Sheffield Hallam University

Old and Cold: Challenges in the Design of Personalised Thermal Comfort at Home

CHILDS, Charmaine <http://orcid.org/0000-0002-1558-5633>, GWILT, Alison <http://orcid.org/0000-0002-2557-7098>, SHERRIFF, Graeme and HOMER, Catherine <http://orcid.org/0000-0003-2571-6008>

Available from Sheffield Hallam University Research Archive (SHURA) at:

https://shura.shu.ac.uk/13112/

This document is the Published Version [VoR]

Citation:

CHILDS, Charmaine, GWILT, Alison, SHERRIFF, Graeme and HOMER, Catherine (2015). Old and Cold: Challenges in the Design of Personalised Thermal Comfort at Home. In: CHRISTER, Kirsty, (ed.) Design 4 health: Proceedings of the 3rd European Conference on Design4Health. Sheffield, Sheffield Hallam University, 1-9. [Book Section]

Copyright and re-use policy

See http://shura.shu.ac.uk/information.html

Sheffield Hallam University Research Archive
http://shura.shu.ac.uk

DESIGN4 HEALTH

Extract of the

Proceedings of the 3rd European Conference on Design4Health

Sheffield 13-16th July 2015

Editor: Kirsty Christer

ISBN: 978-1-84387-385-3

Sheffield Hallam University | Art and Design Research Centre

LAB 4 LIVING

YORKSHIRE & HUMBER
ACADEMIC HEALTH SCIENCE NETWORK

DESIGN4 HEALTH
2015 European Conference

Old and Cold: Challenges in the Design of Personalised Thermal Comfort at Home

Charmaine Childs[1], Alison Gwilt[1], Graeme Sherriff[2] and Catherine Homer[1]

[1]*Sheffield Hallam University, UK*

[2]*University of Salford, UK*

Abstract

The link between winter cold and illness is a major health concern because 'cold kills'. Worse still, old and frail older people can feel cold at any time of year. Solutions need to be found to increase thermal comfort. Whilst clothing manufacturers have produced garment solutions for people to enjoy outdoor activities in the cold, there is a gap in our understanding about how to protect frail/older people from becoming chilled and cold at home.

To date no evidence exists on the benefit of innovative clothing interventions for keeping older adults warm (and healthy) in the home. Our aim therefore was to first understand the behaviours of older adults at risk of indoor cold, living in different domestic environments. Focus groups/semi-structured interviews were used to identify body regions where old/frail older people feel cold and to learn about their attitudes to traditional and modern fabrics and garments for keeping warm at home. Findings from a funded pilot study (RDSYH, Public Involvement grant) are presented. The body regions most vulnerable to thermal discomfort are trunk and extremities (feet, hands). Given the anxiety, discomfort, pain, reduced activity (including taking to their bed to keep warm in early evening) design/engineering-led solutions for a 'smart' warm clothing 'wardrobe' for today's and tomorrow's older people are needed. Feedback suggests that older people are open to fresh ideas about garments and technology; important to them being fabric weight. Older people do not, as often thought, wear outdoor clothes (hats, gloves, scarves) indoors, and are not averse to 'modern' fabrics and garments. Style remains important to many. These findings provide the first step towards identifying 'candidate' fabric, material and garment designs preferred and acceptable to older people for the next stage of work; development of 'smart' personalised thermal comfort solutions for health and wellbeing at home.

Keywords: Frailty, older people, thermal comfort, indoors, clothing

Proceedings of the Third European Conference on Design4Health 2015, Sheffield, 13 - 16 July 2015
ISBN 978-1-84387-385-3

Introduction

The problem of being old and cold

Being cold brings misery and anxiety and exacerbates pre-existing illness. This is especially so for old and frail older people. Whilst winter months represent a time of significant health risk, frail older people can feel cold at any time of year, especially when outside Autumn/Spring temperatures are below seasonal average. Finding a solution to avoid worsening of cold-induced health risks (e.g. stroke, cardiovascular and respiratory diseases) and with the individual taking the initiative to keep warm has the potential for a major health initiative for our time. Recent reports (Public Health England, 2014; Age UK, 2014) typically recommend wearing layers of garments made from thin wool or fleece fabrics, the use of thermal underwear garments, and socks. It is also suggested that the use of articles such as gloves, hats and scarves can protect the face and hands, whilst hats are also recommended for use in bed when extreme cold temperatures are felt. While it is apparent that the advice is intended to better inform older adults, the acceptability and the extent of their use in the community is unknown.

