INDUCT
Interdisciplinary Network for Dementia Utilising Current Technology

Best Practice Guidance

Human Interaction with Technology in Dementia

Recommendations based on the research conducted in the Marie Sklodowska Curie InnovativeTraining Network INDUCT

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Chapter 1 INTRODUCTION

Technology and dementia

Though the evidence is still limited, policy-makers, care professionals and researchers often see technology applications as promising solutions to promote independence and autonomy in people with dementia.

Technologies are increasingly vital in today's activities in homes and communities. Nevertheless, little attention has been given to the consequences of the increasing complexity and reliance on them, for example at home, in shops, traffic situations, meaningful activities and health care services. The users' ability to manage products and services has been largely neglected or taken for granted. People with dementia often do not use the available technology because it does not match their needs and capacities.

The rapid growth of the technological landscape and related new services have the potential to improve the overall effectiveness and cost-effectiveness of health and social services and facilitate social participation and engagement in activities. But which technology is effective and how is this evaluated best?

Successful implementation of technology in dementia care depends not merely on its effectiveness but also on other facilitating or impeding factors on a micro, meso and macro level, related to e.g. the personal living environment (privacy, autonomy and obtrusiveness); the outside world (stigma and human contact); design (personalisability, affordability and safety), and ethics on these subjects.

Best Practice Guidance Human interaction with technology in dementia

This Best Practice Guidance results from the literature and field research conducted within the INDUCT project (2016-2020), a Marie Sklodowska Curie funded Innovative Training Network, which focused on technology for people with dementia in three areas (everyday life, meaningful activities and healthcare). The main aim was to develop a multi-disciplinary, intersectorial educational research framework for Europe to improve technology and care for people with dementia, and to provide the evidence to show how technology can improve the lives of people with dementia.

Regarding research, the INDUCT network had three main objectives:

- Identifying practical, cognitive & social factors that improve the usability of technology for people with dementia;

- Evaluating the effectiveness of specific contemporary technology; and

- Tracing facilitators & barriers for implementation of technology in dementia care.

The recommendations for improving the usability, effectiveness and implementation of technology in dementia which are presented in this Best Practice Guidance are meant to be helpful for different target groups: people with dementia, their formal and informal carers, policymakers, designers and researchers. For this reason representatives of these target groups were consulted and involved throughout the INDUCT project.

Patient and Public Involvement in INDUCT [by Kate Shiells]

The importance of Patient and Public Involvement (PPI) in dementia research has been highlighted at a European level by Alzheimer's Europe as a way in which to enhance the 'transparency, validity and legitimacy' of research (Gove et al., 2017). PPI has been embedded throughout the INDUCT project. For instance, INDUCT was initially conceived following consultations with people with dementia and carers, who highlighted the need for the development of effective, user-friendly technologies that meet their needs in a range of environments. In addition, via Alzheimer's Europe the European Working Group of People with Dementia (EWGPWD) was consulted and provided feedback with strong support for the proposal. Since taking up their posts across Europe, Early Stage Researchers (ESRs) have then continued to involve people with dementia, their formal or informal carers and other relevant stakeholders throughout the research cycle. In particular, the European Working Group of People with Dementia (EWGPWD) has been crucial in the design, dissemination and implementation of projects. Members were present at INDUCT schools in the first and second year, where they advised ESRs on how to engage and recruit people with dementia in research, for example, by using dementia-friendly language in information sheets and consent forms. A subsequent meeting was arranged with the EWGPWD in the third year of the project to share preliminary results and gather their ideas on how best to implement and disseminate findings to appropriate stakeholders.

There are also numerous specific examples of stakeholder engagement activities within each individual project, which have assisted ESRs to develop their recommendations according to each of the three INDUCT objectives. For instance, ESR 1 conducted PPI groups with people with dementia and their carers to elicit their views on empowerment in relation to surveillance technologies, using results to form recommendations on the effectiveness of this technology (Objective 4). ESRs 3 and 4 shared data from their research on the characteristics of Everyday Technologies and the interplay with participation in public space with a PPI group of people with dementia who provided alternative interpretations of the data, leading to recommendations on the usability and implementation of these technologies (resp.Objective 3 and 5). ESR 6 carried out consultations with a PPI group, exploring their opinions of four art applications. This resulted in the selection of two art applications to be used in the proof-of-principle study, examining the barriers and facilitators of implementing digital art in touchscreen devices in nursing homes (Objective 5). Finally, second-level partners in industry have also provided valuable PPI input. For example, ESR 7 collaborated with SilverFit in the Netherlands, a company producing innovative technology to improve elderly care, who provided insight into the implementation of exergaming systems, leading to a publication on the 'do's and don'ts of exergaming for people living with dementia' (Objective 5).

Reference

Dianne Gove, Ana Diaz-Ponce, Jean Georges, Esme Moniz-Cook, Gail Mountain, Rabih Chattat, Laila Øksnebjerg & The European Working Group of People with Dementia (2017): Alzheimer Europe's position on involving people with dementia in research through PPI (patient and public involvement), Aging & Mental Health, DOI: 10.1080/13607863.2017.1317334

Chapter 2 Best Practice Guidance at a glance

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Technologies are increasingly vital in today's activities in homes and communities. Nevertheless, little attention has been given to the consequences of the increasing complexity and reliance on them, for example, at home, in shops, traffic situations, meaningful activities and health care services. The users' ability to manage products and services has been largely neglected or taken for granted. People with dementia often do not use the available technology because it does not match their needs and capacities. In this section recommendations are provided to improve the usability of technology in daily life, meaningful activities and health care services for people with dementia</td></tr>
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The rapid growth of the technological landscape and related new services have the potential to improve the effectiveness and cost-effectiveness of health and social services and facilitate social participation and engagement in activities. But which technology is effective and how is this evaluated best? In this section recommendations are provided to evaluate the effectiveness of technology in daily life, meaningful activities and healthcare services for people with dementia and examples of proven effective technologies in some of these areas are provided.</td></tr>
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Successful implementation of technology in dementia care depends not merely on its effectiveness but also on other facilitating or impeding factors related to e.g. the personal living environment (privacy, autonomy and obtrusiveness); the outside world (stigma and human contact); design (personalisability, affordability and safety), and ethics on these subjects. In this section recommendations are provided on the implementation of technology in everyday life, meaningful activities and healthcare technology.</td></tr>
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Chapter 3 RECOMMENDATIONS

3.1. Practical, cognitive & social factors to improve usability of technology

3.1.1. Technology in everyday life

- ***Consider selling empowering products for people with dementia and carers and avoid stigmatizing stereotypes*** [3.1.1.1]

Guidance: Providers and marketers of ST should not communicate a wanderer with dementia discourse. Rather they should focus on useful person-centred products and communicate this in a non-stigmatising way towards family carers and people living with dementia in order to provide empowering products.

Explanation and Examples: Surveillance Technology (ST), such as GPS tracking devices are used as a resilience tool to increase the safety and independence of people with dementia that portray people with dementia to sell such technologies in a way that encourages stereotypes and contribute to a misunderstanding of dementia. This in turn could also impact technology development. This qualitative research undertook three studies of production (who made what), audience reception (what do users need) and textual analysis (what media techniques are used to attract attention) focused on the UK, Sweden and the Netherlands. The production study examined 242 websites that sell ST and a wanderer discourse with dementia was found. These websites give minimum representation of people with dementia using technology but represent overburdened younger-female carers, who are in need for a locating safety product to covertly use for wandering people with dementia, children and pets. Relying on stereotypes and “not so useful” technology will hinder resilience for people with dementia. Rather, it may imply the continuous stigmatisation that occurs when people with dementia are stereotyped and disregarded as human technology users.

Keywords: Technology advertisements, textual analysis, dementia, stigma, wandering discourse

Target group: Providers, marketers of Surveillance Technology

Type of evidence
Yvette Vermeer (ESR1)
Review of surveillance technology sold online and their marketing techniques

References
Vermeer, Y., Higgs, P., Charlesworth. G. (2018) Marketing of surveillance technology in three ageing countries. Quality in Ageing and Older Adults, 20, 2019(1):20-33 https://doi.org/10.1108/QAOA-03-2018-0010

Vermeer, Y., Higgs, P., Charlesworth, G. (2019). Semiotic themes in advertisements selling technology for ageing in place (submitted).

Vermeer, Y., Higgs, P., Charlesworth, G. (2019). Audience reception to advertising of Surveillance Technology in dementia: evidence from focus groups (submitted).

Vermeer, Y. Analysing advertisements of older adults: controlling the senile back then and wanderers now? (submitted)

Vermeer, Y., Van Santen, J., Higgs, P., Charlesworth, G. (2019). People with dementia and carers online discussing surveillance. Journal of Enabling Technologies. (submitted).

Vermeer, Y., Higgs, P., Charlesworth, G. (2019). Surveillance Technology in dementia care: implicit assumptions and unresolved tensions. Springer, DementiaLab 2019 (submitted).

Vermeer, Y., Higgs, P., Charlesworth, G. (2019). What do we require from surveillance technology: A review of the needs of people with dementia and informal caregivers. Journal of Rehabilitation and Assistive Engineering (accepted for publication).

- ***Consider different needs*** [3.1.1.2]

Guidance: During the development or use of technological devices, the individual needs of the person with cognitive impairments (e.g. dementia or MCI) and carer should be considered. This includes not only everyday technology, but also surveillance technology (ST) and technology used during cognitive training sessions. Increased awareness and offered assistance is recommended.

Explanation and Examples: People with dementia tend to face more and other difficulties than people with MCI when using relevant everyday technologies such as cash machines, calling or texting with a cell phone or using a DVD player, and thus need more assistance in technology use. This may also be the case with ST and technology used for cognitive training.

For example, ST are often presented as a neutral technology, which enables carers to minimise risk. However, the views of users have not been sought by ST developers, which limits the usefulness of ST and suggests the need for the empowerment of user groups. Therefore, a study of audience reception was undertaken through focus groups, online discussions (Netherlands) and PPI (UK). Hereby people with dementia could speak for themselves, which has allowed their needs to be compared with carers. There was no clear recognition that such needs differed between people with dementia and carers, and it has not previously been recognized that this leads to a mismatch between a user's situation and the product design and how this plays out in the acceptance and use of ST. Although, carers and people with dementia have not yet reached an agreement on the privacy debate and on how the media should portray dementia, it is clear that carers often tamper with ST to make up for a lack in current designs. The results suggest that ST are being resold or rebranded by providers to use for dementia, whilst users may experience physical and cognitive barriers to using such technologies for safety reasons.

Regarding technology for cognitive training: As older people have little experience with technological devices, and so may experience problems, professionals involved in cognitive training should monitor training sessions from the outset. The professional must observe and ensure the ability of the older person to understand the instructions given through the technological device, so that the person can really benefit from the cognitive training by computer. For example, in sessions with GRADIOR, a cognitive rehabilitation program, there is always a professional in charge who helps older people to understand the exercises they may experience difficulty with.

Keywords: People with dementia, MCI, carers, needs, everyday technology, surveillance technologies, product design, assistance, usability

Target group: People with dementia; family carers; professional carers, policymakers, technology developers, researchers, clinicians, who promote the use of technology to people with cognitive impairments.

Type of evidence
Yvette Vermeer (ESR1), Sara Bartels (ESR9), Angie Alejandra Diaz (ESR 15)
Literature review, RCT, cross-sectional and focus group studies, online discussions, PPI

References
Vermeer et al. What do we require from surveillance technology: A review of the needs of people with dementia and informal caregivers (forthcoming)

Vermeer et al. People living with dementia and family carers in online discussion of their needs from surveillance technology. (submitted, under review)

S. L. Bartels, S. Assander, A.-H. Patomella, J. Jamnadas-Khoda & C. Malinowsky (2019): Do you observe what I perceive? The relationship between two perspectives on the ability of people with cognitive impairments to use everyday technology, Aging & Mental Health, ePub 6May2019 https://doi.org/10.1080/13607863.2019.1609902

- ***Consider undesired side effects of dementia prevention technologies and discourses*** [3.1.1.3]

Guidance: Public health policy should more fully consider the undesired side effects of dementia prevention technologies and discourses which may reinforce the fear of dementia and imply a moral responsibility on people who cannot maintain cognition in later life due to the progression of the condition.

Explanation and Examples: A review of the literature shows there is little evidence for the effectiveness of brain training to prevent dementia. Furthermore, ethnographic research has generated evidence that engagement with it can act as a form of social exclusion by separating older people into those who have 'successfully cognitively aged' and those who have not. Indeed, the promotion of this technology implies an individual responsibility to stay cognitively healthy, implicitly reinforcing anxiety and blame around the condition and people who live with it. These side effects can reinforce the exclusion of people with the condition.

