

ABSTRACT

There are several vital signs that indicate functions that are very important to the human body. These vital signs are the heart rate (HR) or heart rate and the level of oxygen in the blood (SpO₂). Regarding the vital signs of the body, the pulse oximeter is a tool used to measure the heart rate in one minute "beats per minute" (BPM) and measure the oxygen saturation in the blood in units (%). In addition, human activity, especially the type of mobile activity, is also influenced by the types of normal foot posture, pronated and supinated.

Based on this description, the purpose of this final project is to design and implement a Pulse Oximeter (PO) for monitoring systems for oxygen levels (SpO₂) and heart rate (HR) in the human body during the Six Minute Walking Distance (SMWD) activity and to analyze the data monitoring to determine the correlation of the type of the foot posture with the HR and SpO₂ values.

The results of this final project are the accuracy percentage level of PO for HR 99.88% and for SpO₂ 99.07%. The system is able to work for 14 hours of use. The average size of the data sent is 18.3 Kb/s, the average delay is 6.1 seconds, and the average throughput time is 149.5 Kb/s. The correlation between foot posture and HR value was that during SMWD activity the HR value increased only in the first or second minute for normal foot posture and at the 5th and 6th minute in supinated foot. The difference in the HR values of the two foot postures is (3 - 6) BPM. Meanwhile, the SpO₂ level in the supinated posture is more fluctuating and requires greater oxygen levels than normal foot posture. The difference in the SpO₂ level of the two foot postures is in the range (1-2)%. Furthermore, SMWD has a high value if HR tends to fall or consistently decreases during SMWD, on the other hand, SMWD has low value if HR values tend to increase or consistently increase. The SMWD value is strongly influenced by the decrease in the HR value and followed by the increased and stable SpO₂ value at the value (96 - 97)%. However, a high SpO₂ value does not make a high SMWD result if the HR value tends to increase during the SMWD.

Keywords: Heart Rate, Oxygen Levels, Foot Posture, Pulse Oximeter, Six Minute Walking Distance (SMWD).