

**The environmental temperature of the residential care home: role in thermal comfort and mental health?**

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**TITLE:** The environmental temperature of the residential care home: role in thermal comfort and mental health?

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## **The environmental temperature of the residential care home: role in thermal comfort and mental health?**

### **Abstract**

*Background:* In the midst of changing environmental conditions and increasing populations aged over 65 years, how best to provide nursing care that promotes mental health and wellbeing within residential aged care facilities is an important concern.

*Aim/Objective:* To explore the perceptions of temperature control, thermal comfort and nursing care in a small group of older Australians.

*Design:* Descriptive, qualitative study using thematic analysis.

*Methods:* Individual semi-structured interviews (March to April 2017) were conducted with a group of older Australians who live within an aged care facility in NSW, Australia. Interviews were taped, transcribed and then analysed using thematic analysis.

*Results:* Five adults (three male and 2 female) participated. Themes emerging included: (1) Reliance on habitual behaviour to cope with temperature; (2) The importance of mobility to cope with temperature; (3) Balancing nursing care and resident autonomy. The importance of experiencing a sense of choice and ability to self-regulate personal environment arose as a substantial concern.

*Conclusions:* The attention of older residents to personal issues related to thermal comfort linked to physical and mental health emphasise the importance of concerns regarding mobility, nursing care and autonomy. For older age residents the interplay between thermal comfort and behaviour adaptation is influenced by nurses and their control of the residential environment.

**Key words:** adaptation, aged care, autonomy, mental health, physical health, thermal comfort

**Impact statement:** Nursing staff need to consider aged care residents personal preference in choosing thermal control measures, thereby enhancing autonomy and resident satisfaction.

## Introduction

A recent analysis of global temperatures by NASA's Goddard Institute for Space Studies (GISS) in New York (2017) showed the second highest global temperature readings since modern records were kept, highlighting concerns regarding global warming and climate change. With countries in the southern hemisphere (including Australia) forecast to face accelerated greenhouse effects faster than other regions (Saniotis & Irvine, 2010), the effect of rising surface temperatures presents hazards for mental health and wellbeing (Bi & Saniotis, 2009). Nations face a range of major public health challenges related to climate as forecasts predict increasing heat waves and drought. Such concerns are particularly relevant for older populations as the numbers of people aged over 65 years is rising, with one in four in countries like Australia predicted to be in this age category by 2051; a time during which the continent is expected to be hotter (Australian Bureau of Statistics, 2005).

Links between temperature extremes and mortality (Basu & Samet, 2002) have long been reported, particularly with regard to respiratory and cardiovascular disease. In European climates (United Kingdom for example) public health research has focused primarily on the adverse health effects of cold weather (Public Health England) due to longer spells of cold weather and frequent 'cold snaps'. Although the UK has relatively short and infrequent 'heatwaves' during summertime, Hajat, Vardoulakis, Heaviside, and Eggen (2014) noted a significantly increased risk of cold (and heat) related morbidity and mortality with older people most at risk. This is because older people have different responses to the same thermal conditions than younger people due to changes in their sensory perceptions, and different optimal thermal conditions, thus increasing the likelihood of thermal discomfort (Van Hoof, Schellen, Soebarto, Wong, & Kazak, 2017). In countries where heat waves have

increased, like many urban districts of the United States, older adults were vulnerable primarily because they spend long periods inside buildings where the construction and materials of the building contribute to body heat retention, thus exposing older adults to temperatures which exceed the comfort zone (White-Newsome et al., 2012).

By modelling both outdoor and indoor temperatures during two extremes of climate – the ten-day heat wave of 2006 in New York City and the nine-day heat wave in Paris (2003) – Quinn et al. (2014) revealed the potentially catastrophic indoor heat index that residents could be exposed to. With such extreme weather conditions becoming more common globally, protecting older people, especially those with co-existing disease receiving polypharmacy, is an emerging public health concern in terms of temperature health.