Keywords: Brain training, social exclusion, successful ageing, dementia

Target group: Researchers; policymakers

Type of evidence

Sébastien Libert (ESR2)

Literature review, Ethnography

References

Libert, S., Charlesworth, G., & Higgs, P. (n.d.). Cognitive decline and distinction: A new line of fracture in later life? *Ageing and Society,* 1-19. doi:10.1017/S0144686X19000734

- ***Adaptations to enable more accessible public transport*** [3.1.1.4]

Guidance:

Public transport providers and policy-makers should be more aware of barriers to access and consider adaptations to enable better accessibility for people with cognitive issues or disabilities living with dementia.

Explanation and Examples: Everyday Technologies are required to access public transport (e.g. ticket machines, GPS, travel updates on smartphones). Research from the UK and Sweden explored how access to public transport can enable or disable a person's ability to participate in places and activities, within public space. The UK study involved 64 older people with dementia and 64 older people with no known cognitive impairment. The Swedish study included 35 older people with dementia and 34 older people with no known cognitive impairment. Transportation centres were one of the places most frequently abandoned over time by the Swedish group of people with dementia. In both the Swedish and UK samples, compared with people without dementia significantly fewer people with dementia were drivers, so may have increased need to use public transport. Research shows they face increased barriers to using the Everyday Technologies that are required to access those

services. The research is supported by consultations that were performed across London with community-based groups of older people with and without dementia, and the European Working Group of People with Dementia. The consultations revealed not only physical but also cognitive barriers to using Everyday Technologies to access public transport.

Keywords: Technology, Dementia, Transportation, Activities of Daily Living; Social Participation, Accessibility

Target group: Transportation planners, transportation operators, policy-makers.

Type of evidence

Sophie Gaber (ESR3)

Cross sectional quantitative studies, literature review & multilevel stakeholder consultations.

References

Gaber, S. N., Nygård, L., Brorsson, A., Kottorp, A., & Malinowsky, C. (2019). Everyday Technologies and Public Space Participation among People with and without Dementia. Canadian Journal of Occupational Therapy, 86(5), 400–411. https://doi.org/10.1177/0008417419837764

Gaber, S. N., Nygård, L., Kottorp, A., Charlesworth, G., Wallcook, S., & Malinowsky, C. (2020). Perceived risks, concession travel pass access and everyday technology use for out-of-home participation: cross-sectional interviews among older people in the UK. BMC Geriatrics, 20, 192. https://doi.org/10.1186/s12877-020-01565-0

- ***Addressing stigma through online and offline service options*** [3.1.1.5]

Guidance: Service providers should counter the stigmatising effect of not having access to, or not being a skilled user of, Everyday Technologies, for people with dementia and consider strategies to enhance participation, providing offline and online choices for all public services.

Explanation and Examples: Interviews were performed with 128 older people with and without dementia in the UK, and 69 people with and without dementia in Sweden. In both the UK and Swedish studies, people with dementia reported significantly lower use of Everyday Technologies compared to older people without dementia. People with dementia also reported significantly lower participation in places and activities within public space. Reduced ability to use Everyday Technologies was linked to reduced participation in places visited and activities within public space for people with dementia. Community-based consultations with older people with and without dementia across London showed that Everyday Technologies can provide opportunities to participate in services, e.g. eHealth and online banking. However, without face-to-face or written options (e.g. offline), people with dementia are at risk of stigma associated with digital exclusion. Barriers to participation in their everyday lives can lead to social isolation.

Keywords: Technology, Dementia, Activities of Daily Living, Human Rights, Stigma, Social Isolation, Health Literacy, Health Services Accessibility

Target group: Service providers e.g. retailers, transportation organisations, financial companies etc., government and voluntary services, cultural, recreational and spiritual centres, media etc.

Type of evidence

Sophie Gaber (ESR3)

Cross sectional quantitative studies, literature review & multilevel stakeholder consultations.

References

Gaber, S. N., Nygård, L., Brorsson, A., Kottorp, A., & Malinowsky, C. (2019). Everyday Technologies and Public Space Participation among People with and without Dementia. Canadian Journal of Occupational Therapy, 86(5), 400–411. https://doi.org/10.1177/0008417419837764

Gaber, S. N., Nygård, L., Brorsson, A., Kottorp, A., Charlesworth, G., Wallcook, S., Malinowsky, C. (2020). Social Participation in Relation to Technology Use and Social Deprivation: A Mixed Methods Study Among Older People with and without Dementia. International Journal of Environmental Research and Public Health, 17, 4022. https://www.mdpi.com/1660-4601/17/11/4022#

- ***Design easier to use everyday ICTs (Everyday Information Communication Technologies)*** [3.1.1.6]

Guidance: Technology developers should be aware thatf the challenge of using everyday information communication technologies can be high for older adults, including some people with dementia. They should use inclusive design that addresses cognitive useability to reduce the level of challenge so that more people with cognitive impairments can use ICTs.

Explanation/Examples: A standardized questionnaire investigated how 35 people living with dementia and 34 people with no known cognitive impairment in Sweden perceived their ability to use 90 ETs on a 5 step rating scale. This data was analysed (in a Rasch model) to produce a *challenge measure* for each of the 31 EICTs, showing how difficult or easy they were to use. Landline telephone was the easiest EICT to use. Scores for smartphone functions (make calls, receive calls, alarm, camera) were at the easier end of the challenge hierarchy and comparable to (or lower than) the challenge of the same functions on a push button mobile phone. These smartphone functions were less relevant to the group of people with dementia than the group without. Using a computer for the full range of functions (shopping, banking, email etc.) scored in the top half of the challenge of the hierarchy and using a tablet to search the web was most difficult. No other tablet functions (i.e. banking, email) could be scored since not enough people considered those functions relevant. Several smartphone functions (i.e. game, social media, transaction) could not be scored for the same reason

Keywords: Information Communication Technologies, Usability, Dementia, Older adults

Target group: Technology developers; e.g. designers

Type of evidence

Sarah Wallcook (ESR4)

Cross sectional quantitative study and literature review

References

Wallcook, S., Malinowsky, C., Kottorp, A. & Nygård, L. 'The use of Everyday Information Communication Technologies in the lives of older adults living with and without dementia in Sweden', Assistive Technology, [https://10.1080/10400435.2019.1644685]

- ***Take a multi-perspective approach when procuring public space technologies to improve usability internationally*** *[3.1.1.7]*

Guidance: When selecting technologies for use in public spaces, procurers should involve occupational therapists and designers with expertise in dementia, and people living with dementia. Public space technologies should 1) have the most cognitively enabling and inclusive design features (i.e. minimal steps and memory demands), 2) be sited in the most supportive physical location (i.e.

secure vestibule, busy thoroughfare) and 3) identify and account for wider sociocultural preferences (i.e. continued face-to-face services).

Explanation/Examples: Life outside home in most countries increasingly demands the use of everyday technologies (ETs i.e. transport ticket and parking machines, ATMs, airline self-check in machines, fuel pumps). However, ETs can present challenges, particularly for people with dementia, and differences in design and location may mean some ETs are easier to use than others. To investigate variation in the challenge of ETs; the Everyday Technology Use Questionnaire was administered with 315 people with and without dementia (73 in Sweden, 114 in the USA, 128 in England) in a cross-sectional, quantitative study. Modern statistical analysis found 5/16 public space ETs differed in challenge level between countries (specifically: ATM, airline self-check-in, bag drop, automatic ticket gates, fuel pump). These differences result from variation in design features or siting of technologies. However, they may also be due to differing habits between users in different countries (i.e. necessity and frequency of use, preference for particular modes of transport, concerns about security, embarrassment) or varying progress towards technologised rather than face-to-face services (i.e. towards cashlessness). Taking account of inter-country differences could lead to selecting the most useable technologies and services. This could improve inclusiveness of public space internationally for older adults with and without dementia.

Keywords: Everyday technology, everyday life, accessibility, useability, cultural context, transportation

Target group: Service providers e.g. retailers, transportation organisations, financial companies etc., occupational therapy educators and providers, technology developers, dementia friendly communities

Type of evidence

ESR 4 Sarah Wallcook, quantitative, cross-sectional study with 315 participants in three countries.

References

Wallcook, S., Malinowsky, C., Nygård, L., Charlesworth, G., Lee, J., Walsh, R., Gaber, S.N., & Kottorp, A. (2020) The perceived challenge of everyday technologies in Sweden, the United States, and England: exploring differential item functioning in the Everyday Technology Use Questionnaire, Scandinavian Journal of Occupational Therapy, doi: 10.1080/11038128.2020.1723685.

- ***Cashback is a replacement banking service rurally and local retailers must be aware of legal obligations to accept chip and signature cards*** [3.1.1.8]

Guidance: Due to UK bank and post office closures, local shops have a more central role in ensuring that older adults have continued, secure access to cash via face-to-face services offering card payments and cashback. Staff, managers and proprietors need to be aware of legal obligations to accept customers' chip and signature cards, which support some people with dementia to access their finances. Other countries may need to make legal provisions to ensure financial services and retailers do not discriminate against people with disabilities regarding payment methods and access to cash.

Explanation/Examples: Cash can be a preferred option among people of all ages – including some older adults with dementia - who prefer to retain visual control over their spend. Bank and post office closures have occurred across the UK, affecting particularly people in rural areas, who may now face increased travel distances to reach a branch. Technologies (ATMs and chip and PIN devices) are therefore becoming less avoidable in the process of accessing cash, however, can present problems for people living with dementia. A case study of 13 rurally dwelling older adults in the UK with mild dementia gathered data from in home interviews involving two structured questionnaires, observations, maps, and subsequent relevant document collation (i.e. public transport timetables, local news reports). The importance of local grocery shops and supermarkets in providing a trusted, face-to-face option for accessing cash was highlighted, particularly among cases who lived alone.

Subsequent document analysis found some retailers were unaware of legal obligations to accept chip and signature cards leading to occasional refusals. Raising retailer awareness of the importance of card payment options rurally, and obligations to accept signature cards, could support people living with dementia to continue independently accessing their finances locally.

Keywords: Everyday life, everyday technology, rural, activities of daily living, services

Target Group: Service providers e.g. retailers, transportation organisations, financial companies etc, dementia friendly communities, voluntary services, government

Type of evidence

ESR 4 Sarah Wallcook, case study of 13 rurally dwelling older adults with mild dementia in England.

References

Wallcook, S., Malinowsky, C., & Nygård, L. (in manuscript) Illuminating the everyday technological lives of rurally dwelling older adults with dementia in the North of England.

- ***Private surveillance car parking companies must not discriminate against drivers with dementia and must ensure useability by giving control and feedback to users*** [3.1.1.9]

Guidance: Private car parking companies that use vehicle number plate recognition and surveillance technologies must make accessible provisions that account for memory difficulties common among drivers with mild dementia. Parking facilities must allow users control and provide feedback about time of arrival. Contractors of these companies must ensure the systems they agree to are useable for their customers living with dementia.

Explanation/Examples: Driving remains essential for daily life in rural parts of the UK where public transport infrastructure is sparse. Driving also means handling continually evolving technologies: parking ticket machines (cash, cashless, SMS/app, number plate inputting), automated barriers, fuel pumps, parking surveillance systems. These technologies may increase the complexity of parking and driving, particularly for people living with dementia', and could impact some people's ability to complete everyday activities. A case study of 13 rurally dwelling older adults with mild dementia gathered data from in-home interviews involving two structured questionnaires, observations, maps, and subsequent relevant document collation (i.e. public transport timetables, local news reports). Driving was highlighted as centrally important to daily life, particularly for cases living alone. Carparks which used number plate surveillance on entry and exit were highlighted by one case as particularly problematic. These types of parking technologies offer drivers no feedback about time of arrival, nor any method by which drivers can control their own actions in relation to rules and restrictions leading to unfair discrimination. Short term memory difficulties common among people with mild dementia increase their risk of being unfairly penalised by these systems, leading to curtailed or abandoned activities, or handling complex administration of fines.

Keywords: Everyday life, everyday technology, transportation, surveillance technology, services, rural

Target Group:Service providers e.g. retailers, transportation organisations, financial companies etc, dementia friendly communities, voluntary services

Type of evidence

ESR 4 Sarah Wallcook, case study of 13 rurally dwelling older adults with mild dementia in England.

References

Wallcook, S., Malinowsky, C., & Nygård, L. (in manuscript) Illuminating the everyday technological lives of rurally dwelling older adults with dementia in the North of England.

- ***Provide comprehensive occupational therapy assessments taking account of everyday technology use to improve identification of support needs*** [3.1.1.10]

Guidance: People with dementia reporting new difficulties using everyday technologies should be offered a comprehensive assessment by an occupational therapist. While everyday technology can be assistive to everyday activities, in some cases, a pattern of detechnologising indicates instability in the person's wider pattern of participation and may indicate a need for support, or change in housing situation.

