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Background:

Dementia is a term that describes disorders causing cognitive impairment capable to significantly affect functional status. Alzheimer's disease (AD) is the most common form of dementia and represents one of the major causes of disability, dependency, burden and stress of caregivers increasing institutionalization among older people worldwide. AD counts the 60–70% of cases of dementia (47.5 million people have dementia and there are 7.7 million new cases every year) in all around the world. There has been significant progress in using Information and Communication Technologies (ICT) in the field of healthcare and in particular of AD; in particular, a great effort has been addressed by researchers in order to develop enabling domotic and robotic solutions that are cost-effective.

The main contribution is to evaluate the effectiveness and impact of ICT that can address the needs of the patients with AD in hospital and directly at home. The presentation will be focused on domotics and service robotics in assisted living environments which can help patients with AD to remain active and independent for longer.

Methods:

Literature searches were conducted in the MEDLINE and PUBMED (2000 to March 2017) databases, using the OVID search interface.

The search queries included:

- 1) Information and Communication Technologies (ICT)
- 2) Alzheimer's disease (AD)

Inclusion criteria

- Age \geq 60 years
- Diagnosis of AD according to the criteria of the NIAAA and DSM-5
- Use of ICT tools to support AD patients
- Acceptable clinical measures of cognitive impairment, disability, quality of life, and global clinical assessments

Quality of study reporting was assessed using the Standards for the Reporting of Diagnostic accuracy studies in dementia (STARDdem).

Results:

Most studies reported that older adults with AD need to be technologically savvy in order to successfully complete or benefit from training. All the studies on small samples show that the introduction of ad-hoc ICT tools are accepted, used and could improve the quality of life increasing the permanence at home. From the state of the art point of view some researchers have investigated new solutions for cognitive assistance in the last three years (serious games, technologies used by patients with dementia, technologies used by caregivers, monitoring systems, ambient assistive living with ICTs, and tracking and wayfinding). The research consisted in exploiting software platform allowing the support of new assistive tools that are less expensive and more accessible and could be used as a re-education tool helping to slow the decline of people suffering from AD.

Conclusion:

The evidences suggest the potential for domotics and robotics to support dementia care at home and to improve quality of life for caregivers, so reducing healthcare costs and premature institutional care for these patients.

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Figure 1: "Managing active and healthy aging with use of caring service robots (MARIO)" an European project currently underway.



Figure 2 and Figure 3: "Agile CoCreation of Robots for Ageing (ACCRA)" an European- Japan project currently underway. ASTRO Mobile robot (above with two older patients) is useful to improve the mobility in patients with and without cognitive impairment. Buddy robot (underneath) is useful to improve the conversation and reduce the isolation in older patients.