an experience-based gastric pain scale screening tool in adolescents, involving four main steps, namely retrieve, reuse, revise, and retain. Qorry's prototype provides early diagnostic features that can help them identify different levels of pain. Results: The Qorry prototype provides a diagnosis page that users can use to identify the level of gastric pain based on the symptom data entered, provide initial results and provide solutions for further prevention. Conclusion: The Qorry prototype has good potential in facilitating access for users and the public to health screening services, especially for technology-based gastric pain. Apart from that, the Qorry prototype research can be further developed in the form of IoT.

Keyword: Case-Based Reasoning (CBR), Internet of Things (IoT), Gastric Pain Screening, Qorry Prototype

INTRODUCTION

Stomach pain often occurs in adolescents. This is related to the lifestyle of adolescents, which is often caused by an unhealthy diet. This is because adolescents' awareness of health is still very low, and their behaviour and mindset lead to an unhealthy lifestyle. Stomach pain should not be taken lightly; if left untreated, it can worsen and eventually lead to stomach acid causing ulcers, known as peptic ulcers (Ambarsari et al, 2022).

One classification of stomach disease is gastritis. Gastritis is often characterised by pain in the upper abdomen, as well as nausea, vomiting, weakness, decreased appetite, pale complexion, cold sweats, frequent belching, and in severe cases, vomiting blood. This occurs due to low health awareness. Such habits can lead to gastritis, an inflammation of the stomach (Alvinda Pratiwi, 2024).
Often, teenagers today are unaware of what they are feeling, such as symptoms of stomach pain. Generally, teenagers only assume that when they do not eat, stomach acid will rise and guess at the symptoms they are feeling (Annisa, 2024).

With the advanced technology available, teenagers can easily access the internet, Google, and consultation services like Halo Doc. However, it is not uncommon for teenagers to be unaware of the symptoms they are experiencing (Kruisselbrink, 2019). To help teenagers understand the stomach pain they are experiencing, the author has developed an updated stomach pain screening method for teenagers based on the Internet of Things (IoT) (Ester et al, 2024).

Stomach pain screening for teenagers can be developed using the Internet of Things (IoT) and the Case-Based Reasoning (CBR) method. The CBR method is a weighting technique that compares new cases with old cases through four stages: retrieve, reuse, revise, and retain, thereby identifying the cause of stomach pain. The CBR method is a weighting technique that compares new cases with old cases through four stages: retrieve, reuse, revise, and retain. This process yields the percentage likelihood of the stomach pain condition the user is experiencing (Brilliant, 2022).

Through this application, users can consult with the system as if consulting with an expert to diagnose the symptoms experienced by the user and find solutions to the problems faced (Sitorus et al, 2022). The existence of this website will undoubtedly provide positive impacts and convenience for the public in understanding the types of stomach pain conditions, such as Gastritis, Dyspepsia, GERD, Malignant Stomach Cancer, and their prevention methods (Esthi, 2024). Therefore, a new innovative design will be created by developing a Qorry prototype using the Case-Based Reasoning (CBR) method to facilitate earlier diagnosis of the disease, enabling earlier prevention so that the stomach pain suffered does not become too severe (Herrstedt et al, 2024).

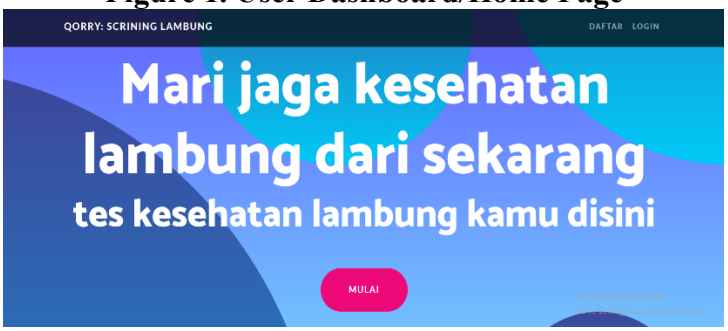
RESEARCH METHODS

This research method utilises the ADITH method (Analysis, Development Product, Implementation, Trial and Error, as well as Product Downstreaming and Commercialisation). The design of the Qorry prototype page for users consists of a login or registration page for new users. The design then proceeds to the user dashboard page, which consists of menus according to needs, including nursing process menus, master data and statistics, reports, and settings (Hasibuan, 2019).