Explanation/Examples: Everyday life, including outside home, more and more involves the use of everyday technologies (mobiles, smartphones, ATMs, transport ticket machines etc), which could even influence the places that people go to. A cross-sectional, quantitative study with 128 older adults with and without dementia in England was conducted using the Everyday Technology Use Questionnaire and the Participation in Places and Activities Outside Home questionnaire. Results of statistical analyses confirmed that for some people; going to a lower amount of places was related to perceiving a lower amount of technologies relevant in daily life and living in a relatively more deprived area. A subsequent case study was conducted with 13 rurally dwelling older adults from the same sample (using the same questionnaires with additional interview notes, observations, maps, subsequent relevant document collation i.e. mobile and internet network availability reports). Findings highlighted a person could perceive detechnologising, particularly around the home and garden, as one of several signs of vulnerability when living alone rurally. Such vulnerability was then a sign of a need for support to make living at home more tenable, including to increase safety in the grounds surrounding home, or was a sign of a need to relocate.

Keywords: Assessments, support, activities of daily living, everyday technology

Target Group: Occupational therapy educators and providers, social care and housing providers, clinicians, health care providers and patient organizations.

Type of evidence

ESR 4 Sarah Wallcook (ESR4)

Quantitative cross-sectional study with 128 UK-based participants, case study of 13 rurally dwelling older adults with mild dementia in England.

References

Wallcook, S., Nygård, L., Kottorp, A., Gaber, S. N., Charlesworth, G. & Malinowsky, C. (submitted) Kaleidoscopic associations between life outside home and the technological environment that shape occupational injustice – revealed with cross-sectional statistical modelling

Wallcook, S., Malinowsky, C., & Nygård, L. (in manuscript) Illuminating the everyday technological lives of rurally dwelling older adults with dementia in the North of England.

3.1.2 Technology for meaningful activities

- ***Optimising the process of prototyping and usability testing*** [3.1.2.1]

Guidance: Gather feedback from people with dementia on working prototypes rather than paper prototypes.

Explanation/example: Work with Eumedianet and the systematic review indicated that people with dementia found it difficult to comment on paper prototypes as it did not provide them with enough knowledge on the future digital application.

Keywords: User involvement, feedback, prototyping, usability testing

Target group: Researchers involved in developing digital applications

Type of evidence

Harleen Rai (ESR5)

Systematic review & development process of the iCST application

References

Rai, H. K., Cavalcanti Barroso, A., Yates, L., Schneider, J., & Orrell, M. Improving the involvement of people with dementia in developing technology–based interventions: a narrative synthesis review and best practice guidelines. JMIR (forthcoming). https://doi.org/10.2196/17531.

Rai, H. K., Schneider, J., & Orrell, M. An individual Cognitive Stimulation Therapy (iCST) application for people with dementia: development and usability study of Thinkability. JMIR Aging (forthcoming). http://doi.org/10.2196/17105.

- ***Creating a suitable user experience and design*** [3.1.2.2]

Guidance: When developing new digital applications, ensure you generate an optimal user experience and focus on sophisticated design including clear signposting and, an easy and intuitive navigation.

Explanation/example: People using the iCST app valued the sophisticated, mature design and the clear navigation but noted the need for clearer buttons. The design should have a highly professional look and feel and be clearly orientated to adults not children.

Keywords: UX design, user experience, design, digital applications

Target group: Researchers involved in developing digital applications, UX designers.

Type of evidence

Harleen Rai (ERS5)

Development process of the iCST application

References

Rai, H. K., Griffiths, R., Yates, L., Schneider, J., & Orrell, M. Field-testing an iCST touch-screen application with people with dementia and carers: a mixed method study. *Aging & Mental Health*, 1-11. https://doi.org/10.1080/13607863.2020.1783515.

- ***Everyday fluctuations*** [3.1.2.3]

Guidance: Consider using smartphone-based experience sampling apps to measure everyday fluctuations of variables such as mood, behaviors, or cognition in people with mild cognitive impairments or carers of people with dementia to better understand variations in daily experiences.

Explanation and examples: The 'Partner in Sight' intervention for carers of people with dementia, the 'Monitor-Mi' study (feasibility of the experience sampling method (ESM) in people with MCI), and the development of two cognitive tasks (mDSST; mVSWMT), all included the experience sampling method (ESM). These studies are first steps towards a better understanding of and support for people with cognitive impairments, such as MCI or dementia, and their carers in everyday life. The results indicate positive effects on carers' well-being, feasibility of using the ESM in people with MCI, and internal validity when assessing momentary cognition in healthy older individuals. The experience sampling method has a high ecological validity with a reduced memory bias, allows to see fluctuations, and uncovers a complex picture of affect, behaviour, and other variables in everyday life. It can be used to increase awareness of own daily patterns and motivate behavioural changes towards more meaningful activities.

Keywords: Experience sampling, everyday life, cognition, people with MCI, carers, mood

Target group: Researchers focusing on eHealth, clinicians

Type of evidence

Sara Bartels (ESR9)

ESM studies: 'Partner in Sight' intervention and related studies; Monitor-Mi study; Cognitive tasks (collaboration with S. Verhagen et al.);

References

Bartels, S.L., Van Knippenberg, R.J.M., Maliowsky, C., Verhey, F.R.J., & De Vugt, M.E. Feasibility and usability of the experience sampling method to gain insight into the everyday lives of people with mild cognitive impairments. JMIR: Aging. (under review).

Van Knippenberg, R. J. M., De Vugt, M. E., Ponds, R. W., Myin-Germeys, I., van Twillert, B., & Verhey, F. R. J. (2017). Dealing with daily challenges in dementia (deal-id study): an experience sampling study to assess caregiver functioning in the flow of daily life. *International journal of geriatric psychiatry*, *32*(9), 949-958.

Van Knippenberg, R. J. M., De Vugt, M. E., Ponds, R. W., Myin-Germeys, I., & Verhey, F. R. J. (2018). An experience sampling method intervention for dementia caregivers: results of a randomized controlled trial. *The American Journal of Geriatric Psychiatry*, *26*(12), 1231-1243.

Daniëls, N. E. M., Bartels, S. L., Verhagen, S. J. W., Van Knippenberg, R. J. M., De Vugt, M. E., & Delespaul, P. A. (2020). Digital assessment of working memory and processing speed in everyday life: Feasibility, validation, and lessons-learned. *Internet Interventions*, *19*, 100300.

Verhagen, S. J., Daniëls, N. E., Bartels, S. L., Tans, S., Borkelmans, K. W., de Vugt, M. E., & Delespaul, P. A. (2019). Measuring within-day cognitive performance using the experience sampling method: A pilot study in a healthy population. *PloS one*, *14*(12), e0226409.

- ***Assessing the Ability to Use Everyday Technologies by self-perceived reports as well as observations*** [3.1.2.4]

Guidance: To understand the ability of the elderly with cognitive impairments to use everyday technology observe the interaction but also ask about their views.

Explanation and examples: Via an observation (guided by the META), the person-technology interaction can be described in detail, e.g. does the person press buttons/the screen with an adequate force or are steps performed in a logical order. This can help to determine which elements of a specific technology are causing problems and might be particularly useful for designing intervention and the development of technology. Through a self-perceived report (S-ETUQ), the individual can reflect on a wider range of technologies and the impact of technology use to perform well in (in relation to) everyday life can be depicted. For example, if someone has problems using the ticket machine for public transport or the ATM, this might impact participating in society; if the individual has problems with using the dishwasher or vacuum cleaner, this might impact the hygiene and well-being at home.

Keywords: Everyday technology, MCI, dementia, self-perceived report, observation

Target group: Clinicians, researchers and industry evaluating technology use of people with cognitive impairments

Type of evidence

Sara Bartels (ESR9)

Correlation study of the META and S-ETUQ (KI and UM)

References

S. L. Bartels, S. Assander, A.-H. Patomella, J. Jamnadas-Khoda & C. Malinowsky (2019): Do you observe what I perceive? The relationship between two perspectives on the ability of people with cognitive impairments to use everyday technology, Aging & Mental Health, DOI: 10.1080/13607863.2019.1609902

3.1.3. Health care technology

- ***Portable and unobtrusive devices for electronic records are optimal for staff and residents*** [3.1.3.1]

Guidance: Nursing homes providing care for people with dementia should consider introducing portable devices in addition to desktop devices for electronic patient records (EPR). Devices should not disrupt or invade residents' privacy.

Explanation & Examples: Portable devices have been shown to increase efficiency in some instances as they allow staff to record data into the EPR at the point of care instead of at the end of the shift. This enables staff to spend more time providing care to residents, particularly for residents with dementia and complex needs. Portable devices can support person-centred care by allowing immediate access to care plans with vital information about residents, such as dementia diagnosis. Rapid access to care plans is important for staff retrieving information about individuals who are at the nursing home temporarily on respite; for those residents who may be unable to recall personal information; and for those staff who work infrequently in the home and are unfamiliar with residents. However, it should be taken into consideration that some staff may prefer desktop devices based on ease of use when completing substantial documents. During the development of portable devices for nursing homes, the impact that such devices could have on residents should be taken into account and staff should explain the purpose of EPR devices to residents and family members who may be unfamiliar with the technology.

Keywords: Device; electronic patient record; nursing home; portability.

Target group: Developers of EPR, Nursing homes

Type of evidence
Kate Shiells (ESR 13)
Integrative literature review
Qualitative study

References

Shiells, K., Holmerova, I., Steffl, M., Stepankova, O. (2018). Electronic patient records as a tool to facilitate care provision in nursing homes: an integrative review. *Informatics for Health and Social Care*, 44(3), 262-277. DOI: 10.1080/17538157.2018.1496091

Shiells, K., Diaz Baquero, A. A., Stepankova, O., & Holmerova, I. (2020). Staff perspectives on the usability of electronic patient records for planning and delivering dementia care in nursing homes: a multiple case study. BMC Medical Informatics and Decision Making, 20, 159. https://doi.org/10.1186/s12911-020-01160-8

Applications promoting the effective use of electronic records are required [3.1.3.2]

Guidance: Applications that should be incorporated into EPR systems used in nursing homes providing care for people with dementia include a spell-check, a copy and paste function and a keyword search function. Log-in processes should be rapid and secure.

Explanation & Examples: The presence of a spell-check has been described as saving time on proofreading, as well as increasing legibility and comprehension of documentation. This allows for more time to be spent with residents with dementia in direct care, and for correct care to be provided. A copy and paste function also saves time by allowing staff to easily transfer information across sections of the EPR where information is often required to be replicated. A keyword function allows staff to enter a keyword and jump to the relevant section in a resident's notes, allowing for more efficient retrieval of information, important in situations when a resident is unable to recall personal information. Rapid log-in processes should reduce barriers to using the EPR, as slow log-in processes have been found to prevent staff from accessing information about residents before delivering care, and have meant staff have been forced to pass on information about residents verbally instead of entering it into the EPR. This may mean important information regarding any sudden changes in an individual's condition might be missed.

Keywords: Applications; electronic patient record; nursing home; software

Target group: Developers of EPR, Nursing homes

Type of evidence

Integrative literature review

Qualitative study

References

Shiells, K., Holmerova, I., Steffl, M., Stepankova, O. (2018). Electronic patient records as a tool to facilitate care provision in nursing homes: an integrative review. *Informatics for Health and Social Care*, 44(3), 262-277. DOI: 10.1080/17538157.2018.1496091

Shiells, K., Diaz Baquero, A. A., Stepankova, O., & Holmerova, I. (2020). Staff perspectives on the usability of electronic patient records for planning and delivering dementia care in nursing homes: a multiple case study. BMC Medical Informatics and Decision Making, 20, 159. https://doi.org/10.1186/s12911-020-01160-8

- ***Functionalities of electronic records should be tailored to the nursing home environment*** [3.1.3.3]

Guidance: Developers of EPR systems for dementia care should consider including a function allowing for the automated generation of graphs to show trends in data, and an accompanying function to prompt staff about changes in a resident's condition. In addition, functions allowing for the automated generation of care plans from assessment data, and alerts to prompt staff to create or update a new document in the EPR may be of value to nursing homes. Interoperability should be a goal for the future.

Explanation & Examples: Automatic generation of graphs displaying trends in a resident's condition increases visibility of changes, allowing staff to more rapidly identify and respond to changing care needs. For example, graphs showing changes in weight, which can commonly affect individuals with dementia. Furthermore, through the incorporation of artificial intelligence (AI), some EPR systems are able to analyse resident data and provide alerts to staff about potential risk factors. For instance, alerts to warn staff about potential skin breakdown, important for those residents with dementia receiving end-of-life care, who may be spending considerable amounts of time in bed and have reduced fluid intake. Automatic generation of care plans from assessment data could save staff time in administration, as well as automatic alerts incorporated into the EPR that prompt staff to update care plans, meaning optimal care can be planned and provided to individuals with dementia. Finally, EPR

systems should be interoperable, so that staff can access and communicate relevant information securely over the internet with external healthcare providers, instead of using paper records.