Understanding how older people who live in residential aged care settings cope and act under conditions of heat stress will become a fundamental concern for nurses with a potential impact on preserving physical health and preventing mental ill health (Saniotis & Irvine, 2010). Although the demographic changes occurring within industrialised society are well accepted, there is currently little known about the strategies older people take to manage their wellbeing, nor how they adapt as ambient temperature rises above the comfort range. The objective of this study therefore, was to begin closing the knowledge gap by exploring the perceptions of a small group of older Australian adults who live within an aged care facility about their perspectives of thermal control and nursing care.

## **Methods**

This ethics approved (H0016356) descriptive, qualitative study was conducted at a residential aged care facility in Sydney, NSW, Australia in 2017. The researchers consulted with the manager at the facility to secure institutional consent and to identify the number of potential participants who would be appropriate for the study, which allowed staff to exclude those patients, such as those with dementia, who might not be able to provide informed consent. Residents were then directly approached by the research team and provided with an information pack. An information session was then held for staff and residents to meet the researchers, provide information about the study, and seek voluntary participants. Residents who volunteered to participate in interviews were confirmed with manager and staff as meeting the study criteria (over 65 years of age and with capacity to give informed consent). Participants were approached in person by a member of the research team (TR) and given a participant information pack containing an information sheet and a consent form.

After obtaining informed consent and completing a signed consent form, face-to-face interviews were undertaken by an experienced mental health researcher (by TR) in a quiet room at the facility. The narratives from each participant were digitally recorded. The length of interviews ranged from 30 to 40 minutes. Interview questions explored the experiences of older aged adults regarding how they manage their body temperature and mental health during extreme temperature changes (e.g. heatwaves and cold snaps). Questions were designed to focus on how temperature extremes affected residents' lived experience, how they cope/adapt (e.g., things they do such as stay in bed when cold or shower if hot, what clothing they wear), how they manage adjustments (e.g., whether they need the help of another person for activities of daily living which are altered by changes in environmental temperature),

how they feel as a consequence of hotter or colder climate, and the strategies and coping adjustments they use. Interviews ceased when no new information was forthcoming.

These interviews were conducted in March/April 2017, during the Australian autumn, meaning participants were not directly impacted by temperature extremes of summer or winter at the time. NSW also represents a moderate climate, located along the central Eastern seaboard and is therefore representative of less weather extremes. As the most populous state in Australia it is also representative of a larger portion of general housing circumstances.

Interviews were transcribed verbatim and checked against the digital recording to ensure accuracy. Information was then de-identified prior to being read, coded, reviewed and categorized to identify ideas and themes by members of the research team. Braun and Clarke's (2006) process of inductive thematic analysis was used. This involved reading, and rereading data, grouping and labelling excerpts which were then used to interpret participants' views and perceptions of environmental temperature and mental health.

## **Findings**

Five residents were interviewed (three male and two female). Interviews focused on thermal control and nursing care. Participants also used the topic of climate as a segue into more emotive discussions around life inside a residential aged care facility and the challenges surrounding that. Three themes emerged, they included: (1) Balancing nursing care and resident autonomy; (2) The importance of mobility to cope with temperature; and (3) Reliance on habitual behaviour to cope with temperature. Each of these themes are described below.

## **Balancing nursing care with resident autonomy**

Participants emphasised that the aged care facility was a controlled environment within which the role of nursing staff were vital to the wellbeing of residents. Well-maintained air-conditioning inside bedrooms was perceived to protect residents from temperature extremes as one participant noted:

*'felt the heat very much the last two summers'* (IV1).

Well managed air conditioning was perceived as ensuring residents could:

*'go into your room and change the temperature if you want to'* (IV3).

Nurses were perceived as being able to manage the environment in ways that could be either empowering or disempowering. Frustration occurred when occasionally nursing staff assumed control of bedroom air-conditioner settings without adequate consultation with residents. Participants felt that at time some nurses undermined their autonomy and sense of privacy by deciding when windows were to be opened and where air-conditioners should be located or how room temperature should be managed:

*'I can do most things for myself and I am not fond of people coming in and saying it's a hot day today you should have that on or you should... well I like to make my own decisions still'* (IV1).