The development process continues to the functional requirements page, including the assessment page, health screening, health history, evaluation, and health screening results statistics. The data collection tool in this study used a closed-ended questionnaire. The instrument used was a questionnaire on knowledge of stomach diseases in adolescents according to indicators aimed at 19 first-year female students at the Payung Negeri Pekanbaru Health Institute with a background of being migrants and not living with their parents. The pilot test process was analysed using the Pair t Test statistical analysis. First-year students at Payung Negeri Pekanbaru, with a background as migrant children living in dormitories or rented accommodation, may develop irregular eating patterns, a preference for spicy foods, and other habits due to being away from their parents.

RESEARCH RESULTS

Figure 1. User Dashboard/Home Page

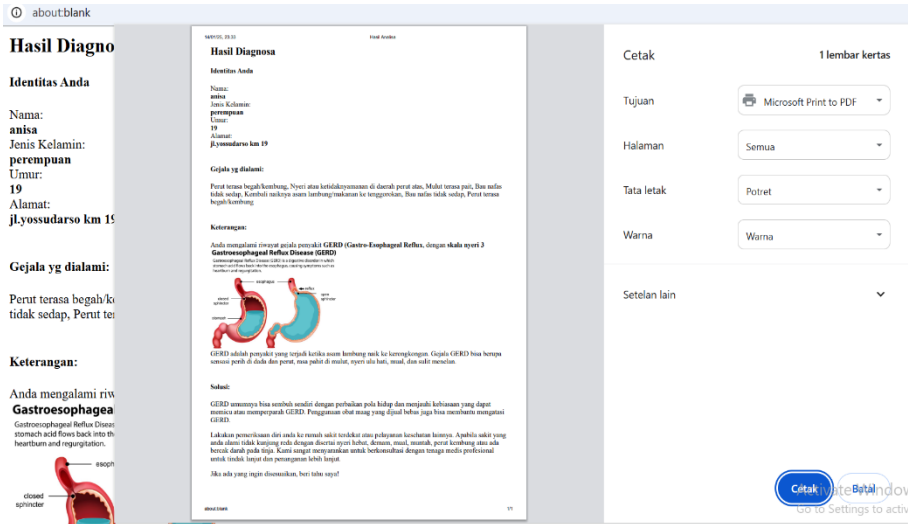


This image shows the main page for accessing the screening process. There is a step for users to register if they do not yet have an account.

Figure 2. Screening Page

This page displays the user's medical conditions if they already have an account, and shows the preliminary diagnosis results.

Figure 3. Results Page



This page displays the results obtained, which can be printed and used as a reference for further examination.

The Qorry Prototype application model was tested on female students at Ikes Payung Negeri Pekanbaru. The sample size for this limited trial was 19 students from Ikes Payung Negeri Pekanbaru. The instrument used to measure the Qorry Prototype application model was a questionnaire developed in phase I of the study.

Table 1. Limited Scale Model Trial (n = 19)

Variabel	Pengukuran	Mean	SD	*p Value*
Knowledge of gastritis	*pre test*	7,0526	1,74718	**0,000**
	post test	8,6842	2,00146	
Prevention of gastritis behaviour	*pre test*	22,0000	3,21455	**0,000**
	post test	24,1053	3,26420	

Table 1 shows that the p-values for each variable, consisting of the knowledge variable, workload variable, IT utilisation variable, quality variable, and completeness variable < α = 0.05, meaning that Ho is rejected, which can be interpreted as there being a difference in the trial of the Qorry Prototype application model on knowledge, workload, IT utilisation, quality, and completeness of nursing documentation before and after the intervention using the Qorry Prototype application model.

DISCUSSION

This website can identify the level of stomach pain and uses the CBR method to make decisions based on previously collected data and provide automatic responses based on existing patterns, namely cached data. For example, if a user enters certain symptoms that match the data patterns in the cache, the website can provide automatic results based on the existing data. The website provides a pain score or category based on user input. Users must enter information about themselves, their medical history, and the frequency of their stomach pain so that the website can provide recommendations for further consultation and action. In data processing and integration with the healthcare system, this website can be integrated with other medical platforms or more in-depth health applications.

Performance monitoring is carried out regularly to ensure that the website is continuously updated, including system performance and response speed. Regular evaluations are conducted to measure the effectiveness of maintenance and updates. The Qorry prototype can be used as a reference for further research, particularly regarding the development of the website into an official application that can be downloaded from the Play Store. New features can be added and further developed.

CONCLUSION

Testing results on the Qorry prototype showed adequate accuracy in diagnosing the level of stomach pain, although there were several factors that could affect the accuracy of the results, such as the quality of input data and individual response variations. After providing education about stomach diseases and implementing this stomach pain screening application, the results

showed an increase in respondents' knowledge. The mean score was 8.6842 and the standard deviation was 2.00146.

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