



## Monitoring and Analysis of Sleep Patterns of People with Dementia

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# Abstract Submission

## 44. Tele-health

IPA-564

### **SYMPOSIUM#1-TECHNOLOGY -TECHNOLOGICAL SUPPORT IN DEMENTIA AND LATE LIFE DEPRESSION**

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**Please choose your preferred presentation method:** Symposium

**Please indicate your occupation:** Other

**If other please specify:** Researcher psychogeriatrics

**Please indicate your primary discipline:** Psychology

**Full submission: Symposium #1 Technological support in dementia and late life depression.**

#### **Overview:**

**Introduction** on technological support in dementia and late life depression; dr. F.J.M. Meiland

**Presentation 1:** eCare@home - Tablet-based Ambient Assistance For Older Adults With Bipolar Disorder Or Recurrent Depressive Episodes; dr. J. Schuurmans.

**Presentation 2:** Monitoring and Analysis of Sleep Patterns of People with Dementia; prof.dr. M.M. Mulvenna

**Presentation 3:** Technological support for dementia and ageing; prof.dr. J. Soar

#### **Introduction:**

With the growing number of elderly persons in the future, the higher morbidity among older persons and the subsequent expected increase in demands for social and health care, technological support devices are indispensable. These technologies need not be used as 'replacement for human interaction and care' but as complementing care and support (Alzheimer's Society, 2014). The assistive technologies for older people can be applied in various domains, e.g. health and self-esteem, housing and living, mobility and transport, communication and governance, and work and leisure (Van Bronswijk, Bouma and Fozard 2002). They may have impact on e.g. safety, health and quality of life (Alzheimer's Society, 2014). Current evidence shows promising results on the effectiveness, although results are sometimes mixed and the quality of the study designs is low. More research is needed, also on the cost-effectiveness (Robinson et al., 2013, Bemelmans et al., 2012, Westphal, et al., 2010, Lauriks et al., 2007). In daily practice, the use of assistive technologies by older persons is low and reasons may be the lack of information about its usefulness among professionals as well as the target group (Robinson, 2013). For technologies to be useful for and adopted by older persons with mental health problems, it is important that they are developed together with stakeholders and end-users, personalized to the needs of these users and that long-term business models are available (Alzheimer's Society, 2014; Acola, 2014; Span et al., 2013, Meiland et al., 2012).

In this symposium we will discuss assistive technologies in some of the domains mentioned above (e.g. health, communication, living) for people with dementia or with severe mood disorders and older people with disabilities. We will focus on issues like user-participatory design processes in the design of assistive technologies, their usefulness, impact on health and independent living, and dissemination.

#### **Presentation 1: eCare@home - Tablet-based Ambient Assistance For Older Adults With Bipolar Disorder Or Recurrent Depressive Episodes.**

Dr. J. Schuurmans, dr. J. Ruwaard, drs. J. van der Linden (MSc), Prof. dr. H. Riper, Prof. dr. J. Smit, Prof. dr. M. Stek.  
Objectives

Studies show that depression has an unfavorable prognosis in late life, with a higher risk of relapse and chronicity than in younger populations. Bipolar disorder, though less common, accounts for 8-10% of psychiatric admissions in late life. Although e-mental health applications may be beneficial for older patients with severe mental disorders, little is known about requirements for interventions that target the needs of this specific population. In the ecare@home project, we aim

to improve self-management and relapse prevention, as well as facilitate contact with care through a user-friendly tablet-computer for older patients with recurrent mood disorders.

#### Methods

The ecare@home system builds on an existing platform (welltogether.eu) that was designed for older adults with somatic care needs. To tap the needs of mental health patients and their formal and informal caregivers, requirements were systematically assessed through an iterative participatory design approach. End-users were interviewed at several stages before and during the developmental phase. A feasibility trial in N=50 patients will be carried out from May 2015 onward.

#### Results

The user assessments revealed a need for quite drastic changes to the existing platform, that was targeted at managing somatic care needs. Both clinicians and patients express the importance of respect for the patient's autonomy and need for privacy and the validation of 'normal' mood swings.