Residents felt that staff could sometimes misjudge resident preferences when it came to indoor environments. One participant complained that this made them feel like they had little feeling of choice, remarking:



*'They don't ask...they come out here and they throw all these windows open and you nearly get blown out of bed. It's not treated as your room...there is no feeling of choice' (IV2)*

Residents perceived such frustrations as being related to 'habits' that certain nursing staff got into related to their daily duties and a

lack of distinction made by staff between residents who were immobile and those who were more independent. As one resident stated:

*'I think a lot of them don't make a sufficient distinction between the people who are bedridden or confined to wheelchairs or whatever and those who can move around and do something for themselves because I think they tend to get into the habits.'* (IV1).

### **The importance of mobility to cope with temperature**

Mobility issues meant some residents felt less able to control the temperature of their room. While it was described as a duty of nursing staff to, 'make sure that we are warm' (IV3), one participant recalled a wheelchair-bound resident being placed in a cold draft coming from an air-conditioner and expressed concern that they would become unwell as a consequence (IV1). Another participant reflected that such experiences made them feel 'stuck', they stated:

*I am sitting right in front of it (air conditioner) and that's where you're stuck. So if they have it on you get the full blast and it does come out full blast too... With air conditioning there's not enough consideration been given (IV2).*

Discussing strategies to mitigate the effects of extreme temperatures led participants to reflect more broadly on the concept of getting outdoors and how their ability to do this had been impacted by age, mobility and living in a residential aged care facility. For one resident, outdoor temperature made little difference because they had lost the desire to go outdoors anymore (IV3). Others had enjoyed regular exercise in the form of walking outdoors but their move into a residential aged care facility had led to a lack of exercise, instead being in a 'controlled environment':

*I am a bit lazy here, I should get up and do more walking around but I sit down here with a book and I find it very difficult to get myself out again (IV1). The last two years I have basically been here in a controlled environment. When I was outside I would just seek a nice shady spot outside and sort of just put the day to that (IV2).*

Another participant highlighted the importance of staff efforts to counteract a sense in immobility among residents. The participant described how a staff member had emphasised the importance of physical exercise. Such encouragement was appreciated by the resident who stated:

*'The chairs we have in our rooms are hard for anyone to be comfortable in them. A nurse when I came here five years ago said they were not meant to be comfortable because you are meant to move. It's not good for old people to be comfortable. I thought it was good idea really because I realised that if I stayed in my room I would quickly become much older than I am.'* (IV3).

For this participant getting outdoors was important regardless of weather conditions, indicating a level of confidence regarding their ability to cope regardless of the weather being overly hot or cold.

### **Reliance on habitual behaviour to cope with temperature**

Overall participants felt the effects of environmental temperature had little impact on their mental health. No strong links between cold temperatures and mental health were perceived, with just one resident explaining that extreme cold sometimes led to experiences of low mood (IV3). Likewise, hot weather was not perceived as having a strong impact on mental health, with just one participant stating that:

*I can become much more easily irritable on a very hot day and I feel very tired at times, I just want to flop down. I feel washed out completely on a good, hot, humid day. I just feel I don't want to do anything (IV1).*

The importance of dressing appropriately to cope with weather conditions was emphasised, with extra layers used in colder temperatures (IV1, IV2, IV4, IV5). However, dressing in hotter weather often reflected more of a sense of tradition than strategy. Illustrating this, one participant commented:

*I used to wear a tie in the middle of summer, which drew comment. I remember many years ago when I was at the Library one of the librarians noticed I wasn't wearing my tie and she wanted to know where it was! She noted that no matter what the day was like I used to come wearing a tie (IV1).*

Another resident supported the prioritisation of habitual behaviour that did not change with time or temperature stating:

*I would never wear shorts, even in the hottest of weather (IV2).*

Participants referred to eating warmer foods in colder temperatures (IV2, IV3) and using air conditioning to stabilise temperatures indoors (IV2, IV3, IV5). Little concern was expressed regarding their ability to cope with periods of extreme temperature. One participant viewed their lack of concern with weather conditions as a matter of having to accept the situations life brings and adapt:

*Expect it and accept it and it doesn't bother you. Once you have that attitude you are better off (IV4).*

## **Discussion**

Ageing has been described as 'an environmental process in the sense that it is shaped by the mutual interaction of individuals and groups and their environment(s)' (Wanka et al., 2014, p.468). Research supports the notion that extreme temperatures pose a risk to older population groups by exacerbating pre-existing conditions, such as cardiovascular conditions, renal impairment and diabetes (Bobb, Obermeyer, Wang, & Dominici, 2014; Kovats & Kristie, 2006; Schneider & Breitner, 2016), as well as from decreased body regulation, medication intake and respiratory distress (Schneider, Ruckerl, Breitner, Wolf, & Peters, 2017). Bunker et al. (2016) described the particular vulnerability of older populations when mitigating extreme temperatures with regards to access to medical care and limited options for heating and cooling, especially those still living at home and with limited financial resources. Such vulnerabilities underpin the high proportion of older fatalities resulting from extreme weather events (Bobb et al., 2014; Kovats & Kristie, 2006), such as those

encountered during the European heatwave of August 2003 (McMichael, Woodruff, & Hales, 2006). Vulnerabilities are not restricted to extreme temperature events either. Research has shown that even mild thermal changes can have both positive and negative physiological responses and can result in increased blood pressure for older people, making correct assessment of thermal comfort all the more important (Schellen, & Van Hoof, 2017).

In spite of this, an Australian study found that only 5% of older people living independently in South Australia, and 14% in Victoria, did not have air conditioning (Hansen et al., 2015). This resulted in a reduced sense of concern for extreme temperatures and accounted for a higher likelihood of South Australian respondents staying inside during heatwaves. This supports the theme that older people feel less vulnerable to thermal discomfort if their sense of autonomy can be increased. Comparisons regarding the levels of air conditioning installations in residential aged care facilities are not examined in the literature, and therefore its comparability with this research cannot be made. However, after the heatwave in Europe in 2003 it was found that many aged care facilities in Paris were not air-conditioned nor were residents moved quickly to shelters that were to avoid thermal discomfort (McMichael et al., 2006). A more recent study also found that the age of the building played a part in its thermal efficiency and its overall average temperatures but that air conditioning systems were often not operated properly, limiting their capacity to produce thermal regulation (Tartarini, Cooper, & Fleming, 2018).

Findings drawn from the interviews conducted in this scoping study revealed little overt attention being paid by participants to coping strategies to mitigate temperature extremes and little concern being given to the impact of temperatures on their physical and mental health. This is consistent with a study by Kalkstein and

Sheridan (cited in Wanka et al., 2014) that found only half of people felt they needed to adapt their behaviour in response to extreme heat. Another study by Hansen et al. (2015), which looked at heat-health behaviours of older people living independently, found that a majority did take adaptive behaviours but remained unconcerned about heatwaves, something that was a response to the experiential knowledge of older people. A further study concluded that older people were more likely to change their thermal response actions than their thermal environment (Van Hoof et al., 2017). This meant the adding or removing of layers was more likely than use of windows due to challenges with lifting them or heaters/coolers due to the financial cost of using them. This, however, was contrasted by further research that showed active control of the thermal environment by residents of an aged care centre by opening windows for ventilation, something which resulted in overheating at times during warmer weather (Tartarini, Cooper, & Fleming, 2018).

Berry et al. (2010) and Schneider et al. (2017) found a role for the health system in minimising the mental health impacts for those affected by extreme temperature events. This was further supported in a study by Ebi (2011) which emphasised the importance of health care providers in reducing the risks of extreme temperature changes on health through information sharing regarding appropriate behavioural changes. Our scoping study supported this finding with participants viewing the role of nursing staff as having potential to either improve or hinder wellbeing depending on their approach. When staff took a person-centred approach that facilitated thermal comfort this was appreciated. At other times though, if staff imposed their own preferences on residents in regard to regulating temperature this was perceived negatively, such as opening windows or turning on air conditioners without asking residents beforehand.