Keywords: Alerts; artificial intelligence; electronic patient record; functionality; nursing home

Target group: Developers of EPR, Nursing homes

Type of evidence
Kate Shiells (ESR 13)
Integrative literature review
Qualitative study

References
Shiells, K., Holmerova, I., Steffl, M., Stepankova, O. (2018). Electronic patient records as a tool to facilitate care provision in nursing homes: an integrative review. *Informatics for Health and Social Care*, 44(3), 262-277. DOI: 10.1080/17538157.2018.1496091

Shiells, K., Diaz Baquero, A. A., Stepankova, O., & Holmerova, I. (2020). Staff perspectives on the usability of electronic patient records for planning and delivering dementia care in nursing homes: a multiple case study. BMC Medical Informatics and Decision Making, 20, 159 https://doi.org/10.1186/s12911-020-01160-8

- ***Electronic care documentation should meet the needs of nursing home staff caring for people with dementia*** [3.1.3.4]

Guidance: EPR systems should include the necessary assessment templates for use in the care of people with dementia, as well as space for entry of free text and to upload photos of residents. Electronic assessment forms and care plans for dementia care should use formalised nursing language to prompt the entry of correct information, and structured templates that guide staff through body systems, leading to comprehensive care plans.

Explanation & Examples: EPR systems in nursing homes have been found to omit the appropriate scales and assessments required by nursing staff caring for people with dementia. For instance, staff stated that they require the MMSE assessment, the QUALID scale, and the Barthel Index of Activities of Daily Living incorporated into the EPR. Furthermore, staff have identified incorrect nursing language in electronic forms, meaning important information is not recorded. For example, the omission of the term 'dementia diagnosis' from assessment forms meant that nurses were not entering this information about residents. By including the appropriate structured forms for data entry with formalised nursing language, Artificial Intelligence (AI) tools can be more successfully integrated into the EPR. Space for photos of residents is important for new staff when learning residents names and for confirming identities of residents when required, and structured body templates included into the EPR have been identified as a useful visual prompt for completing assessments. Staff also require space to enter life stories, and space for free data entry for additional notes and observations. For example, changes in the behaviour of a resident with dementia.

Keywords: Assessment; care plans; electronic patient record; nursing language; nursing home; templates

Target group: Developers of EPR, Nursing homes

Type of evidence
Kate Shiells (ESR 13)
Integrative literature review
Qualitative study

References

Shiells, K., Holmerova, I., Steffl, M., Stepankova, O. (2018). Electronic patient records as a tool to facilitate care provision in nursing homes: an integrative review. *Informatics for Health and Social Care*, 44(3), 262-277. DOI: 10.1080/17538157.2018.1496091

Shiells, K., Diaz Baquero, A. A., Stepankova, O., & Holmerova, I. (2020). Staff perspectives on the usability of electronic patient records for planning and delivering dementia care in nursing homes: a multiple case study. BMC Medical Informatics and Decision Making, 20, 159 https://doi.org/10.1186/s12911-020-01160-8

- ***Electronic care documentation should meet the needs of people with dementia in nursing homes*** [3.1.3.5]

Guidance: Electronic assessment forms and care plans used for planning dementia care in nursing homes should prompt staff to consider the following needs of residents: activities, maintaining previous roles, reminiscence, freedom and choice, appropriate environment, meaningful relationships, support with grief and loss, and end-of-life care.

Target group: Developers of EPR, Nursing homes

Explanation & Examples: The themes above have been described by people with dementia in various studies exploring their self-reported needs and experiences in nursing homes. Developers should therefore consider including these themes into electronic assessment and care plan templates as prompts for nursing home staff to explore with residents.

Keywords: Assessment; care plan; electronic patient record; needs; nursing home; self-report

Target group: Developers of EPR, Nursing homes

Type of evidence

Kate Shiells (ESR13)

Scoping literature review

References

Shiells, K., Pivodic, L., Holmerova, I., Van den Block, L. (2019). Self-reported needs and experiences of people with dementia in nursing homes: a scoping review. *Aging & Mental Health,* DOI: 10.1080/13607863.2019.1625303

- ***Technology design focused on the characteristics of the population provides usability*** [3.1.3.6]

Guidance: To improve usability design of the technology should be developed specifically on the characteristics of the person with dementia, with respect to vision, auditory and cognitive capacities.

Explanation and Examples: Dementia is mainly suffered by elderly people. It´s well known the visual and auditorily perception changes. Shapes, colours, glares, temporal frequency of stimuli, visual acuity, and relevant visual stimuli can be bad perceived. Therefore, the design of any technology should be focused and fitted to these perceptual changes. Consequently, it is important to increase the lighting of the context of the task, the level of contrast and font size.

Equally elderly people might suffer impaired hearing, especially in sensitivity to high frequencies, discrimination of tones and differentiation of the speech of the background noise. Therefore, it is necessary for any technology to increase the intensity of the stimuli, control the background noise, avoid stimuli with high frequencies and adapt the speed of the words.

The design of the technology should take into account the cognitive impairment of a person with dementia (type, level, and deficits associated with impairment). Technology for rehabilitation must

comprise different difficulty levels, take slow processing speed into account by extending response intervals of exercises, and an increase the variety in types of exercises.

The degree of usability of a technology will influence the user´s experience, generating a degree of satisfaction in the person with dementia that will affect their level of motivation to continue using a rehabilitation program such as Gradior.

Keywords: Visual-auditory abilities, cognitive impairment, user´s experience, degree of satisfaction, motivation, usability.

Target group: Researchers, developers, people with dementia

Type of evidence
Angie Alejandra Diaz Baquero (ESR 15)
RCT
RCT Gradior Validation
Other sources of support:

References
Toribio Guzmán, J. M., Franco Martin, M.A., Perea Bartolomé, M.V. (2015). Long Lasting Memories, an integrated ICT platform against age-related cognitive decline: usability study. (Doctoral), Department of basic psychology, psychobiology and methodology of behavioral sciences - Faculty of psychology. University of Salamanca, Spain.

- ***Consider user-centred design in the development of computer-based cognitive rehabilitation programs for people with dementia*** [3.1.3.7]

Guidance: User-centered design should be considered in the development of any technology or computer-based program for cognitive rehabilitation in people with dementia.

Explanation and examples: User-centered design is a methodology applied in the development of programs or new technologies for cognitive rehabilitation in people with dementia. This design takes into account the target population from the beginning to the end of the development process, with the aim of investigating their needs and expectations, developing a prototype that meets these needs and evaluating the final prototype based on usability and user experience criteria.

Keywords: Dementia, computer-based program, development design, cognitive.

Target group: Researchers, developers, people with dementia, policy makers

Type of evidence
Angie Alejandra Diaz Baquero (ESR 15)
Systematic literature review.

References
Diaz Baquero, A. A., Dröes, R. M., Perea Bartolomé, M. V., Irazoki, E., Toribio-Guzman, J. M., Franco-Martin, M. A., van der Roest, H. G. Methodological designs applied in the development of computer-based training programs for the cognitive rehabilitation in people with mild cognitive impairment (MCI) and mild dementia. Systematic Review (Currently in preparation).

3.2 Evaluating the effectiveness of specific contemporary technology

3.2.1 Technology for everyday life

- ***Ecological validity contributes to the effectiveness of a technology*** [3.2.1.1]

Guidance: The ecological validity and cultural context in which the technology will be implemented should be taken into account, to ensure it is applicable to the 'real life situation' of the person with dementia

Explanation & Example*:* When cognitive rehabilitation is applied to people with dementia, it is necessary to consider the ecological validity of each tool or instrument used to perform cognitive rehabilitation, training or stimulation. Ecological validity is determined by the ability of those tools, instruments or techniques used for cognitive training to be transferred to the patient's daily life. Therefore, the patient may feel that using these techniques or tools in their daily lives can bring them benefits and influence their daily life, "beyond the rehabilitation session". For example: Gradior includes images of real objects which are well-known to the users. These objects are close to those of real life, among others: calculation exercises associated with real adult life (shopping at a supermarket), presents quizzes of daily activities (prepare a specific recipe). New technologies for rehabilitation or cognitive training should consider ecological validity as their main objective otherwise it may not be appropriate for the person with dementia who uses it.

The context is a factor that must be considered in the design of new technologies, that is, it is not enough to delimit the population and its characteristics. For example: a technology may be applied in an urban context but not necessarily in a rural one, due to the difficulties that this context may have in terms of the existence and scope of communication systems (internet connection, presence of devices, etc.).

Consequently, Gradior was developed free of contents. This means that it is easy to change the contents of the software and objects interacting with the person with dementia. In this way, it can be fitted to different environments in an easy way. It is necessary that the exercises and objects have significance to the users.

Keywords**:** Ecological validity, cultural context, effectiveness, GRADIOR

Target group*:* Researchers, developers, dementia people, Policy makers

Type of evidence

Angie Alejandra Diaz Baquero (ESR 15)

RCT GRADIOR

References

None

3.2.2 Technology for meaningful activities

- ***Pay attention to psychological coping when evaluating the impact of technology*** [3.2.2.1]

Guidance: When evaluating the impact of technology on the self-management of people with dementia, it is recommended to also evaluate how people succeed in coping psychologically and emotionally with the consequences of dementia in their daily life.

Explanation and examples: Measures to assess self-management in people with mild dementia evaluate how people compensate for their functional disabilities in daily life, but do not rate how people cope psychologically and emotionally with the consequences of dementia in their daily life (e.g. maintaining positive thinking and relationships), which is also a component of self-management. It is recommended to use additional instruments such as the Jalowiec Coping scale (1984) or the

Qualidem (Ettema et al, 2007) for these aspects when assessing the impact of technology on self-management.

Keywords: Measuring instruments, self-management, social participation, coping

Target group: Researchers and industry evaluating interventions aimed at improving the self-management of people with mild dementia living at home.

Type of evidence
Floriana Mangiaracina (ESR8)
Systematic literature review

References
Floriana Mangiaracina, Franka Meiland, Yvonne Kerkhof, Martin Orrell, Maud Graff, Rose-Marie Dröes Self-management and social participation in community-dwelling people with mild dementia: a review of measuring instruments. International Psychogeriatrics 2019 Feb 6:1-19. doi: 10.1017/S1041610218001709.

- ***Personalized feedback and sustained support for carers using the experience sampling method*** [3.2.2.2] Please replace full text by this adapted recommendation

Guidance: When using smartphone-based digital self-monitoring/experience sampling in carers of people with dementia, consider providing personalized feedback to promote emotional well-being and stimulate the undertaking of more activities they enjoy (e.g. relaxation activities).

Explanation and examples: 'Experience sampling' (ESM)-based smartphone apps can offer solutions to raise awareness of enjoyable activities, strengthen learned coping strategies, and provide (long-term) support in everyday life. The 'Partner in Sight' intervention has been found to decrease perceived stress as well as negative affect, and to increase sense of competence in carers. However, an increase in passive relaxation activities was only achieved with personalized feedback. Long-term support could be achieved by adding additional features, such as booster sessions, micro interventions (short version of the original intervention) or ad-hoc counseling after the main intervention period, through cost-effective and common technologies (smartphone apps, webpages, emails, telephones).

Keywords: Carer coping, experience sampling method, personalized feedback, sustained support, long-term support

Target group: Researchers and clinicians supporting family carers of people with dementia in everyday life with the experience sampling method or designing interventions for caregivers of people with dementia

Type of evidence

Sara Bartels (ESR9)

Follow-up results of the ESM 'Partner in Sight' intervention

References
Bartels, S.L., Van Knippenberg, R.J.M., Viechtbauer, 8., Simons, C.J.P., Ponds, R.W., et al. Intervention Mechanisms of an Experience Sampling Intervention for Spousal Carers of People with Dementia: A Secondary Analysis, Aging & Mental Health (under review)
Bartels, S. L., van Knippenberg, R. J., Köhler, S., Ponds, R. W., Myin-Germeys, I., Verhey, F. R., & de Vugt, M. E. (2019). The necessity for sustainable intervention effects: lessons-learned from an experience sampling intervention for spousal carers of people with dementia. *Aging & Mental Health*, 1-11.

Van Knippenberg, R. J. M., De Vugt, M. E., Ponds, R. W., Myin-Germeys, I., & Verhey, F. R. J. (2018). An experience sampling method intervention for dementia caregivers: results of a randomized controlled trial. *The American Journal of Geriatric Psychiatry*, *26*(12), 1231-1243.

- ***Technical problems should be solved before evaluating the effectiveness of new tablet interventions for people with dementia*** [3.2.2.3]

Guidance: Pilot studies should be conducted to help inform and reduce technical problems and improve accuracy prior to evaluating the effectiveness of new tablet interventions

Explanation and example: Our feasibility study of FindMyApps, a digital programme helping people with dementia to find useful apps for self-management and meaningful activities, showed that when people experienced technical problems they were sometimes not able to provide useful feedback about FindMyApps. For instance, some participants did not use the intervention anymore after they encountered technical problems. Even though a development and pilot study were conducted technical problems still occurred, such as: apps not being available anymore, explanation videos which did not work, personal settings not being saved, the button to go back being difficult to find, and links that did not work. To ensure that technical problems are resolved timely and do not interact with the evaluation of the tablet intervention, it is important to monitor for technical barriers by regular contact with people using the intervention in evaluation studies.

