

ORAL PAPER PRESENTATION 3: PHYSICAL AND MENTAL HEALTH

Prolonged pressure monitoring using a smart mattress for pressure injury prevention

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Purpose Pressure injuries caused by prolonged pressure remain a significant health care issue for bed-ridden older adults in various settings. Pressure monitoring was found to be one of the most promising current solutions (Mansfield et al., 2019). A motion-sensing smart mattress (*WhizPad*®) has been developed for patient fall prevention. It is a comfortable mattress made with viscoelastic, temperature-sensitive, polyurethane memory foam. In a study with 254 participants at risk of developing pressure injuries recruited from the intensive care unit of a medical center, the use of the pressure redistributing foam mattress was associated with an 88% reduced risk of pressure injury development (Bai et al., 2020). This study aims to develop the function of prolonged pressure monitoring for the smart mattress and provide visual feedback to the healthcare staff to reduce further the risk of bed-ridden older adults developing pressure injuries. **Method** The smart mattress contains 30 sensing areas for on/off pressure sensing. When an event is detected, the control box sends out a Bluetooth Low Energy (BLE) broadcast message, which contains the duration of time a sensing area has been under pressure. As shown in Figure 1, the system displays sensing areas in deep blue (under pressure within 1 hour), orange, between 1 and 2 hours) and red (over 2 hours) for the real-time status. In addition, the control box sends out a beacon message every 10 minutes, which also contains the duration of time a sensing area has been under pressure. The data is accumulated for 24 hours (8 am to 8 am the next day). The system displays the prolonged pressure record on the next day, including the continuous pressure areas in different colors, the maximum time, and the accumulated pressure areas for 24 hours (Figure 2). **Results and discussion** The real-time status has been implemented in the system. Nursing home caregivers responded that this visual display, together with the audio alert, helps remind them to do back tapping and body turning for bed-ridden older adults every two hours. The prototype of the prolonged pressure record function has been built and tested. We are conducting a field trial to collect feedback. We expect the record of continuous pressure area and maximum time can reflect whether the caregivers have regularly performed back tapping and body turning for the bed-ridden older adults. The accumulated pressure areas and time can also provide helpful information for assessing the risk of pressure injury in bed-ridden older adults, particularly the body areas that have a higher risk of developing pressure injuries.

References

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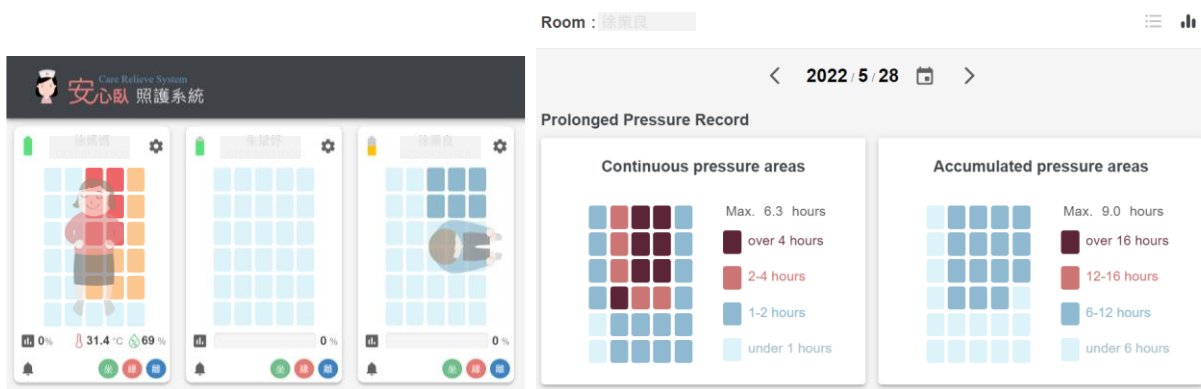


Figure 1. Real-time status

Figure 2. Prolonged pressure record