Technology-driven solutions to prompt conversation, aid communication and support interaction for people with dementia and their caregivers - A Systematic Review Protocol

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Background

There are currently are more than 46 million people worldwide living with dementia, a number that will almost double every 20 years and reach 131.5 million by 2050 [1]. Dementia is a brain condition that affects cognitive functions, with symptoms including challenges in communication skills as well as impaired memory function and orientation [2]. As short-term memory impairment is common in dementia, holding and maintaining conversations can become increasingly difficult as the disease progresses, something which can result in great frustration for the conversation partner [3]. Hence, dementia does not only affect a person physically and cognitively, but also socially, leading to a negative effect on relationships as meaningful social interactions taper. In interaction with People with Dementia (PwD), caregivers have an important role in supporting interaction, a responsibility that only increases as the disease progresses, as the conversation partners of PwD gradually become more important for both initiating and upholding conversations [4]. When communication is deteriorating, carers are left to interpret meaning from behaviour, something which may have negative consequences, such as social isolation from the lack of meaningful interactions [3]. Studies show that formal caregivers of PwD report frequent psychosomatic symptoms and exhaustion, and the need for social contact of PwD is often not sufficiently met in dementia caregiving institutions. This lack of social contact can be explained by the challenges nursing staff experience in communicating with service recipients [5, 6].

The importance of communication and the influence of the progressive nature of dementia on interactions between PwD and their conversation partners is acknowledged as an important priority in dementia research [7]. In a study by Alm et al. [3], it was demonstrated that the use of a technical device to aid conversation contributed to decreased communication labour for formal caregivers of PwD, as the device turned the conversation into an interactive experience, without demanding any particular education of the participants. Developing non-pharmacological interventions for PwD can not only engage PwD in constructive, meaningful activities resulting in a positive impact on interaction and social participation, but also help staff members of nursing homes in providing them tools that they can use in the caregiving of these persons [8]. Although an increasing proportion of these interventions are technology-driven, the research in technological support in interaction and communication for this group is still relatively young. This might be explained by that technological solutions to cognitive problems associated with dementia have mostly focused on cognitive rehabilitation and training rather than communication [9]. There is an unexploited potential in technology-driven solutions that facilitate interaction between PwD and their (in)formal caregivers [10]. Although important aspects of communication have been reviewed, to our knowledge, none of the current reviews focused specifically on studies of technology that prompts conversation and facilitate interaction that enhances the dyadic relationship quality. As a result, studies of such technology-driven solutions in a dementia context are scattered across different reviews and a more systematic approach is required towards synthesising the current body of literature on this subject.

Aim

This literature review aims to provide a comprehensive description and quality appraisal of methodologies used in technology-driven social interventions for people living with dementia and their conversation partners to enhance communication and interaction, thereby potentially the quality of the relationship. The overarching goal is the display of technology that aims to support social health challenges and requirements in a dementia caregiving context. Furthermore, barriers and facilitators of implementation of the technology will be identified.

Review Question

- Which technology-driven solutions exist that are used that prompt conversation and facilitate communication for both members of the dyad in dementia caregiving?
- In what manner do these conversation aids function as a third party in social interaction in that they contribute to enhancing the interaction between PwD and their conversation partners?
- Which of these conversation aids have shown an effect on the relationship quality by either members of the dyad in a communication context?
- What are the reported communication outcomes and how are these measured?

Search Strategy

The databases PubMed, CINAHL and PsycINFO will be searched. Search terms are chosen to describe the concepts of the health condition, the technology, the targeted outcome measures and the setting included in this review.

An example preliminary search of PsycINFO, limiting the publication year from between 2010-2019 revealed 145 records based on the following terms: ((dementia or Alzheimer* or mild cognitive impairment) and (techno* or digital* or tablet or touchscreen or computer or smart or robot* or intelligent or machine or gerontotechnology) and (engag* or social* or communicat* or convers* or relationship or relationship quality or interact* or participat* or inclusion or mood or affect) and (dyad* or spouse or family or relative or caregiver)).ab

Inclusion Criteria

- Studies must have described an intervention. Studies without an intervention component (e.g. only workshops or semi-structured interviews on reflections) will be excluded.
- Interventions must have PwD as the primary target group in social interaction with the surrounding social environment.
- Interventions need to be based on some form of technology.
- The technology-driven solutions need to be focused on social interaction between PwD and their conversation partner (i.e. communication skills, training technique programs, online support groups or pure monitoring systems will be excluded)
- The technology must have some function as conversation aid for interacting, either intended or as a consequence of the primary objective.
- Communication technology intended for simulated presence (such as tele-presence, a digital conversation partner or pure cognitive simulation) will be excluded
- In addition, since the research into technology is a rapidly changing field with new technological advances every year, only articles published within the last ten years (2010-2019) will be included.

Domain of interest

Application scenarios for technology promoting social health in ambulatory, stationary long-term care, in hospital care and in a community setting.

Population

People with a formal dementia diagnosis (no dementia types excluded), without a mental disorder as primary diagnosis (e.g. schizophrenia), together with their conversation partner. This conversation does not have any exclusion criteria, and can be either formal/informal caregivers, family members, friends, volunteers or researchers.

Intervention

Included interventions will be technology-based, i.e. delivered on personal computers, tablets, mobile phones or though social robots (e.g. pet- or humanoid robots). The interventions may be categorised as conversation prompts, communication, social participation or engagement. Dual interventions, e.g. technology-supported and caregiver training will be excluded.

Control

Likely not applicable. If applicable, usual-care or other comparators can be reported in single studies.

Context

The care setting should be identified distinctly within a publication. Studies that report findings for more than one setting will be recorded. Studies that include the population defined above in a laboratory setting will also be included and recorded.

Outcome

The intervention must be designed to improve enhance or facilitate conversation quality, communication, interaction and the dyadic relationship. Conversely, primary outcomes for PwD are global communication functioning (measured by conversation quality, duration, frequency, initiation), quality of interaction and quality of relationship. Secondary outcome measures will be psychosocial aspects related to well-being and quality of life such as engagement, depression, mood and caregiver burden.

Data Extraction

Studies included after primary screening of title and abstract, described under Search Strategy will be exported in an EndNote-Library, excluding duplicates. Studies must be in English and can be from any country of origin to be included. The references of studies meeting the inclusion criteria and meta-analyses found on the topic of interest will be screened by hand. Timeframe restrictions 2010-2019. Screening of titles, abstracts and full texts will be conducted by two independent reviewers. A third person will be consulted if the initial reviewers still disagree on inclusion or exclusion of a publication after discussion. The number of initial hits as well as number of titles included and excluded in the screening process will be documented in a PRISMA-flowchart [11]. Study Characteristics that will be extracted is: author; title; year of publication; study design; aim of study; characteristics of technology; setting; sample size; characteristics of the caregiver (formal, informal or purely conversation partner); major findings related to communication, conversation, interaction or relationship quality; other, explicitly stated requirements for the application of the technology.

Critical Appraisal

Methodological quality of papers will be assessed using Pluye and Hong [12] Mixed Method Appraisal Tool Checklist as a guide for appraisal. This tool is selected as it allows appraisal and scoring of mixed methods, qualitative, and quantitative designs and is designed for use in reviews.

Data synthesis

Where papers report on quantitative measures related to primary or secondary outcomes, these will be reported. Outcomes will be grouped into domains for review in the narrative section. Findings reported by researchers in relation to aspects of the interventions we believe to be important will be grouped into domains and reported in a narrative style.

Analysis of subgroups

Not applicable.

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