Keywords: FindMyApps, technology, tablet intervention, dementia, self-management, meaningful activities

Target group: Researchers and developers of interventions on tablets for people with mild dementia or mild cognitive impairment

Type of evidence

Kim Beentjes (ESR 8)

Preliminary results of pilot RCT feasibility study (Beentjes, Dröes, Meiland, & Kerkhof, in preparation)

Development study FindMyApps (Kerkhof et al., 2019)

First pilot study FindMyApps (Kerkhof et al., in preparation)

References

Beentjes, K. M., Dröes, R.-M., Meiland, F. J. M., & Kerkhof, Y. J. F. (n.d.). User Evaluation of FindMyApps as a Tablet Intervention for Self-Management and Meaningful Activities (in preparation).

Kerkhof, Y., Kohl, G., Veijer, M., Mangiaracina, F., Bergsma, A., Graff, M., & Dröes, R.-M. (n.d.). Randomised controlled feasibility study of FindMyApps: First evaluation of a tablet-based intervention to promote self-management and meaningful activities in people with mild dementia (in preparation).

Kerkhof, Y., Pelgrum-Keurhorst, M., Mangiaracina, F., Bergsma, A., Vrauwdeunt, G., Graff, M., & Dröes, R.-M. (2019). User-participatory development of FindMyApps; a tool to help people with mild dementia find supportive apps for self-management and meaningful activities. *DIGITAL HEALTH*, *5*, 205520761882294. https://doi.org/10.1177/2055207618822942

- ***Pay attention to contextual, implementation, and mechanisms of impact factors when evaluating technological interventions*** [3.2.2.4]

Guidance: When evaluating the benefits of technological interventions for people with dementia and their carers it is recommended to conduct a process evaluation to understand the possible influence of contextual, implementation and mechanisms of impact factors that may have influenced the intervention outcomes. This will also provide useful information on the conditions for successful implementation of the intervention.

Explanation and example: In our randomised controlled exploratory pilot trial into the FindMyApps programme, a tablet-based selection tool and training to help people with dementia to find apps for better self-management and meaningful activities, we conducted a process evaluation based on the British Medical Research Council's (MRC) guidance for process evaluation of complex interventions (Moore et al., 2015). This framework highlights the possible influence that contextual, implementation and mechanisms of impact factors may have on intervention outcomes. The process evaluation in the FindMyApps study provided very relevant information. For instance, with regard to contextual factors we found that it is important that the person with dementia has someone who is easy to approach and who can help them in case of practical problems, and that a helpdesk is in place for more complicated questions and technical problems. With regard to implementation, it proved important to check if and how much a participant had experience in working with technological devices, and to adapt their training accordingly. Additionally, it proved necessary to personalise the approach to a participants' awareness of their deficits. This was largely because some people with dementia had a more accurate understanding of their abilities and limitations with respect to their deficits than others. With regard to mechanisms of impact, we found that users who regularly practiced and who's caregivers helped them by means of the errorless learning method learned to use FindMyApps easier than users who practiced less and who's caregivers were less active in guiding them by using errorless learning. This information is not only relevant for the outcome evaluation, but also to get insight into conditions for successful implementation of FindMyApps.

Keywords: FindMyApps, technology, tablet intervention, dementia, self-management, meaningful activities, process evaluation, MRC guidance for process evaluation of complex interventions

Target group: Developers planning to design and implement eHealth interventions for caregivers of people with dementia; researchers focusing on eHealth, including tablet interventions; researchers evaluating implementation of technology for people living with dementia

Type of evidence

Kim Beentjes (ESR8)

Process Evaluation of the FindMyApps program (Beentjes et al., submitted)

References

Beentjes, K. M., Kerkhof, Y. J. F., Neal, D. P., Ettema, T. P., Koppelle, M. A., Meiland, F. J. M., … Dröes, R.-M. Process Evaluation of the FindMyApps Program Trial: a Tablet Computer-Based Intervention for Self-Management and Meaningful Activities for People with Dementia (submitted).

Moore, G. F., Audrey, S., Barker, M., Bond, L., Bonell, C., Hardeman, W., … Baird, J. (2015). Process evaluation of complex interventions: Medical Research Council guidance. *BMJ (Online)*, *350*. https://doi.org/10.1136/bmj.h1258

- ***In order to help people with dementia and their carers find dementia-friendly apps for self-management and meaningful activities a selection tool is desirable*** [3.2.2.5]

Guidance: People with dementia can have difficulty finding apps for self-management, meaningful activities and social participation that match their needs, interests and abilities. A tool that helps them find such apps is therefore recommended.

Explanation and example: People with dementia often experience unmet needs in their self-management, meaningful activities and social participation. Apps and technological interventions can potentially help them fulfil these needs and also decrease the burden for caregivers. The last decade many apps have been developed that can support people with dementia in managing daily life, engaging in activities and staying in touch with their social network. However, people with dementia may have difficulty finding apps that match their needs, interests and abilities, FindMyApps is a

selection tool that aims to help people find, download and use apps for self-management and meaningful activities, which are dementia-friendly and meet their needs, interests and capabilities. A randomized controlled exploratory trial into the effectiveness of FindMyApps showed that people with dementia who were offered this tool more frequently downloaded and used apps for self-management and meaningful activities than people who did not have access to this tool. This confirmed the usefulness of the tool. Therefore, a tool such as FindMyApps is recommended for people with dementia and their caregivers to ease the search for suitable apps.

Keywords: FindMyApps, technology, tablet intervention, dementia, self-management, meaningful activities, social participation, caregiver burden

Target group: People living with dementia, family carers, Professional carers, clinicians, welfare professionals, who promote the use of technology to people with cognitive impairments and dementia, developers planning to design and implement eHealth interventions for caregivers of people with dementia; researchers focusing on eHealth, including tablet interventions; researchers evaluating implementation of technology for people living with dementia

Type of evidence

Pilot feasibility study (Kerkhof et al., 2020)

Exploratory pilot trial (ESR8, Beentjes et al., submitted)

References

Beentjes, K. M., Neal, D. P., Kerkhof, Y. J. F., Broeder, C., Moeridjan, Z. D. J., Ettema, T. P., … Dröes, R.-M. Impact of the FindMyApps Program on People with Mild Cognitive Impairment or Dementia and their Caregivers; an Exploratory Randomized Controlled Trial (submitted).

Kerkhof, Y. J. F., Kohl, G., Veijer, M., Mangiaracina, F., Bergsma, A., Graff, M., & Dröes, R.-M. (2020). Randomised controlled feasibility study of FindMyApps: First evaluation of a tablet-based intervention to promote self-management and meaningful activities in people with mild dementia. *Disability and Rehabilitation: Assistive Technology*, Jun 19; 1-15. doi: 10.1080/17483107.2020.1765420

- ***Consider offering Exergaming as meaningful activity in day care centres for people with dementia*** [3.2.2.6]

Guidance: Meaningful activities for people with dementia have proven value for their social health. Exergaming is an innovative way of exercising in a gaming environment. This movement activity may be experienced as meaningful by the persons with dementia, is considered fun to do and has benefits for them as well as for their relatives.

Explanation and Examples: Exergaming was compared to usual activities in a cluster Randomized Controlled Trial among day care centres for people with dementia. In this study exergaming consisted of interactive cycling using a stationary bicycle (i.e. home trainer) connected to a screen. The screen displays various routes which the participant can select and this mimics the experience of cycling outside, thus offering simultaneous physical and cognitive stimulation. Positive effects in favour of exergaming were found on cognition and social functioning in people with dementia and on carers' distress related to their relative's neuropsychiatric symptoms and the carers' sense of competence. Furthermore, persons with dementia, family carers and staff were satisfied with the exergaming intervention. Exergaming can thus be considered a meaningful activity, and a good alternative when outdoor physical activities are not possible because of weather conditions or safety risks (fall incidents, wandering).

Keywords: Exergaming; effectiveness; meaningful activities, carer distress, carer sense of competence

Target group: Care organizations and professionals; Volunteers, employees and managers of day-care centres; People living with dementia; family carers

Type of evidence

Joeke van Santen (ESR7)

Randomized Clinical Trial (RCT)

References

Van Santen, J., Dröes, R. M., Twisk, J. W., Henkemans, O. A. B., van Straten, A., & Meiland, F. J. (2020). Effects of Exergaming on Cognitive and Social Functioning of People with Dementia: A Randomized Controlled Trial. Journal of the American Medical Directors Association, ISSN 1525-8610, https://doi.org/10.1016/j.jamda.2020.04.018.

- ***Consider potential benefits in family carers when persons with dementia use technology*** [3.2.2.7]

Guidance: When persons with dementia use technology for meaningful activities this may not only impact their own quality of life but also the well-being of their (primary) family carers.

Explanation and Examples: In the exergaming project, people with dementia were engaged in an exergaming activity or activities as usual in day care centres. We studied the effects on persons with dementia as well as on their family carers. In carers, positive effects were found in favour of the exergaming intervention, i.e. on the carers' distress related to their relative's neuropsychiatric symptoms and the carers' sense of competence (after a three months intervention period).

Keywords: Exergaming; dementia; carers' well-being; effectiveness

Target group: Researchers, Care organizations and professionals, Volunteers, employees and managers of day-care centres

Type of evidence

Joeke van Santen (ESR7),

Randomized Clinical Trial (RCT)

References;

Van Santen, J., Dröes, R. M., Twisk, J. W., Henkemans, O. A. B., van Straten, A., & Meiland, F. J. (2020). Effects of Exergaming on Cognitive and Social Functioning of People with Dementia: A Randomized Controlled Trial. Journal of the American Medical Directors Association, ISSN 1525-8610, https://doi.org/10.1016/j.jamda.2020.04.018.

- ***Take actions to alleviate carers' involvement in eHealth research*** [3.2.2.8]

Guidance: Effectiveness research into eHealth interventions for community dwelling persons with dementia, often rely on information from and involvement of family carers. As they may already be (over)burdened by their caregiver tasks, participation in effectiveness research may be denied. It will be helpful to think of methods to support informal carers to participate in research.

Explanation and Examples:

In the exergaming project, a bottleneck of participation of couples into the effectiveness study, was the refusal of family carers to participate because they were already (over)burdened. To accommodate caregivers they were offered support in filling out questionnaires and a little present to thank them for their contribution. This seems to have added slightly in the number of participants in our study. Other strategies to alleviate burden of participation in eHealth research may also be considered, like data logging or ecological momentary assessments.

Keywords: Exergaming; carers' well-being; effectiveness, e-Health

Target group: Researchers

Type of evidence

Joeke van Santen (ESR7),

Randomized Clinical Trial (RCT)

References

Van Santen, J., Dröes, R. M., Twisk, J. W., Henkemans, O. A. B., van Straten, A., & Meiland, F. J. (2020). Effects of Exergaming on Cognitive and Social Functioning of People with Dementia: A Randomized Controlled Trial. Journal of the American Medical Directors Association, ISSN 1525-8610, https://doi.org/10.1016/j.jamda.2020.04.018.

Van Santen, J., Dröes, R.M., Bosmans, J.E. Blanson Henkemans, O.A. Van Bommel, S., Hakvoort, E., Valk, R., Scholten, C., Wiersinga, J., Van Straten, A., Meiland, F. (2019). The (cost-) effectiveness of exergaming in people living with dementia and their informal caregivers: protocol for a randomized controlled trial. BMC Geriatrics 19:50, 2019. 10.1186/s12877-019-1062-x

- ***Consider cost-effectiveness research into eHealth interventions*** [3.2.2.9]

Guidance: Methodological sound effectiveness research into eHealth interventions for community dwelling persons with dementia is growing. To determine the added value of such interventions, it is important to look at their effects *and* costs. This gives a balanced picture and helps policy makers to make the right decisions when deploying eHealth interventions.

Explanation and Examples: Positive effects were found of exergaming compared to usual activities in day care centres. The provision of exergaming brought additional costs related to the equipment (purchase and maintenance) and staff involvement. Compared to non-technology based interventions, especially equipment costs can be a cost driver. In the exergaming study, the participating organisations received a list of potential funders for the equipment to be used, and various funding organisations (charitable organizations) were willing to pay for it. In some cases this helped to participate in the study. Taking into account the intervention costs may help day care centres to balance the positive effects of using the eHealth interventions (for people with dementia and their carers) against the long-term costs (to be covered by own funding or external funding). This will promote a well-informed implementation and securing of the eHealth intervention.

Keywords: Exergaming; implementation; cost-effectiveness

Target group: Researchers; Care organizations and professionals; Volunteers, employees and managers of day-care centres

Type of evidence

Joeke van Santen (ESR7), RCT

References:

Van Santen, J., Dröes, R.M., Bosmans, J.E. Blanson Henkemans, O.A. Van Bommel, S., Hakvoort, E., Valk, R., Scholten, C., Wiersinga, J., Van Straten, A., Meiland, F. (2019). The (cost-) effectiveness of exergaming in people living with dementia and their informal caregivers: protocol for a randomized controlled trial. BMC Geriatrics 19:50, 2019.

