Empirical studies on the effectiveness of assistive technology in the care of people with dementia: a systematic review

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CRD summary
This review assessed assistive technology in the care of people with dementia. The authors concluded that general use of the assistive technology available did not establish a positive difference to the lives of people with dementia. This conclusion appears rather negative, based on the results presented. Whilst most studies were poor quality, some better quality studies had promising results.

Authors' objectives
To evaluate the use of assistive technology in the care of people with dementia.

Searching
MEDLINE, CINAHL, PubMed, PsycINFO, ProQuest, Web of Knowledge, IEEE and the Cochrane Library were searched for articles published from 1995 up to 2011; search terms were reported. Five journals and the reference lists of reviews and related articles were manually searched. Two gerontologists were asked to identify papers they considered to be significant.

Study selection
Studies that included a control group, pre-test post-test, cross sectional or survey design and evaluated an intervention using assistive technology in the care of people with dementia aged over 50 years were eligible for inclusion.

The included studies consisted of caregivers and patients with moderate to severe dementia or mild to moderate Alzheimer's disease; some were residents of nursing homes, a chronic care facility, or psychogeriatric wards (where reported). Interventions varied including: electronic memory aids; safety technologies such as tracking devices, alarms, illumination devices and fall detectors; telecare and telehealth interventions; increased lighting; multi-sensory stimulation; and simulated presence therapy.

One reviewer initially screened studies for inclusion based on titles and abstracts; potentially relevant papers were assessed for inclusion by two reviewers.

Assessment of study quality
Studies were assessed for quality using the Forbes approach, which assessed design and allocation of intervention, inclusion, attrition, control of confounders, data collection and statistical validity. Studies that passed at least four criteria and did not fail any criteria were categorised as 'strong'. Studies that passed less than four criteria and did not fail any criteria were categorised as 'moderate'. Studies that failed one or two criteria were categorised as 'weak'. Studies that failed more than two criteria were categorised as 'poor'.

Two reviewers independently assessed the studies for validity, with disagreements resolved by consensus.

Data extraction
Study characteristics and results were extracted from each of the studies. The authors did not state how many reviewers undertook data extraction.

Methods of synthesis
A narrative synthesis was presented around the following topics: independence, prompts and reminders; safety and security; telecare and telehealth; and therapeutic interventions.

Results of the review
Forty-one studies were included in the review: seven studies were considered to be strong (522 participants; range 5 to 136); ten moderate (138 participants; range 3 to 26); and 24 weak (total number of participants unclear). Studies had
very small sample sizes, high drop-out rates, basic statistical analyses, lack of adjustment for multiple comparisons and poor performance of the technology.

**Independence, prompts and reminders:** It appeared that once the evaluation moved from the laboratory, significant practical and methodological problems emerged. Generally, the reported use of the technology made little difference to practical outcomes.

**Safety and security:** The very weak evidence showed that common problems were associated with lack of acceptance by the user, difficulties with use, and technical reliability. Careful assessment was required to discover the likely benefit of the technology to an individual; there was a strong suggestion that the window of opportunity was quite small for the successful application of technology.

**Telecare and telehealth:** Although the literature did not seem to support the use of technology (in the form available) to enhance communication initiated by the person with dementia, it provided some promise that remote carer initiated communication could be used for assessment and simple therapeutic interventions. However, the included studies were not methodologically strong.

**Therapeutic interventions:** There was little convincing evidence to support the use of Snoezelen technology (multisensory stimulation exposure) over other activities to improve the wellbeing of people with dementia. The effects of simulated presence therapy appeared modest and short lived.

**Authors' conclusions**

General use of the assistive technology available did not establish a positive difference to the lives of people with dementia.

**CRD commentary**

The inclusion criteria were broad, but clear. A thorough search of relevant sources was undertaken, although it was not stated whether any language restrictions were applied and limited attempts were made to identify unpublished studies, so some studies may have been missed. Not all stages of the review were undertaken in duplicate, which increased the potential for error and bias.

The assessment of study quality appears to have been appropriate, but full results were not reported, so it was not possible to judge study quality. Most studies were categorised as weak, with small sample sizes and high drop-out rates amongst other problems. Study details and results were tabulated for the strong and moderate quality studies, but not the weak studies. The narrative synthesis was quite basic, with a description of the individual studies for each topic area, followed by a broad summary of the evidence.

This was a very broad review, which included many poor quality studies. However, the authors' conclusion is very general and appears rather negative, considering that some of the better quality studies had positive results.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that there was a great need for better designed studies with larger samples.

**Funding**

The Primary Dementia Collaborative Research Centre, UNSW as part of the Australian Government's Dementia: A Health Priority National Initiative.

**Bibliographic details**


**DOI**

10.1108/JAT-09-2012-0021
Original Paper URL
http://www.emeraldinsight.com/journals.htm?articleid=17104981

Indexing Status
Subject indexing assigned by CRD

MeSH
Dementia; Self-Help Devices; Humans

AccessionNumber
12014027951

Date bibliographic record published
15/08/2014

Date abstract record published
02/09/2014

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.