



Implementing monitoring technologies in care homes for people with dementia: A qualitative exploration using Normalization Process Theory



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ABSTRACT

Background: Ageing societies and a rising prevalence of dementia are associated with increasing demand for care home places. Monitoring technologies (e.g. bed-monitoring systems; wearable location-tracking devices) are appealing to care homes as they may enhance safety, increase resident freedom, and reduce staff burden. However, there are ethical concerns about the use of such technologies, and it is unclear how they might be implemented to deliver their full range of potential benefits.

Objective: This study explored facilitators and barriers to the implementation of monitoring technologies in care homes.

Design: Embedded multiple-case study with qualitative methods.

Setting: Three dementia-specialist care homes in North-West England.

Participants: Purposive sample of 24 staff (including registered nurses, clinical specialists, senior managers and care workers), 9 relatives and 9 residents.

Methods: 36 semi-structured interviews with staff, relatives and residents; 175 h of observation; resident care record review. Data collection informed by Normalization Process Theory, which seeks to account for how novel interventions become routine practice. Data analysed using Framework Analysis.

Results: Findings are presented under three main themes: 1. Reasons for using technologies: The primary reason for using monitoring technologies was to enhance safety. This often seemed to override consideration of other potential benefits (e.g. increased resident freedom) or ethical concerns (e.g. resident privacy); 2. Ways in which technologies were implemented: Some staff, relatives and residents were not involved in discussions and decision-making, which seemed to limit understandings of the potential benefits and challenges from the technologies. Involvement of residents appeared particularly challenging. Staff highlighted the importance of training, but staff training appeared mainly informal which did not seem sufficient to ensure that staff fully understood the technologies; 3. Use of technologies in practice: Technologies generated frequent alarms that placed a burden upon staff, but staff were able to use their contextual knowledge to help to counter some of this burden. Some technologies offered a range of data-gathering capabilities, but were not always perceived as useful complements to practice.

Conclusion: Implementation of monitoring technologies may be facilitated by the extent to which the technologies are perceived to enhance safety. Implementation may be further facilitated through greater involvement of all stakeholders in discussions and decision-making in order to deepen understandings about the range of potential benefits and challenges from the use of monitoring technologies. Staff training might need to move beyond functional instruction to include deeper exploration of anticipated benefits and the underlying rationale for using monitoring technologies.

What is already known about this topic?

- Monitoring technologies may be appealing to the care home sector to help enhance safety, increase resident freedom, reduce staff

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burden, and reduce costs, although robust evidence for their clinical and cost effectiveness is lacking.

- There may be a range of challenges to the implementation of such technologies, including removal of wearable devices by residents, generation of false alarms, and false senses of security in technologies that lack reliability.
- There are ethical concerns about the use of such technologies, including their influence upon residents' freedom, autonomy, human rights, privacy, and dignity, the potential dehumanising of person-centred care, and the potential for remote monitoring by management of staff activity.

What this paper adds

- The overwhelming justification for the use of monitoring technologies is likely to be made based on the extent to which they are perceived to enhance safety, with less consideration about other potential benefits or challenges.
- The involvement of stakeholders in discussions and decisions around monitoring technologies seems to be variable: staff training tends to be informal and based upon assumptions that technologies will be simple to use, and the involvement of residents is particularly challenging due to the impacts of cognitive impairment.
- Greater involvement of stakeholders in discussions and decisions, and staff training that goes beyond functional instruction, may help to facilitate deeper understanding of benefits and challenges from using monitoring technologies in practice.

1. Background

Today's ageing populations are associated with increasingly large numbers of people with dementia and complex co-morbidities, who are progressively reliant upon residential care facilities for long-term support (OECD/European Commission, 2013; Office for National Statistics, 2014). In the UK (and the present paper), the term 'care home' refers to facilities providing 24-h residential care, which may include nursing care (British Geriatric Society, 2011). Recent decades have seen improvements in quality of care in many care homes (Owen et al., 2012). However, the sector is facing extremely complex challenges, including limited resources, problems with workforce recruitment and morale, poor public image (Lievesley et al., 2011; Alzheimer's Society, 2013), wide variations in quality (Care Quality Commission, 2016), and diverse and unclear models of health service delivery (Goodman et al., 2016). In recent years, UK health and social care policy has recognised the need for innovation within the care home sector (Commission on Residential Care, 2014); better integration of care homes into the wider healthcare system (NHS England, 2016); and higher care standards, staff knowledge and skills (Department of Health 2009, 2015). Global policy emphasises the potential of technological innovation to enhance clinical outcomes, economic benefits, and patient experience (Howitt et al., 2012; World Health Organization, 2016). Such innovation may be particularly appealing for the care home sector given the challenges it faces (Westphal et al., 2010). Table 1 shows a range of available technologies which may enhance quality of care in care homes.