Van Santen, J., et al. Cost-effectiveness of exergaming. (in preparation)

3.2.3. Health care technology

- ***The need for more high-quality research into development, implementation and evaluation of complex health technologies*** [3.2.3.1]

Guidance: Better research using high-quality study designs is needed to develop, implement and evaluate complex palliative care interventions (targeting whole-system change) for people with dementia living and dying at home.

Explanation: Our systematic review found that the existing evidence base remains insufficient and is generally too weak to robustly assess the effects of palliative care interventions for people with dementia living at home.

Keywords: Complex health technology, complex intervention, palliative care

Target group: Researchers, as well as policymakers to support the conduct of this kind of palliative care research

Type of evidence

Rose Miranda (ESR11)

Systematic review of palliative care interventions for people with dementia living at home

References

Miranda R, Bunn F, Lynch J, Van den Block L, Goodman C. Palliative care for people with dementia living at home: A systematic review of interventions. Palliat Med. 2019; 33(7):726-742.

- ***Call for research on online training programs for carers' mechanisms of change to increase the quality of online training for families of people with dementia*** [3.2.3.2]

Guidance: Evaluations of the effectiveness of internet training programs should explore mechanisms of change and aspects of the intervention design, such as reliability, the type of device used and modality of the intervention.

Explanation and example: The systematic review (Egan et al 2018) of internet training support for familiy carers lacks detail about potential factors which may influence the effectiveness of online programs (i.e. type of connectivity, development of the intervention, usability, etc.). The quality of individual studies selected for the systematic review was limited as more than 50% of the studies showed incomplete data reporting, and 25% showed a selective reporting of outcomes according to the risk of bias assessment performed making the generalization of the results difficult. However, the systematic review reported improvements on carer's mental health outcomes by internet training.

Keywords: carer training programmes, mental health, mediators and moderators

Target group: Researchers

Type of evidence

Ángel C. Pinto Bruno (ESR14)
Systematic literature review

References

Egan, K. J., Pinto-Bruno, A. C., Bighelli, I., Berg-Weger, M., van Straten, A., Albanese, E., & Pot, A. M. (2018). Online Training and Support Programs Designed to Improve Mental Health and Reduce Burden Among Caregivers of People With Dementia: A Systematic Review. J Am Med Dir Assoc, 19(3), 200-206.e201. doi:10.1016/j.jamda.2017.10.023

- ***Further implementation of effective Internet-based carer training programmes recommended*** [3.2.3.3]

Guidance: Internet training programmes for family carers have potential to increase carers' well-being, to reduce distress, depression and anxiety symptoms and to increase knowledge skills.

Explanation and example: A systematic review (Egan et al. 2018) about online training programmes for family carers reported on two studies in which improvements in depression symptoms were demonstrated, two studies with overall improvements in anxiety and two studies showing reduction of stress symptoms. Good examples of informative websites and internet training programmes for family carers are 'Mastery over Dementia', iSupport, 'iCARE: Stress management eTraining programme' and the STAR E-Learning course.

Keywords: Carer Internet training programs, carers' well-being, carer's mental health, Mastery over Dementia, iSupport, iCARE, STAR E-Learning

Target group: Policy-makers, health care providers and patient organizations.

Type of evidence
Ángel C. Pinto Bruno (ESR14)
Systematic literature review

References
Egan, K. J., Pinto-Bruno, A. C., Bighelli, I., Berg-Weger, M., van Straten, A., Albanese, E., & Pot, A. M. (2018). Online Training and Support Programs Designed to Improve Mental Health and Reduce Burden Among Caregivers of People With Dementia: A Systematic Review. J Am Med Dir Assoc, 19(3), 200-206.e201. doi:10.1016/j.jamda.2017.10.023

- ***Call for research on moderators of online training programs for carers' of people with dementia*** [3.2.3.4]

Guidance: Analyses of the moderation effect of demographic characteristic of the carers and other characteristics of the person with dementia on the internet training programs outcomes should be encouraged.

Explanation and example: Several studies have been done to find moderators of effects of online training programs for carers of people with dementia. Some studies have demonstrated that some programs were more effective for certain subgroups of carers. However, in our analyses we could not replicate these findings. Our analyses on the effect of age, gender, level of education, relationship with the person with dementia, functional status of the person with dementia and frequency of appearance of challenging behaviour suggests that the program is equally effective for all the subgroups analysed. More research is needed before we have definitive answers. A better understanding of moderators of carers' training programs could lead to better tailoring of programs based on the specific characteristic of the carer.

Keywords: carer training programmes, mental health, mediators and moderators

Target group: Researchers

Type of evidence

Ángel C. Pinto Bruno (ESR14)

Preliminary results of moderation analyses 'Mastery over dementia'

References
Pinto-Bruno, A. C., Blom, M., Kleiboer, A., Dröes, R-M., van Straten, A., & Pot, A. M. (In process). Moderation analyses of an online support program for carers of people with dementia.

- ***Consider the factors that potentially determine adherence to a computer-based cognitive rehabilitation program to generate corresponding adaptations*** [3.2.3.5]

Guidance: When evaluating adherence of people with dementia to a computer-based cognitive rehabilitation program, sociodemographic, cognitive, and psychological factors should be taken into account.

Explanation and examples: When we consider evaluating the adherence of people with dementia to a computer-based program for cognitive rehabilitation, it is important to consider sociodemographic (age, sex, educational level), cognitive (memory, attention, executive function) and psychological factors (level of motivation, expectations, previous computer use). For this purpose, a periodic evaluation will help to evaluate these factors and their relation to the amount and the time that a person spends in using a computer program for cognitive rehabilitation. In this way, significant modifications could be made to the program, so that the program meets the needs of people with dementia.

Keywords: dementia, rehabilitation, software, computer-based program, cognition, psychology.

Target group: Researchers, people with dementia, policy makers

Type of evidence

Angie Alejandra Diaz Baquero (ESR 15)
Study into adherence profile in people with mild cognitive impairment and mild dementia in the computer-based cognitive training program "GRADIOR"

References

Diaz Baquero, A. A., Perea Bartolomé, M. V., Toribio-Guzmán, J. M., Parra Vidales, E., Bueno Aguado, Y., Franco-Martin, M. A., van der Roest, H. G. Adherence profile in people with mild cognitive impairment and mild dementia in a computer-based cognitive training program "GRADIOR" (Currently in preparation).

3.3 Implementation of technology in dementia care: facilitators & barriers

3.3.1. Technology in everyday life

- ***Involve diverse groups of stakeholders and consider existing contexts when designing, developing and using Everyday Technologies*** [3.3.1.1]

Guidance: Technology companies and developers should involve more diverse groups of people living with dementia or caring for people with dementia, in all stages of design, development and implementation of technologies. They should also consider existing contexts before introducing them.

Explanation and Examples: Consultations explored the ways in which Everyday Technology can be both an enabler and disabler, among people living with dementia, or providing care for people with dementia, from minority and migrant communities within the EU (Germany and Greece). The consultations highlighted the need for more contextually-relevant Everyday Technologies. This includes consideration of existing contexts before introducing technologies or technology interventions e.g. eHealth, finance or social apps. Consultees reported the need to identify existing levels of access and ability to use Everyday Technologies (e.g. possession of technological devices and digital literacy etc.) as well as access to infrastructures to support their use (e.g. internet connection, battery charging

facilities and face-to-face support). Everyday Technology use is influenced by contextual and cultural factors. Technology companies and developers need to involve a more diverse group of people living with dementia or caring for people with dementia (e.g. from different cultural and socio-economic backgrounds, urban and rural environments etc.) throughout all stages of technology development.

Keywords: Every day technology; Dementia; Activities of Daily Living; Human Rights; Minority Groups; Social Isolation; Health Literacy; Health Services Accessibility

Target group:Technology developers and providers, NGOs and Think Tanks.

Type of evidence

Sophie Gaber (ESR3)

Multilevel stakeholder consultations & literature review.

References

Findings presented at The Health Inequalities Research Network (HERON) Conference, London, UK, 2018. [How do Contextual Factors and Everyday Technologies Shape Inequalities in Participation among Ageing Communities Living with Health-related Vulnerabilities?]

Gaber, S. N., Nygård, L., Brorsson, A., Kottorp, A., Charlesworth, G., Wallcook, S., Malinowsky, C. (2020). Social Participation in Relation to Technology Use and Social Deprivation: A Mixed Methods Study Among Older People with and without Dementia. International Journal of Environmental Research and Public Health, 17, 4022. https://www.mdpi.com/1660-4601/17/11/4022#

- ***Consider involving occupational therapists to enable people with dementia to use everyday technology*** [3.3.1.2.]

Guidance: Consider involving occupational therapists in providing interventions that enable people with dementia to use the everyday information and communication technologies they have.

Explanation and Examples: A standardized questionnaire mapped how many Everyday Information & Communication Technologies (EICT) (maximum 31) were relevant to 35 people living with dementia and 34 people with no known cognitive impairment in Sweden. A relevant EICT is one that is being used, or has been used in the past, or is planned for use in future. The median amount of relevant EICTs was shown to be 11 in the group without dementia, and 7 (significantly less) in the group with dementia. Each person also rated their ability to use (maximum 90) relevant Everyday Technologies (ETs) on a 5 step rating scale. This data was analysed (in a Rasch model) to produce a score for each person's *ability to use ET*. When we compared ability to use ET with amount of relevant ETs in each group, the more EICTs a person counts as relevant, the higher was their ability to use ET. This pattern was only found in the group of people with dementia, and not the group without. The amount of relevant EICTs is affected by a person's ability to use them. So some people may need support to identify the usefulness and possibility to use an EICT function that they have access to.

Keywords: Occupational therapy, everyday life, information communication technology, activities of daily living.

Target group: Health and social care planners, digital inclusion planners, commissioners, policy makers, occupational therapy educators and organisations

Type of evidence

Sarah Wallcook (ESR4)

Cross sectional quantitative study with literature review

References

Wallcook, S., Malinowsky, C., Kottorp, A. & Nygård, L. 'The use of Everyday Information Communication Technologies in the lives of older adults living with and without dementia in Sweden', Assistive Technology, [https://10.1080/10400435.2019.1644685]

- ***Provide non-ICT (Information Communication Technology) options for people with dementia who need it*** [3.3.1.3]

Guidance: To avoid excluding some people with dementia, service developers should provide alternative non-ICT options when they deliver services and interventions that rely on smartphones, tablets and computers.

Explanation and Examples: A standardized questionnaire mapped how many Everyday Information & Communication Technologies (EICTs) (maximum 31) were relevant to 35 people living with dementia and 34 people with no known cognitive impairment in Sweden. In the same questionnaire, each person also rated their perceived their ability to use (maximum 90) relevant ETs on a 5 step rating scale. A relevant EICT is one that is being used, or has been used in the past, or is planned for use in future. This data was analysed (in a Rasch model) to produce a score for each person's *ability to use ET***,** and a *challenge measure* for each of the 31 EICTs to show how difficult or easy they were to use compared to each other. EICTs on smartphones and tablets were not relevant for a high proportion of both groups. Combined with a lower ability to use ET, particularly for people in the group with dementia, and high challenge measures for computer and automated telephone service functions, this could mean some people cannot access EICT-based services and interventions on computerized devices. However, the landline telephone was easiest to use and relevant to the majority of both groups, so this, together with face-to-face options could provide viable alternatives.

The study is currently under review and will be available under open access.

Keywords: Policies, services, information communication technology

Target group: Policy makers, service developers

Type of evidence
Sarah Wallcook (ESR4)
Cross sectional quantitative study with literature review

References
Wallcook, S., Malinowsky, C., Kottorp, A. & Nygård, L. 'The use of Everyday Information Communication Technologies in the lives of older adults living with and without dementia in Sweden', Assistive Technology, [https://10.1080/10400435.2019.1644685]

3.3.2. Technology for meaningful activities

- ***Ensure multiple employees are responsible for exergaming to ensure successful implementation of this technology*** [3.3.2.1]

Guidance: Exergaming in day care centres can be implemented more successfully by making more than one employee responsible for it.

Explanation and examples: We have asked day-care centres for people living with dementia, which factors were important for successful implementation of Exergaming. Sometimes, only one person in the day-care centre was responsible for the Exergaming activity. If this person was not at the day-care centre, because he/she was ill or left for another job, the Exergaming activity often was forgotten.

Keywords: Exergaming, implementation, staff

Target group: Researchers and industry evaluating implementation of technology for people living with dementia, volunteers, employees and managers of day-care centres, management of care

organisations, professional carers, clinicians, who promote the use of technology for people living with dementia.

Type of evidence
Joeke van der Molen (ESR7)

Preliminary results of the process analysis

References
Joeke van Santen, Rose-Marie Dröes, Marian Schoone, Olivier A. Blanson Henkemans, Judith E. Bosmans, Sjef van Bommel, Esther Hakvoort, Ronald Valk, Carla Scholten, Joris Wiersinga, Marjolein Smit, Franka Meiland (2019). FACTSHEET Exergaming for people living with dementia: can you move along? Recommendations to promote successful implementation [in Dutch: FACTSHEET Exergaming voor mensen met dementie: beweeg je mee? Adviezen ter bevordering van succesvolle implementatie].

