



KEY POINT SUMMARY

OBJECTIVES

The objective of this pilot study was to test the accuracy and acceptability of a wireless five-sensor motion detection system (5S-MDS) for detecting falls.

DESIGN IMPLICATIONS

This study provides good evidence of the power of interdisciplinary research in healthcare. While still in the testing phase, how designers would support this technology, and others like it, in the future should be integrated into today's designs.

A Pilot Study Testing a Fall Prevention Intervention for Older Adults Determining the Feasibility of a Five-Sensor Motion Detection System

Ferrari, M., Harrison, B., Rawashdeh, O., Rawashdeh, M., Hammond, R., Maddens, M
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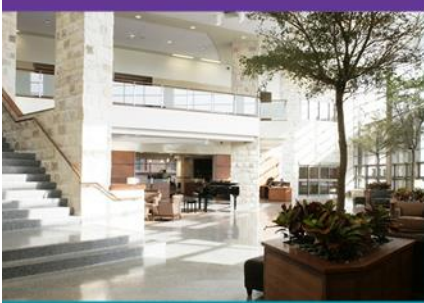
Key Concepts/Context

With reported rates from 2 to 5 events per 1,000 patients, falls are the most commonly reported adverse event in hospitalized patients. In addition to the physical consequences of falls to patients, preventing falls has financial implications as well, as Centers for Medicare and Medicaid Services regulations limit hospital reimbursement for fall-related injuries. Thus, interventions to prevent falls in hospitalized older adults are essential to reduce morbidity, mortality, and healthcare costs. One potential intervention is wearable motion sensors, which measure and integrate movement in space to identify the human movement patterns that precede falls, thus, encouraging prevention. However, sensors must be accurate, and older adults must find the wearable sensors to be acceptable and comfortable.

Researchers studied accelerometers used in conjunction with a gyroscope, as well as tilt sensors. Attached to a Bluetooth device, this combination of devices allowed for real-time monitoring and increased accuracy of fall detection. It continually monitors the patient and displays his or her movements and sends real-time alarms for fall prevention. The accelerometer measures small changes in motion. The gyroscope notes the changes in a person's posture. The tilt sensor detects when a person is lying down.

Methods

This descriptive feasibility study recruited 5 healthy older adults (mean age = 69.6) who wore the 5S-MDS while performing 35 movement scenarios. After they



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completed the scenario script, researcher surveyed participants about the sensor's comfort and acceptability. Each participant rated how uncomfortable, painful, distracting, limiting, and irritating each sensor was on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*).

Findings

The 5S-MDS accurately reflected the patients' movements, and the older adults said the sensors were acceptable and did not affect skin integrity. Thus, the 5S-MDS has potential as an early warning system for falls.

Limitations

This study used healthy individuals and was limited to 5 participants without mobility limitations and who wore the sensors for a limited amount of time. In addition, the sensors often reflected gross or small movements inaccurately. For instance, compared with the patient movement on the video recording, the sensor data graph occasionally measured output as too large or small of a peak. Validity testing of this system should be conducted in a larger sample of patients.