ABSTRACT

Postoperative pain is a sensation that arises after a patient undergoes surgery. The levels and types of postoperative pain vary. There are two types of postoperative pain, namely acute pain and chronic pain. The common approach to alleviate acute postoperative pain is using opioids. However, the use of opioids is not without the risk of overdose, especially if the dosage is not based on accurate pain assessment. Determining an inadequate opioid dosage can result in excessive drug use and even fatal risks associated with opioids. One factor that can contribute to overdose is the lack of objective pain assessment.

To overcome this impact, a wearable pain detector product was developed that is designed to detect pain quantitatively in the form of numerical values and can classify the level of pain qualitatively based on the pain scale. Pain detection is done by combining two physiological parameters, namely heart rate activity and skin gland activity. Where the output of the product can be monitored in real time and stored in a Web application and allows regular monitoring of patients by medical personnel or nurses through a nurse station.

The results show that this wearable pain detector product can measure pain quantitatively by producing a pain scale in the range of 0-10, as well as qualitatively with categories from "no pain" to "the most intense pain". Testing the heart rate sensor (MAX30102) produced an accuracy value of 98%, while the skin conductance sensor (galvanic skin response) produced an accuracy value of 99.8. Overall, the wearable pain detector product has an accuracy of 80% to calculate the pain scale on the subject. The product can display and store information in digital form and this product is designed in a wearable form that resembles a watch, making it comfortable to use on patients.

Keywords: Wearable, Post-Surgery, Heart Rate Activity, Skin Galvanik Response Activity, Pain Detector