Residents' concerns were not limited to the concept of thermal comfort but also included the general role care staff played in managing the environment of the aged care home. The natural tendency for participants to expand from a focus on climate to a mixture of personal and environmental factors, such as mobility, ageing and the challenges of living in a residential care environment highlighted the importance of a sense of 'autonomy' for participants in this study. Residents' emphasis on themes related to autonomy suggest that a theoretical framework such as 'Self Determination Theory' (SDT) may be useful for future studies within aged care settings.

SDT is a theory of human motivation focused on explaining how the relationship between peoples environments and their psychological motivation interact to effect their mental health and wellbeing (Deci & Ryan, 2012). SDT suggests that alongside physical needs such as food, clothing and shelter, human beings also have innate psychological needs. These are competence, relatedness and autonomy. Competence refers to a person's drive to feel that they have ability to influence life outcomes and contribute to their community. Relatedness refers peoples need for satisfying and supportive social relationships. Finally, autonomy is concerned with people's innate desire to live with a sense of freedom and choice.

SDT suggests that people can be empowered and engaged in their natural drive to satisfy these three needs or frustrated and disaffected, and this can then dramatically affect health outcomes (Ryan & Deci, 2000). For example, according to this theory a resident living in aged care residential facility who is not given control of their room temperature via an air conditioner would be more likely to experience frustration and distress than a person who is given control of their room temperature via an air conditioner. Theoretical frameworks are important because they provide

the 'lens' through which research data is examined (Kosciulek & Merz, 2001). The findings of this scoping study suggest that SDT may be useful to guide future research regarding the nexus between the environment of aged care facilities, nursing care and residents.

### **Strengths and limitations**

This study was limited by two factors – setting and sample size. It was confined to single setting, being one residential aged care facility in Sydney, New South Wales. Multiple sites may have resulted in a more diverse spread of socioeconomic demographics and thereby offered a better representation of a cross-section of society. The sample recruited was also small, being five participants. This limited the range of views expressed and thereby the findings that could be drawn from them. The findings were limited in their direct relevance to the research aims as focus tended to move away from climate and thermal control towards other areas of importance to participants, such as mobility, autonomy and ageing in a residential aged care setting. This in itself was a strength of the research. Semi-structured interviews allow a more direct discussion of personal experiences, feelings and perceptions (Crouch & McKenzie, 2006). By allowing the participant to determine the direction of the interview they were better able to demonstrate the issues most important to them, even if these were not in keeping with the research aims.

### **Impact statement**

Little is known about the views of aged care residents towards temperature change and the adaptations they make to address thermal discomfort as a consequence. What is known is that there is a strong link between aging, poorer health and susceptibility to extreme temperatures and that appropriate thermal comfort



measures are required to minimise this impact. This paper adds a direct perspective on this issue from a small group of residents within an aged care facility in New South Wales, Australia. The perspectives of these residents emphasises the importance autonomy in relation to the use of thermal control measures used to address temperature extremes.

## **Conclusion**

This qualitative scoping study focused on the response of five older Australians in a residential aged care facility to thermal discomfort caused by the temperature extremes. Findings indicate that the nature of residential aged care living was akin to a controlled environment where the temperatures outside were not experienced inside due to air-conditioning. No overt focus was demonstrated on strategizing or adapting to mitigate the effects of extreme temperatures. Instead, participants emphasised the importance of autonomy, mobility and freedom, which were perceived as being reduced by residential aged care living. Rather than providing insight into how nurses might reduce the risks posed by temperature extremes to older people, this study highlights the need to consider personal preference in choosing thermal control measures, thereby enhancing mental health and wellbeing. It also highlighted the importance of ensuring residents the opportunity to stay mobile where possible, either within the facility or outside. This too can enhance a sense of satisfaction.

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