All of the sensors, integrated systems, radio frequency, satellite and video-based systems in Table 1 may be categorised as 'monitoring' technologies (Cahill et al., 2007; Niemeijer et al., 2010). These technologies may potentially increase safety, enhance clinical knowledge, reduce staff burden, and promote freedom of movement for residents; outcomes which may be particularly desirable in long-term dementia care (e.g. Rantz et al., 2013; Woolrych et al., 2013). However, robust high quality evidence demonstrating the effectiveness of monitoring technologies in achieving such outcomes is lacking (Khosravi and Ghapanchi, 2015; Schoenfeld et al., 2016), and there is a lack of evidence to support claims that they will be cost-effective for dementia

care (Gibson et al., 2016). Robust data regarding usage trends and distribution of monitoring technologies throughout the UK are lacking, however the most common type in use and desired by care homes seems to be fall detectors (South East Health Technologies Alliance, 2016).

Despite limited evidence for the effectiveness of monitoring technologies, dementia policy tends to emphasise their potential benefits uncritically, and implementation is strongly encouraged (Gibson et al., 2016). Uptake of technologies into routine healthcare practice is frequently acknowledged as a major challenge, for reasons including cost, time, resistance to change, and user acceptance (Eccles et al., 2009; National Institute for Health and Care Excellence, 2015). A detailed understanding of implementation challenges is important because they may underpin any apparent lack of clinical effectiveness (Medical Research Council, 2008). Monitoring technologies present a range of implementation challenges, such as removal of wearable devices by residents, generation of false alarms and overburden for staff from 'alarm fatigue', or creation of a false sense of security (Niemeijer et al., 2010). There are also ethical concerns, including the potential for negative influence on residents' freedom, autonomy and privacy; for dehumanising care; and for remote monitoring of staff by management (Robinson et al., 2007; Niemeijer et al., 2010). Attitudes towards monitoring technologies are culturally sensitive, for example, there is more scepticism and debate in Europe than North America (Niemeijer et al., 2010).

Research exploring the implementation of monitoring technologies in care homes has largely investigated hypothetical scenarios, such as perspectives on potential use (Robinson et al., 2007; Niemeijer et al., 2010). More recently, literature within health and social sciences and engineering and computer sciences reports upon projects involving real-world implementation of monitoring technologies in care homes (e.g. Zwijsen et al., 2012; Sugihara et al., 2015; Niemeijer et al., 2014, 2015). This literature shows that there seems to be more emphasis placed upon safety, which may be easier to 'see' than other potential benefits such as freedom of movement in residents with dementia and concomitant physical impairments. Ethical acceptance of technologies by staff may come from relativist positions such as a lack of objection or awareness from residents, the intention behind the use, or priorities of staff roles. However, the literature lacks detailed insight into processes such as staff training, communication, decision-making and consent around the use of monitoring technologies. It is also largely uninformed by implementation science theory, use of which has been recommended to help develop understandings of the mechanisms underpinning implementation success or failure, and of the contexts in which implementation occurs (Greenhalgh et al., 2004).

The increasing availability, affordability and sophistication of monitoring technologies, and continual encouragement of their use, coupled with a lack of knowledge about context-specific implementation challenges, presents a pressing need for comprehensive exploration into factors influencing the implementation of such technologies within care homes. This paper presents findings from a qualitative study that explored facilitators and barriers to the uptake of monitoring technologies into routine practice in care homes. In particular, we wanted to explore the influence of the ethical debate between 'safety' and 'freedom', the perception of benefits from using monitoring technologies balanced against the potential challenges such as false alarms, and organisational processes such as training, communication and decision-making. We used Normalization Process Theory (May et al., 2015; see Methods) to add theoretical depth.

2. Methods

2.1. Design

We used an embedded multiple-case study design (Yin, 2009) within three care homes specifically for people with dementia in North-West England. The case was defined as the process of imple-

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