

Towards Falls Prevention: Future Innovation and Current Practice

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Dear Editor-in-Chief,

Falls is a tremendous problem among elderly, about one third of adults above 65 years old fall at least once per year with escalating frequency along with advanced aging and frailty level(1). Falls among hospitalized patients is not only causing a serious physical disability or even death but also affecting the psychological aspect with expanding length of stay and the overall health expenditure (2). Despite strong evidence that falls have a catastrophic impact in morbidity and mortality among hospitalized elderly, many hospitals are struggling to reduce its incidence and monitor its day to day pattern with limited successful preventive strategies(3). In a prospective follow up study was conducted on inpatients admitted to Ain Shams university hospitals, with total number of 1779 inpatients were recruited for this study with median length of hospital stay about 8 days and total duration of follow up about 2 weeks, they found the average fall incidence was 9-11 per 1000, being higher in elderly patients (14 per 1000) who had longer hospital stay and more functional dependency in this study (4).

Current practice and emerging innovation

Falls prevention in older patients is in definite need for effective and evidence based interventions especially in acute care settings and particularly who have cognitive impairment and/or delirium. Available preventive protocols are widely variable for many reasons like availability of resources, nursing staff number, elderly friendly design of the health care facility.....etc. However, many of those implemented strategies aren't met our demands and expectations therefore, other emerging high-tech solutions could provide such a hope.

Novel technological solutions and tools which used in this area of interest include but not limited to objective falls risk assessment, gait analysis, 3D body motion analysis and to lesser extend smart modification of surrounding with automated software interactivity. For instant, smartphones, low-cost video depth camera, inertial sensors, pressure sensors, motion ambient sensors and light sensors can provide valuable

information and critical data for mobility tracking and gait analysis. In a recent systematic review concluded that, those novel devices have a promising potential to provide easy-to-use, affordable and accurate objective data can filling the gaps between clinical practice and innovative solutions (5). Although, wearable wireless sensors could provide accurate, individualized and diverse sets of data extending from clinical setting to unsupervised natural environment, are still need more research trials and monitoring among elderly population to assess its efficacy, comfort and day-to-day experience above and beyond, its cost-effectiveness and availability of software programming and expertise.

On the other hand, ambient sensors are embedded to the environmental objects in both indoors or outdoors which allow detection of motions, activity pattern, or even physiological measures.

After receiving previous information, we can determine the output actions like data storage, processing or even a physical outcome like increase lightening or trigger an alarm.

Pioneering and roadmap

Geriatric medicine department at Ain Shams University, as a pioneer clinical and academic department in our region intended to launch a pilot study by a group of researchers lead by the author, assessing the concept of smart hospital. Ambient-sensor-based project is believed to be a promising surveillance and preventive technique help the health care providers to monitor and prevent hospital related falls events. This pilot project will be a randomized controlled trial for geriatric hospital falls incidence and will initially include pressure sensors, falls alarm sensors, Wi-Fi signal-based ambient devices and Passive Infrared (PIR) Motion Sensors, all that Sensor-driven smart elderly health care design is embedded in the surrounding environment and wearable sensors will be excluded at this stage.

Falls still a major geriatric issue carries very high risk of morbidity and mortality for elderly patient, so every idea tackling this problem will be highly appreciated.

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