Scientific publication (in English) will follow in 2020.

- ***Ensure the support from the management of care organisations to promote successful implementation of exergaming*** [3.3.2.2]

Guidance: Employees of care organisations should be supported by the management in their responsibility for Exergaming as a new activity. Managers should be actively engaged in Exergaming and be kept updated on any developments with regard to Exergaming (i.e. positive experiences of people with dementia practising Exergaming, any potential issues with the activity).

Explanation and examples: We have asked day-care centres for people living with dementia, which factors played a role in successful implementation of Exergaming. The staff of these day-care centres sometimes did not feel supported by the management in supervising and implementing the Exergaming activity. This made it less likely for them to implement it.

Keywords: Exergaming, implementation, management, support.

Target group: Researchers and industry evaluating implementation of technology for people living with dementia, volunteers, employees and managers of day-care centres, management of care organisations, professional carers, clinicians, who promote the use of technology for people living with dementia.

Type of evidence
Joeke van der Molen (ESR7)

Preliminary results of the process analysis

References
Joeke van Santen, Rose-Marie Dröes, Marian Schoone, Olivier A. Blanson Henkemans, Judith E. Bosmans, Sjef van Bommel, Esther Hakvoort, Ronald Valk, Carla Scholten, Joris Wiersinga, Marjolein Smit, Franka Meiland (2019). FACTSHEET Exergaming for people living with dementia: can you move along? Recommendations to promote successful implementation [in Dutch: FACTSHEET Exergaming voor mensen met dementie: beweeg je mee? Adviezen ter bevordering van succesvolle implementatie].

Scientific publication (in English) will follow in 2020.

- ***Focus on aspects that are of interest to people with dementia when introducing a new technology***. [3.3.2.3]

Guidance: Introduce new application (app) technology to a person with dementia by focusing on aspects that are likely to encourage their interest, such as family photographs, video calls with friends and family, music, games, or art applications.

Evidence: Review of the literature on the use of touchscreen technology by people with dementia and carers.

Keywords: Touchscreen technology; applications; entertainment.

Target group: Family and formal carers, and policy-makers.

Type of evidence

Aline Cavalcanti Barroso (ESR6)

Literature review and proof of principle study

References
Part of Academinc thesis in preparation

- ***Ensure free access to the internet for all residents in care homes*** [3.3.2.4]

Guidance: Internet should be freely available in care homes so residents with and without dementia can have access to online resources (e.g.social media, entertainment, information).

Evidence: The multi-country survey indicates that it is not common for the residents to have access to the internet in care homes, with the internet use restricted to the staff. This means that many social and leisure activities based on ICT will be inaccessible for people with dementia, depriving them of enjoyable, meaningful activities and social networks.

Keywords: Care homes; internet access

Target group: Care home and nursing home providers and policy-makers.

Type of evidence

Aline Cavalcanti Barroso (ESR 6)

Multi-country survey

References
Part of Academinc thesis in preparation

- ***Explore and consult with the eHealth context to facilitate implementation of eHealth interventions*** [3.3.2.5]

Guidance: To develop an eHealth intervention for caregivers of people with dementia that will be used in practice, developers should investigate the needs of the target population (people with dementia and their caregivers), and the needs of the people who will be implementing these interventions after a trial phase (such as case managers, hospital workers, volunteers or professionals associated with advocacy groups).

Explanation and examples: A systematic search was conducted into the implementation of studies including the terms ‘dementia’, ‘eHealth’, and ‘caregivers’. 2524 abstracts and 122 full texts were read, resulting in 46 studies meeting all criteria. Containing 204 statements on implementation. Most implementation statements could be grouped into 2 main themes: ‘Determinants associated with the eHealth intervention’ and ‘Determinants associated with the caregiver’. Very few statements were in the themes ‘Determinants associated with the implementing organization’ and ‘Determinants associated with the wider context’. Absence of knowledge on the contextual environment creates

significant difficulties for health system planners and implementers who aim to translate these interventions into practice.

Keywords: eHealth, dementia, caregivers, implementation.

Target group: Developers planning to design and implement eHealth interventions for caregivers of people with dementia

Type of evidence

Hannah Christie (ESR10), Sara Bartels (ESR9)

Systematic review

References

Christie, H. L., Bartels, S. L., Boots, L. M., Tange, H. J., Verhey, F. R., & de Vugt, M. E. (2018). A systematic review on the implementation of eHealth interventions for informal caregivers of people with dementia.*Internet interventions*, *13*, 51-59.

- ***Start making eHealth financing and business plans at the start of the development phase*** [3.3.2.6]

Guidance: To ensure that the eHealth interventions for caregivers of people with dementia will continue to be available, supported, updated and compatible with changing software and hardware requirements, financing and business plans should be developed from the beginning.

Explanation and examples: A mixed-methods study followed up on the 12 publications included in Boots et al.'s (2014) widely cited systematic review on eHealth interventions for informal caregivers of people with dementia, to explore implementation into practice. Publicly available online information, implementation readiness (ImpRess checklist scores), and survey responses were assessed. The majority of survey respondents identified commercialization and having a business plan as facilitators to implementation. There was little evidence for any of the 12 applications being put into practice.

Keywords: eHealth, dementia, caregivers, implementation, business models

Target group: Developers planning to design and implement eHealth interventions for caregivers of people with dementia

Type of evidence

Hannah Christie (ESR10)

Follow-up study

References

Christie, H. L., Bartels, S. L., Boots, L. M., Tange, H. J., Verhey, F. R., & de Vugt, M. E. (2018). A systematic review on the implementation of eHealth interventions for informal caregivers of people with dementia. Internet interventions, 13, 51-59.

- ***Implementation of technology in dementia care: facilitators & barriers*** [3.3.2.7]

Guidance: Ensure new technology is compatible with a range of relevant platforms to promote implementation.

Explanation and examples: Findings from the feasibility trial showed that people with dementia use a range of devices with various software versions (e.g. smartphones, touch-screen tablets, and personal computers) to access apps and other services. New technology which aims to be compatible with these different devices, can lead to increased uptake and may contribute to successful implementation.

Keywords: accessibility, implementation, dementia, technology, device.

Target group: technology developers, UX designers, researchers developing technology.

Type of evidence

Harleen Rai, ESR 5

Results from a feasibility randomised controlled trial (RCT).

References

Rai, H. K., Schneider, J., & Orrell, M. A feasibility study of a randomised control trial to examine the individual Cognitive Stimulation Therapy (iCST) application for people with dementia (in process of submission).

3.3.3. Health care technology

- ***Increase family carers' awareness about the use and benefits of online interventions*** [3.3.3.1]

Guidance: People involved in the provision of support to family carers, such as health professionals, patient organizations, should inform them about the potential benefits derived from the use of online interventions and actively promote their use.

Explanation and example: Despite the potential benefits of Internet carer support and training programmes, family carers are not always informed about the existence and use of online alternatives to traditional face-to-face support programmes. Extra attention should be paid to inform and motivate family carers to start and continue using Internet training programmes, especially in countries where the use of the Internet for health related purposes is not common yet. India trial (Mehta et al. 2018) Rrecruitment and adherence for a randomized controlled trial of an online support programme in India (Mehta et al. 2018) turned out to be challenging as most of the family carers were not accustomed to access to the Internet for health-related reasons.

Keywords: Online intervention, unpaid carers, informal carers.

Target group: Researchers, policy-makers, healthcare providers and patient organizations

Type of evidence

Ángel C. Pinto Bruno (ESR14)

RCT India

Systematic review

References

Egan, K. J., Pinto-Bruno, A. C., Bighelli, I., Berg-Weger, M., van Straten, A., Albanese, E., & Pot, A. M. (2018). Online Training and Support Programs Designed to Improve Mental Health and Reduce Burden Among Caregivers of People With Dementia: A Systematic Review. J Am Med Dir Assoc, 19(3), 200-206.e201. doi:10.1016/j.jamda.2017.10.023

Mehta, K. M., Gallagher-Thompson, D., Varghese, M., Loganathan, S., Baruah, U., Seeher, K., . . . Pot, A. M. (2018). iSupport, an online training and support program for caregivers of people with dementia: study protocol for a randomized controlled trial in India. Trials, 19(1), 271. doi:10.1186/s13063-018-2604-9

- ***Involve all users during the development process of complex health technologies*** [3.3.3.2]

Guidance: To make complex health technologies more useful and applicable for users, it is crucial to involve all users, including staff, in the early phase of development of these interventions.

Explanation: In developing complex health technologies that would be delivered by nursing staff to people with dementia, it is important to involve the nursing staff themselves in the early phase of development of such technologies. In doing so, complex health technologies can be more useful and applicable for the nursing staff.

Keywords: Complex health technologies, involvement of users.

Target group: Researchers, nursing home managers, policy-makers

Type of evidence

Rose Miranda (ESR11)

Process evaluation of cluster RCT

References

Publication in preparation

- ***Make complex health technologies flexible for tailoring to local contexts*** [3.3.3.3]

Guidance: To better implement complex health technologies in complex settings such as nursing homes, it is important to make these health technologies flexible to existing situations and processes including: the specific context of the nursing homes; the needs and roles of nursing staff; and the timing and order of implementation of different intervention components (e.g. training on specific subjects).

Explanation: Nursing homes may have their own culture and own ways of working. Hence, complex health technologies should be able to fit in this context. The nursing staff may also have varying levels of knowledge and skills and complex health technologies should be flexible for tailoring so that it can be used based on the capabilities of all nursing staff. The timing and order of implementing components of the complex health technologies may not be applicable in all situations, so interventions should be flexible for nursing staff to decide when to implement certain complex health technology components.

Keywords: Tailored interventions, complex health technology.

Target group: Researchers, nursing home managers, policy-makers

Type of evidence
Rose Miranda (ESR 11)
Process evaluation of cluster RCT
Annelien van Dael (ESR 12)
Feasibility study; preliminary results of process evaluation of cluster RCT

References
Publication in preparation

- ***Ensure management engagement when implementing complex health technologies*** [3.3.3.4]

Guidance: Consider active engagement of nursing home management as a crucial component when designing complex health care technologies for nursing homes. Their commitment to the project's

success will help to ensure staff have sufficient time and other resources to participate in the new programme.

Explanation: A lack of time is one of the most important barriers for implementing advance care planning (ACP) in nursing homes. Therefore, it is crucial staff gets enough time to engage and work with the intervention in order to properly implement it. When staff is given time to spend on intervention-related tasks, instead of having to spend this time on other tasks, this will increase their ownership of the intervention.

Example: In the ACP$^+$ programme all nursing home managers signed a contract stating they would allow their staff to spend time on the intervention. Training sessions were held during working hours and staff got paid while attending these sessions.

Keywords: Advance care planning; management engagement; implementation

Target group: Researchers, policy makers

Type of evidence
Annelien van Dael (ESR12)
Feasibility study; preliminary results of process evaluation of cluster RCT

References
Publication in preparation

- ***Target multiple levels when implementing complex health technology in a specific context*** [3.3.3.5]

Guidance: When implementing Advance care planning (ACP) as a complex health technology in a complex setting such as a nursing home, multiple levels should be targeted, including management, nurses, care staff, volunteers, visiting or residing physicians, families, cleaning or other staff.

Explanation: The implementation process will have a higher chance of succeeding when multiple levels are targeted within the nursing home. Colleagues in the nursing home can help each other to implement the intervention, creating a positive and open environment to learn and develop new skills and deliver the best care possible. In this way the intervention can produce a shift in working culture and attitudes and deliver sustainable change.

Example: The ACP$^+$ intervention targeted not only the (head) nurses, but also other care staff and cleaning, kitchen and maintenance staff. Also, engagement of the management was required for participation in the trial. A few highly motivated people were extensively trained in conducting ACP conversations and this knowledge was past onwards to colleagues via internal training sessions. In this way the whole nursing home was involved in the intervention, leading to greater participation of all nursing home employees.

Keywords: Complex interventions, implementation, complex health care technology

Target group: Researchers and care organizations and professionals

Type of evidence
Annelien van Dael (ESR12)
Development of advance care planning intervention (based on review, theory of change workshops and feasibility testing)

References
Publication in preparation

- ***Accessibility to technology should be ensured for all people with dementia*** [3.3.3.6]

Guidance: Cognitive rehabilitation technology should be accessible physically and in terms of cost, taking into account the mobility problems and the low income of many older people with dementia. For increasing the accessibility of technology it is necessary to deliver it with low cost. Consequently, or should be promoted financed licenses for people with dementia.

Explanation: Programs for cognitive rehabilitation for people with dementia may be inaccessible due to high costs or difficulty getting access to the location that provides the program because of mobility issues. Technology associated with cognitive rehabilitation or stimulation should be accessible to all those who could benefit from it. Technologies for cognitive rehabilitation should be accessible at home, especially in people living in rural areas or with mobility problems who are not able to travel to a center to perform cognitive rehabilitation.

