An internet of things patient care system on inpatient fall prevention and the care quality
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Purpose It has been increasingly used technological solutions for inpatient fall prevention (Capezuti et al., 2019). De-spite that bed-exit detection systems have been commonly used in clinical practices to prevent falls, the evidence for the effectiveness is insufficient and inconclusive (Gu et al., 2016; Kosse et al., 2013). The main purpose of this study was to investigate the effect of an IoT patient care sys-tem called the Smart Patient Care System (SPCS) on inpatient fall prevention and the nursing care quality. **Method** A prospective cohort study design was employed and 1,300 participants were recruited from two wards of Gastroenterology and Hepatology Department of a medical center in Taiwan. One ward used a traditional patient care system while the other one used SPCS. This innovative system is an IoT patient care system to integrate and transfer the nursing call and bed-exit signals to nursing staff for appropriate care. The system signal pathway is presented in figure 1. In SPCS, a motion-sensing mattress plays an important role in notifying nursing staff the patients' real-time in-bed positions. It also uses machine learning method to generate the algorithm for patients' specific position identification (on-bed, bed-edge, and off-bed) and then sends out the alerts of at-risk patients' intention to leave bed. **Results and Discussion** There were 1300 patients with 650 in each ward recruited, followed-up, and analyzed in this study. The total falling incidence during hospitalization was 0.7% (n=9), with only one (0.1%) fell in the SPCS ward while 8 (0.7%) participants in the other ward. We found that the likelihood of falling in ward with SPCS was reduced by 88% (OR = 0.12, 95% CI: 0.01, 0.97, P = 0.047). we also investigated the using experience of SPCS by nursing staff. Nurses using the smart patient care system agreed it was generally more helpful and reduced the care stress in comparison with the traditional system especially with the immediate communication function and bed-exit alarm with algorithm that predict patients' intention to leave bed. Possible explanations for the significant association between SPCS and reduction in fall rate include that SPCS could specify the purpose of the signals as general, emergence, and bed-exit alarm; nurses can receive the alarms immediately by mobile phone and conducts the immediate communication with patients via mo-bile phone; the three-stage bed-exit alarm of the motion-sensing mattress helps care providers know patients' intention to leave bed and offer help if necessary.

References

Capezuti E, Brush BL, Lane S, Rabinowitz HU, Secic M. Bed-exit alarm effectiveness. Archives of gerontology and geriatrics. 2009;49(1):27-31.

Gu Y-Y, Balcaen K, Ni Y, Ampe J, Goffin J. Review on prevention of falls in hospital settings. Chinese nursing research. 2016;3(1):7-10.

Kosse NM, Brands K, Bauer JM, Hortobágyi T, Lamoth CJ. Sensor technologies aiming at fall prevention in institutionalized old adults: a synthesis of current knowledge. International journal of medical informatics. 2013;82(9):743-52.

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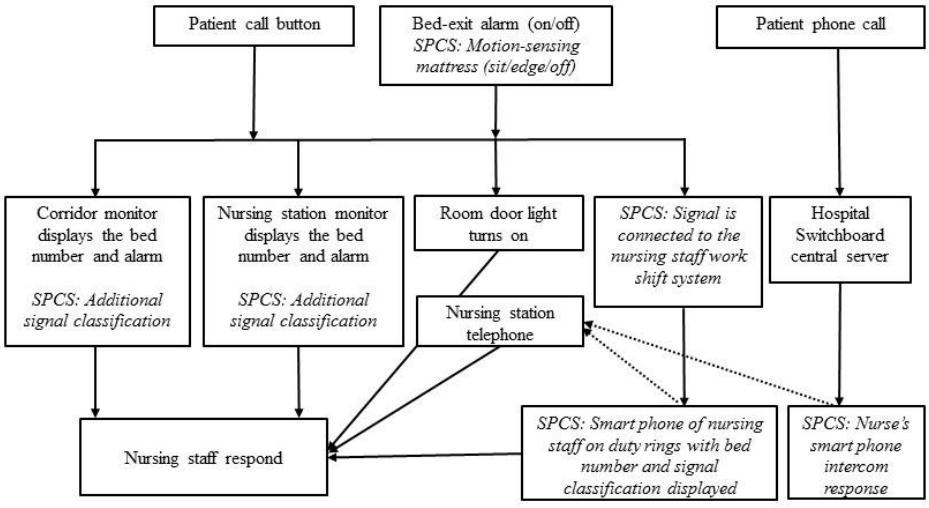

Figure 1. The Smart Patient Care System signal pathway