

Conflict of interest: The authors declare no conflict of interest.

Acknowledgments: We would like to thank the Fundação de Amparo à Pesquisa e Inovação do Estado de Santa Catarina – FAPESC (2021TR995) for supporting this research.

Ethics committee approval: Approved by CEPISH/UEDESC (CAAE: 51097321.1.0000.0118).

<https://doi.org/10.1016/j.bjpt.2024.100995>

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PERSPECTIVES ON NEW TECHNOLOGIES FOR PREVENTING AND DETECTING FALLS IN THE ELDERLY

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Background: Considering the challenges and benefits inherent to the Internet of Things for the elderly, the use of wearable devices to monitor health parameters, especially the risk of falls, could promote optimal conditions or prevent the deterioration of health conditions in aging. The use of these devices in the mapping of movement and gestures, loss of balance, postural changes, movement speed or loss by period of time, in daily tasks, in one or more movement axes, may determine gait parameters. In monitoring health conditions and the environment, in identifying the risk of falling when traveling across different terrains, slopes of roads, ramps, steps of different heights and dimensions, it may trigger a potential alert capable of promoting the perception of obstacles or barriers, minimizing the impact of coping with them and avoiding a fall, given the physical condition of the elderly person, in relation to the adversity of the environment.

Objective: Know the new technologies, wearable and non-wearable sensors, for detection and prevention of falls in the elderly.

Methods: A systematic mapping of the literature was carried out in the Virtual Health Library (VHL), Web of Science, Pubmed, Embase and Medline databases in March 2023.

Results: New technologies, wearable sensors and connected applications, in promoting the lives of the elderly, providing support for daily activities, is in increasing evolution. The technologies for detecting falls stand out, an important marker of the functional decline of the elderly, associated with sensory, neuromuscular or osteoarticular deficiencies. Different types of sensors and monitoring and alarm systems have been developed and can be used to alert caregivers. Sensors are electronic devices that allow transforming nature from an observed physical value into an exploitable digital value. The devices to activate an alarm are based on the monitoring of motor activity through one or several sensors, basic elements of data acquisition systems, informing the position of permanence of the elderly person after a fall. There is a diversity of sensors related to the collection of data on the physiological state, such as temperature, heart and respiratory rate, blood pressure; and movement measurement, such as accelerometers, gyroscopes, magnetometers. Also, geolocation and environmental measurement (audio and video). For fall detection, wearable sensors are more effective because they can identify changes in acceleration, planes of movement or impact, not being limited to a restricted area of movement of the elderly. These sensors can be located in shoes, insoles and on the wrist, registering movement; in belt, refer to attitude and

direction; on a keychain or pendant with an alarm button, they alert an emergency; all connected to the app via smartphone.

Conclusion: Regarding sensors intended for the prevention or detection of falls, wearable and non-wearable sensors stand out, all with good results when tested in actions of daily life.

Implications: The technological variety intended to support the elderly, particularly in the prevention of falls, is promising. Challenges for adoption at scale seem to be the obstacle to important results in a real-life context.

Keywords: Elderly, Internet of Things, Falls

Conflict of interest: The authors declare no conflict of interest.

Acknowledgments: Funded by the authors, with no external sources of funding.

Ethics committee approval: Not applicable.

<https://doi.org/10.1016/j.bjpt.2024.100996>

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PHYSICAL PERFORMANCE, MUSCLE STRENGTH AND ENDURANCE IN ADULTS AND ELDERLY PEOPLE WITHOUT PREVIOUS DISABILITIES AT HOSPITAL DISCHARGE FOR COVID-19

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Background: The COVID-19 pandemic has had an unprecedented impact on our health services, the population, society, and the economy. COVID-19 poses a risk of serious illness, hospitalization, and death. The hospitalization of these patients can be prolonged, and they are at risk of significant loss of muscle mass and function, even in a short period of immobility. This problem can be especially relevant in elderly patients.

Objectives: to verify the functional performance, quadriceps muscle strength and endurance in adults and elderly people without previous disability who were hospitalized for COVID-19 at the time of hospital discharge

Methods: This is a cross-sectional observational study, in which HU-UFSCar patients over 18 years of age were recruited at the time of hospital discharge, from August 2021 to December 2022. Anamnesis, assessment of functional performance by Short Physical Performance Battery (SPPB) and quadriceps strength and resistance by manual dynamometry.

Results: Thirty-four patients aged 58±14 years were evaluated, 16 of whom were adults and 18 were elderly. The length of stay was 8 (3-61) days, and 11 patients were on invasive mechanical ventilation, 7 of whom were elderly. The mean functional performance was 66% predicted for adults and 44% predicted for the elderly. The 4-meter gait speed and the 5-repetition sit-to-stand test were the components with the greatest impact on the decline in the total SPPB score. Regarding quadriceps isometric muscle strength, the results found were equivalent to 65±25% of predicted, 71% in adults and 57% in the elderly. Regarding the isometric resistance of the quadriceps, the median was 54 seconds, 55 seconds for adults and 48 seconds for the elderly.

Conclusion: It is concluded that patients who survived COVID-19, especially the elderly, whether or not they needed intensive care, had worse functional performance, reduced strength and isometric resistance of the quadriceps.

Implications: These results reinforce the importance of the participation of the physiotherapist in the decision of the patient's hospital