

ABSTRACT

Cardiovascular disease is the leading cause of death in Indonesia, with a mortality rate of 651,481 people per year, including stroke, coronary heart disease, and hypertensive heart disease. These conditions are largely caused by high cholesterol levels in the body, which are influenced by unhealthy eating habits, lack of physical activity, smoking, excessive alcohol consumption, obesity, and age. Many individuals with cardiovascular conditions are unaware of their condition due to infrequent health checks, especially since cholesterol tests are generally invasive and require professional medical personnel. As a solution, a non-invasive and portable cholesterol detection device has been developed for easy use by patients. This device is designed to measure total cholesterol, SpO₂, and BPM without invasive procedures, enabling self-health monitoring. It is expected to help patients monitor their health more conveniently and comfortably while increasing awareness of their health status.

Testing results from the age range of 23-41 show that the device has good accuracy, with an accuracy error of 13.99% for total cholesterol, 1.61% for SpO₂, and 8.25% for BPM. The detection time for these parameters is only 10 seconds, with an operational range of up to 10 meters and a response time of about 5 seconds, as conducted in mobile apps. In conclusion, this non-invasive cholesterol detection device has significant potential to improve the efficiency and effectiveness of health monitoring while providing a better user experience.

This study evaluates the reliability and accuracy of the CCNI device in measuring total cholesterol, SpO₂, and BPM. The device demonstrates high reliability with consistent measurement results. For cholesterol testing, the average absolute error decreased from 43.2 mg/dL at the Developer stage to 22.32 mg/dL at the Final stage, while the relative error reduced from 31.94% to 13.99%. These results indicate a significant improvement in the accuracy of the CCNI device at the Final stage, making it a reliable and accurate non-invasive tool for measuring total cholesterol. In validity and reliability testing, the results showed good validity. Reliability testing using Cronbach's Alpha obtained a value of 0.665, slightly below the 0.7 threshold, but the questionnaire is still considered reasonably reliable.

Keywords: cholesterol, non-invasive, cardiovascular, health, portable