Keywords: Accessibility, economic constraints, physical impairment.

Target group: Researchers, policy-makers, health technology assessment, people with dementia

Type of evidence

Angie Alejandra Diaz ESR 15

RCT Gradior Validation

References

Fumero Vargas, G., Franco Martin, M.A., Perea Bartolomé, M.V. (2009). Start-up and study of usability of a computer cognitive rehabilitation program "Gradior" in the treatment of neurocognitive deficits (Doctoral), Department of basic psychology, psychobiology and methodology of behavioural sciences- Faculty of psychology.

- ***Take into account the level of cognitive impairment when implementing technologies*** [3.3.3.7]

Guidance: The level of cognitive impairment must be taken into account in the design of technology because people with severe dementia have different needs vs. mild dementia.

Explanation & Example: People with severe cognitive impairment will have more problems learning to use different and new devices. They need more explanation and a longer learning time, due to limited cognitive capacities. For example, the clinical experience with Gradior shows that people with moderate and severe dementia should have the therapist as a permanent guide. According to this, Gradior possibly would have to adopt new systems and tools to become effective in people with moderate and severe dementia, and in turn, allow a level of autonomy of the person with dementia who uses this technology. Indeed, the help of a therapist in the first steps of applying a technological-based therapy is strategic for implementing and accepting the approach.

Keywords: Grade of cognitive impairment, implementation, usability.

Target group: Researchers, developers, dementia people, policy-makers

Type of evidence
Angie Alejandra Diaz ESR 15
RCT Gradior Validation

References

Fumero Vargas, G., Franco Martin, M.A., Perea Bartolomé, M.V. (2009). Start-up and study of usability of a computer cognitive rehabilitation program "Gradior" in the treatment of neurocognitive

deficits (Doctoral), Department of basic psychology, psychobiology and methodology of behavioural sciences- Faculty of psychology.

Toribio Guzmán, J. M., Franco Martin, M.A., Perea Bartolomé, M.V. (2015). Long Lasting Memories, an integrated ICT platform against age-related cognitive decline: usability study. (Doctoral), Department of basic psychology, psychobiology and methodology of behavioural sciences - Faculty of psychology.

- ***Nursing home managers should ensure the appropriate conditions for implementation of EPR systems*** [3.3.3.8]

Guidance: Issues such as access to the EPR system, appropriate training and system development and support should all be considered by nursing homes before and during the implementation of EPR systems.

Explanation & Examples: Access or non-access to various parts of the EPR system should be discussed and put in place. For instance, management should consider whether auxiliary staff should be allowed to access medical information, such as dementia diagnosis, and whether this would consequently entail training in the field of dementia. Appropriate training in the EPR system according to individual staff needs is also required, as some staff may be more experienced in the use of technology than others. Training 'on the job' was found to be preferred by many over classroom-based teaching. Finally, software developers should consider working alongside nursing homes during the design of EPR systems in order to ensure software is appropriate for their needs. Developers should continue to be involved in improving the EPR following implementation, as part of an iterative cycle.

Keywords: electronic patient record; implementation; nursing home; software development; training

Target group: Developers of EPR, Nursing home management

Type of evidence

Kate Shiells (ESR 13)

Qualitative study

References

Shiells, K., Diaz Baquero, A. A., Stepankova, O., & Holmerova, I. (2020). Staff perspectives on the usability of electronic patient records for planning and delivering dementia care in nursing homes: a multiple case study. BMC Medical Informatics and Decision Making, 20, 159. https://doi.org/10.1186/s12911-020-01160-8

- ***Ensure the involvement of a dedicated trainer throughout the entire implementation of a complex health technology in nursing/care homes or other institutional settings*** [3.3.3.9]

Guidance: To improve the implementation of complex health technologies focused on training healthcare professionals in institutional settings, it is important to ensure the involvement of a dedicated trainer throughout the entire implementation process.

Explanation: For complex health technologies focused on training healthcare professionals, trainers play a crucial role. Trainers should be able to spend dedicated time to deliver the trainings in a specific facility or institution (e.g. nursing home). Hence, they should preferably be paid by a third party or, if paid by the institution, mechanisms should be in place to ensure trainers have dedicated time and training can be delivered. Ensuring the continuous and long-term involvement of such trainers (e.g. via regional collaborations) could facilitate better implementation of complex health technologies, as

timing of the trainings can then be tailored to the needs in a specific context and to the learning needs of the professionals in this context.

Keywords: Complex health technology, involvement of dedicated trainers

Target group: Researchers, developers of complex health technologies, policy makers

Type of evidence

Rose Miranda (ESR 11)

Cluster RCT and process evaluation of cluster RCT

Annelien van Dael (ESR 12)

Cluster RCT and process evaluation of cluster RCT

References

1. Oosterveld-Vlug M. Evaluating the implementation of the PACE Steps to Success Programme in long-term care facilities in seven countries according to the REAIM framework. Implement Sci. 2019;14:107.
2. Van den Block L, Honinx E, Pivodic L, Miranda R, Onwuteaka-Philipsen BD, van Hout H, et al. Evaluation of a Palliative Care Program for Nursing Homes in 7 Countries The PACE Cluster-Randomized Clinical Trial. JAMA Intern Med. 2020;180(2):233–42
3. Pivodic, L.*, Wendrich-van Dael, A.*, Gilissen, J., Deliens, L., Vander Stichele, R., Gastmans, C. & Van den Block, L. Effectiveness of a complex advance care planning intervention in nursing homes: a cluster randomised controlled trial (in preparation)
4. Wendrich-van Dael, A., Gilissen, J., Deliens, L., Vander Stichele, R., Gastmans, C., Pivodic, L.* & Van den Block, L.* Implementation of advance care planning in nursing homes in Flanders, Belgium: a mixed-methods process evaluation of the ACP+ trial (in preparation)

- ***Ensure a clear distinction of roles and responsibilities for staff when implementing complex health technologies in institutional settings*** [3.3.3.10]

Guidance: To improve the implementation of complex health technologies in institutional settings, it is important to ensure a clear distinction of roles and responsibilities for staff throughout the entire implementation process.

Explanation: To facilitate the implementation of complex health technologies in a, often complex, health care setting, a clear distinction of roles and responsibilities for staff is crucial. This clear distinction helps, 1) the staff to know what is expected of them, 2) co-workers to know what they can ask and expect of the staff involved in the implementation and 3) management to determine how much time would be needed for the staff to implement the technology in an appropriate manner.

Keywords: Complex health technology, roles and responsibilities

Target group: Researchers, developers of complex health technologies, policy makers

Type of evidence

Annelien van Dael (ESR12)

Cluster RCT and process evaluation of cluster RCT

References

1. Pivodic, L.*, Wendrich-van Dael, A.*, Gilissen, J., Deliens, L., Vander Stichele, R., Gastmans, C. & Van den Block, L. Effectiveness of a complex advance care planning intervention in nursing homes: a cluster randomised controlled trial (in preparation)

2. Wendrich-van Dael, A., Gilissen, J., Deliens, L., Vander Stichele, R., Gastmans, C., Pivodic, L.* & Van den Block, L.* Implementation of advance care planning in nursing homes in Flanders, Belgium: a mixed-methods process evaluation of the ACP+ trial (in preparation)

3.4. Glossary

Term	Definition
Advance care planning	Continuous, dynamic process of reflection and dialogue between an individual, those close to them and their healthcare professionals, concerning the individual's preferences and values concerning future treatment and care, including end-of-life care.
Application technology	Software designed to be downloaded and used in a computer or touchscreen device (e.g. mobile phone, tablet)
Artificial Intelligence Tools (AI)	These can be incorporated into the EPR and analyse clinical data to identify patients most at risk, for example, of dehydration or pressure sores.
Barthel Index	Barthel Index of Activities of Daily Living. A measure of independence in activities of daily living.
Brain Training	Internet enabled cognitive training allowing for personal comparison with other users
Complex health technology	A complex health technology is a procedure or system developed through the application of organised knowledge and skills and aims to solve a health problem and to improve quality of lives. Examples of complex health technologies include the PACE intervention (INDUCT Project 11) and the ACP+ intervention (INDUCT Project 12)
Electronic patient record (EPR)	An electronic set of information about a single patient
ESM	Experience Sampling Method: Data collection method/ 'digital diary' using a mobile device or smartphone app to collect information on an individual's behaviour, affect and social context in everyday life; can be used in an intervention approach to raise awareness for positivise activities through self-monitoring and to guide personalized feedback
Everyday Information Communication Technologies	Commonplace information communication technologies and their functions that most people would agree are widely available in homes and society. Eg. make a call from a mobile phone, receive a mobile phone call, games on a smartphone, internet banking on a tablet computer etc.
Everyday technologies	Commonplace technologies that most people would agree are widely available in homes and society. Eg. Microwave, television, ATM, ticket machine, elevator/lift, smartphone etc.
Exergaming	Physical exercise interactively combined with cognitive stimulation in a gaming environment (e.g., *Wii Fit*©). Exergaming relies on technology that tracks the participants' body movement or reactions, which are fed back into the digital

	game, influencing the course of the game that is shown on the screen.
Implementation	A set of planned, intentional activities that aim to put into practice evidence-informed policies and practices in real-world services (www.implementation.eu)
META	Observational tool to understand the ability of an (older) individual to use everyday technology
MMSE	Mini Mental State Examination. A type of assessment used by clinicians to assist in the diagnosis of dementia, and to establish severity.
Online intervention	Internet-based programs providing information and/or training, social and mental health support.
Palliative care	Palliative care is an approach that aims to improve the quality of life of people with dementia and their families facing the problem associated with life-threatening illness through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, psychosocial and spiritual.
PPI	Patient and Public Involvement
QUALID Scale	Quality of life in late-stage dementia scale. An observational scale used by clinicians and caregivers to rate quality of life in persons with late-stage dementia.
S-ETUQ	Everyday Technology Use Questionnaire (Short version) Self-perceived report assessing the ability of and (older) individual to use everyday technology
ST	Surveillance Technology: Electronic tracking systems monitoring movements of wearers
Tailoring	Aligning processes. In this case; being flexible, to a certain extent, with the developed intervention-components to make them compatible with the existing processes in the nursing home.
UX	User Experience

Chapter 4 EPILOGUE

The recommendations that were included in this Best Practice Guidance for Human Interaction with Technology in Dementia were based on the findings of research done by 15 Early Stage Researchers in the INDUCT Innovative Training Network (2016-2020) funded by the European Marie Sklodowska Curie Programme.

Each of the early stage researchers systematically investigated part of the literature to get a comprehensive insight in the state of the art of science regarding the usability of technology for people with dementia in daily life and in meaningful activities as well as in the application of technology in the organisation of dementia care. All researchers did also scientific field work, systematically collecting new data in these areas, with a special focus on the usability of technology, the evaluation of its impact on people with dementia and their carers and/or tracing facilitators and barriers for the implementation of technologies in daily practice. Moreover, during their field work they involved different types of stakeholders, such as people with dementia and carers, professional health care workers, developers of technology, policy makers and researchers to get feedback on their work and findings and to get informed on the different stakeholders' perspectives. All together this resulted in a comprehensive knowledge base and in total 56 recommendations to improve the development, usage and implementation of technology for people with dementia and their application in dementia care. More specifically 21 recommendations on Practical, cognitive & social factors to improve the usability of technology for people with dementia, 15 recommendations on Evaluating the effectiveness of specific contemporary technology, and 20 recommendations on Facilitators and barriers in the implementation of technology in dementia care. Although this set of recommendations is not exhaustive it provides different stakeholders with useful state of the art information to promote the use of technology in dementia.

This Best Practice Guidance should be seen as a dynamic document that can, and will have to be, updated when new insights are available in the continuously developing technological landscape. The recommendations should therefore always be interpreted with caution. The Best Practice Guidance paves the way for a new Marie Sklodowska Curie funded ITN project DISTINCT (2019-2023) in which 15 new Early Stage Researchers will investigate the usability, impacts and implementation of technology in three domains of Social health in dementia: supporting/promoting their ability to fullfil their potential in the society, supporting/promoting self management in daily life and supporting/promoting social participation and meaningful activities.

Research into the usability, impact and implementation of technology is still in its infancy. With this Best Practice Guidance we hope to inspire and stimulate many researchers, policy makers and investers in the development of technology for people with dementia and innovation of dementia care to effectively contribute to the further development and implementation of user-friendly, useful and easy implementable technology for people with dementia and carers and dementia care in general.

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Researchers evaluating implementation of technology for people living with dementia [3.3.2.1],[3.3.2.2],[3.2.2.4]

Researchers supporting family carers of people with dementia in everyday life with the experience sampling method or designing interventions for caregivers of people with dementia [3.2.2.2]

Researchers to support the conduct of this kind of palliative care research [3.2.3.1]

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