ICT TECHNOLOGIES AS NEW PROMISING TOOLS FOR THE MANAGING OF FRAILTY: A SYSTEMATIC REVIEW

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Background

Frailty is a major health issue in older persons, and recent studies explored Information and Communication Technology (ICT) interventions as alternatives to manage frailty. The aim of the present systematic review was to synthesize current evidence on ICT application within the complex models of frailty care in older people.

Material & Methods

Data sources included PubMed, PsycINFO, EMBASE and Web of Science, considering eligible those reviews on ICT application in samples of older persons (65+) formally assessed as frail. The systematic review followed the PRISMA, Cochrane, and AMSTAR guidelines.

Results

Among the 764 retrieved papers, 2 systematic reviews met our inclusion criteria. Considering the AMSTAR ratings, the quality of the two systematic reviews was moderate to high. A total of 76 studies were included in the two selected reviews. Only 16 observational cross-sectional studies in one review and 1 Randomized Control Trial (RCT) in the other one were synthesized because specific for frailty.

3,510 participants ranging from a mean age of 66.33 years to 83.58 years were included. 2/3 of participants were women. The Frailty Phenotype by Fried was the principal model and assessment tool used. Improving the evaluation of frailty was the aim of the majority of studies (16 studies), to assess the effect of home Tele-monitoring to prevent frailty was the aim of the RCT. Cost effectiveness evaluations were absent.

Study	Groups	ICT devise	Aim	Risk of bias
Chang, 2013	Nf; pf	eScale; eChair; ePad; eReach; home-based Information Gateway	Discrimination	71.43%
Chen, 2015	Nf; pf; f	Tri-axial accelerometers; Handheld dynamometer	Assessment	83.33%
Fontecha, 2013	ns	Accelerometer sensors; Mobile device	Assessment	83.33%
Galán-Mercant, 2014a	Nf; f	Inertial sensors	Improving	66.66%
Galán-Mercant, 2014b	NF; f	Inertial sensors	Improving	83.33%
Ganea, 2011	NF; f	Body-worn inertial sensors; Light portable data-logger	Evaluation	66.66%
Greene, 2014	Nf; pf; f	Body-worn inertial sensors; Pressure sensor platform; Wii balance board; Handheld dynamometer	Improving	83.33%
Hollewand, 2016	f	Accelerometer sensors	Assessment	50%

Study	Groups	ICT devise	Aim	Risk of bias
Martinez-Ramirez, 2011	Nf; pf; f	Individual MEMS inertial sensors	Discrimination	66.66%
Martinez-Ramirez, 2015	Nf; pf; f	Individual MEMS inertial sensors; Hydraulic hand dynamometer	Assessment	50%
Millor, 2013	Nf; pf; f	Individual MEMS inertial sensors	Discrimination	66.66%
Mohler, 2016	Nf; pf; f	Tri-axial accelerometer; Inertial sensors	Discrimination	50%
Schwenk, 2015	Nf; pf; f	Inertial sensors; Hydraulic hand dynamometer; Motion sensor	Discrimination	50%
Soaz, 2016	Nf; f	Tri-axial accelerometers	Discrimination	66.66%
Theou, 2012	Nf; pf; f	Uniaxial accelerometers; Rate monitor; elettromiography device; GPS watch	Discrimination	66.66%
Thiede, 2015	Nf; pf	Inertial sensors	Discrimination	50%
Uparising, 2013	Telemedicine vs usual care	Home placed peripheral equipment smart homes and broadband network	Effectiveness of	25%

Nf= non-frail; pf= pre-frail; f= frail

☐ Assessment of frailty ☐ Intervention on frailty

Conclusion

The research investigating the use of ICT in the context of frailty is still at the very beginning. Few studies strictly focused on the assessment of frailty, while intervention on frailty using ICT was rarely reported. The analyzed studies used accelerometers, inertial sensors, dynamometer, and/or motion sensors as tools for assessment of frailty.

The lack of a proper characterization of the frail condition along with the methodological limitations prevented the investigation of ICT within complex care models. Future studies are needed to effectively integrate ICT in the care of frailty.

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