

Implementation of SMS Base Pulse Oximeter for Early Identification of “Silent Hypoxia” Patients

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Abstract

COVID-19 infected patients are diagnosed with “silent hypoxia” in absence of dyspnea. Hypoxemia, is a life-threatening medical condition which drops the oxygen saturation to 80% - 85% suddenly. However, due to hospital capacity limitations, the majority of Covid-19 patients were treated at home. But regular monitoring of SpO₂ level was essential to diagnose silent hypoxia for immediate hospitalization and provide the medical assistance. In this project work, a low-cost user-friendly Short Message Service (SMS) base pulse oximeter to measure SpO₂ level for early diagnosis of “Silent hypoxia” in COVID-19 infected patients is implemented to minimize the risk. This novel remote monitoring design of the SMS based-pulse oximeter is combined with a Global System for Mobile Communications (GSM) module in order to send a SMS to the clinician about the condition of the patient. Further, if the patient is diagnosed with “silent hypoxia”, clinician will be informed automatically with a high-prioritized SMS. To validate the performance of the new device, United States Food and Drug Administration (FDA) approved pulse oximeter was used. According to the results, $P > 0.05$ which implies that there is no significant difference and good correlation similarities exist between them. This design contributes to reduce the mortality rate of Covid-19 patients and critical conditions. Alternatively, the novel design improves the self-confidence of the patients, hence the mental stability during the period of home-quarantine. This design can be further improved to facilitate emerging technologies such as Hospital to Home and Virtual Doctor in order to provide remote monitoring facilities to patients with other conditions as well.

Keywords: *COVID-19, Pulse oximeter, Silent hypoxia, Home quarantine, GSM module*