We identified three main pillars for the ecare@home system;

- Health-tracking using simple Likert scale one-item questions to detect patterns in mood, activities and sleep;
- Providing online support from formal and informal carers through instant messaging and video-conferencing;
- Providing (individualized) information on relapse prevention, disease-management and social activities.

#### Conclusion

- In building a user-friendly e-health solution for severe mental disorders in late life, less is often more.
- E-health targeted at relapse prevention in mood disorders requires a comprehension of the sloping scale between normal fluctuations and relapse.

## **Presentation 2: Monitoring and Analysis of Sleep Patterns of People with Dementia**

Haiying Wang, Huiru Zheng, Maurice Mulvenna, Ulster University

#### Objective

The quantity and quality of sleep has a direct impact on the quality of life for people with dementia and their carers. Many research questions remain to be explored: (1) How to monitor and assess the quantity and quality of sleep objectively and ubiquitously? (2) How does sleep pattern change over the course of various disease types? (3) What variables should be used to assess sleep patterns? (4) What feedback format can be used in telecare service? And (5) What support can be provided to ameliorate sleep disturbances suffered by people with dementia?

#### Methods

##### A. Sleep measurement variables

The main interest to telecare service is to monitoring shifts in sleep patterns and to flag the unusual patterns, so as to observe the changes of clients' health condition. In this study we examine three types of sleep information: quantity, quality, and rhythm.

##### B. Sleep events detection

The bed sensor and the PIR sensors are triggered by the events in seconds. Events such as turning over in bed could trigger the bed sensor and the bedroom PIR sensor. To remove this type of short time trigger and extract the in-bed and out-of-bed events, various rules were applied.

##### C. Visualization

Visual feedback is one of the key issues in telecare systems, as telecare staff and the clients' carers may be novice ICT users.

##### D. The system of sleep pattern detection and visualization

#### Results

A total of n=8 individual participants with dementia completed the 3 month final evaluation phase of the project with fully deployed systems. The different sleep patterns observed between the clients are consistent with the clinical observation that most people with dementia suffer sleep disturbance, have more sleep episodes and lower sleep quality.

#### Conclusion

It is feasible to detect unusual sleep patterns and monitor the trend of the changes. This system could also be used to provide information for the prevention of the risks of other mental health issues that might be triggered by the sleep disorder.

### 3) Technological support for dementia and ageing

Prof.dr. J. Soar, University of Southern Queensland, Australia

#### Objective:

To evaluate Assistive Technologies (AT) in dementia and aged-care

#### Methods:

Two recent AT projects will be presented: a trial of AT in dementia and a national review of AT/Telehealth projects across Australia.

In the Dementia Trial (Yuginovich & Soar 2014) a convenience sample of 39 clients of Alzheimer's Queensland participated out of 60 who were selected and invited. All participants were prescribed individual items of AT, based on an Occupational Therapist assessment of individual need and functional capacity, in order to assess the value as perceived client and their carers. The carers completed a survey before and after a trial of the AT, and participated in an interview and/or focus group after the trial. Alzheimer's Queensland Occupational Therapists were also interviewed to gain their feedback on the strengths, weaknesses and general applicability of the AT for this group.

The national review was of AT/Telehealth projects that involved patients (ACOLA 2014). Thirty people participated in individual or small group interviews; these were AT/Telehealth project leaders and the purpose was to understand their experiences, outcomes and learnings from the projects. This was convenience sampling in that people known to have undertaken AT/Telehealth projects were invited to participate.

#### Results:

The AT/Telehealth projects were found to have delivered results that were consistent with the literature in terms of user satisfaction and, where appropriate, clinical benefits such as better managed care leading to reduced hospital readmissions. The national review identified factors for success of AT as 1. A market focus. 2. Expert 'champions' 3. Long-term business models 4. Recognition of New interdisciplinary players, coordination, incentives and support.

#### Conclusion:

The literature supports the view that there are significant benefits available for patients, families, care providers and the community through the greater adoption of appropriate Assistive Technologies. As with the experiences in many parts of the world there have been many successful pilots (Soar et al 2015) but few that have continued into regular production use or work-practices of care organisations; that needs to be the focus of future research.

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