To date, studies that specifically explore the benefit of innovative clothing interventions to keep older adults warm in the home are limited. Although the Keeping Warm in Later Life (KWILLT) study (Tod *et al*, 2012) explored the attitudes and belief of older people primarily in the context of keeping the home warm, our work focuses specifically upon identifying appropriate clothing for thermal comfort in the older population. Our objective was to first understand the behaviours of older adults living in different domestic environments specifically: a) their personal feelings of being cold, b) body regions susceptible to cold c) preferred traditional and new clothing choices for 'wrapping up'.

Methods

Focus Groups

The core methodology comprised three focus groups, based in Rotherham and Doncaster, South Yorkshire. Access to the groups was arranged to coincide with regular social occasions when older people meet; a sheltered accommodation quiz session, community centre luncheon club, exercise session at a church hall. Using these existing groups was considered a practical way to talk to the members and with gatekeeping from Age UK. It also provided a setting in which the participants could, as much as possible, feel comfortable surrounded by their peers and carers. This was considered important in understanding the social dynamics of attitudes towards keeping warm. The focus groups also allowed observation to be made of the interactions between participants, peers and the researchers where appropriate.

Proceedings of the Third European Conference on Design4Health 2015, Sheffield, 13 - 16 July 2015
ISBN 978-1-84387-385-3

The focus groups were structured around a series of questions around practices in the home to keep warm at different times of the day. At points in the discussion, participants were presented with garments and asked to comment on them within the context of the discussion. To complement the focus groups, and act as prompts in the discussion, a series of quiz sheets were produced. These included an exercise to draw on a figure the parts of the body where they experienced cold, their feelings about pain, and another to rank garments in terms of the likeliness that they would wear them indoors.

Faces Pain Scale

As a visual aid and to obtain a tangible indication of any link between cold and discomfort/pain, the visual Facial Pain Scale (Scherder and Bouma, 2000) was completed. The scale is used for people with a degree of language problems or cognitive impairment.

Mapping of body regions

To map the temperature of body regions where sensations of cold temperature are typically experienced, participants were asked to indicate the ''affected'' area by drawing on a body manikin chart.

Clothing preferences/garment choices

Different items of clothing items and accessories worn by people to keep warm were distributed amongst the participants. The products acted as prompts to stimulate discussions about personal preferences for specific fibres, fabrics and garment styles. At the same time an 'activity sheet' was distributed to the participants, designed for them to reflect on the clothing they typically use to keep warm and to rank their choice of commonly available garments and clothing accessories (gloves, hat, thermal underwear, fleece/lightweight cardigan, thick wool cardigan, and an overcoat). The opportunity to list other clothing preferences was also provided

Institutional ethics review was obtained before commencing the study.

Findings

Forty-two participants attended the focus groups. All provided information about feelings of being cold. However, due to the nature of medical condition and cognition of 15 participants, the more detailed feedback and participation to the quiz, pain scales and further questions was limited to the remaining 27 older people (aged 58-85, median 76 years) who were regular members of the social groups and who travelled to the respective centres from home.

1. General feelings about being cold

Proceedings of the Third European Conference on Design4Health 2015, Sheffield, 13 - 16 July 2015
ISBN 978-1-84387-385-3

There were many different concerns about feeling cold (Table 1). Some said they felt ''cold all over'' but when they were younger they didn't feel the cold so much. Another said that when they got cold they added on a cardigan; a fleece being the last resort. There was a general view that outdoor clothes were not acceptable in the house ("not polite'' remarked one man on wearing a hat indoors). On wearing gloves indoors, gloves were not accepted –over the limit for what she would put on when cold explain one woman; others liked to have something over their legs. In the daytime, one woman said that the kitchen gets so cold, she tries to "do stuff in there as quickly as possible". It warms up when cooking but not otherwise. This lady puts on extra clothes when she goes to the kitchen. Others would not wear items such as thermals. One man puts on a cardigan and ''zips it right up to the top". Observations of the group revealed that whilst some older people said they were not cold ("I'm not cold, feel my hands") they were, nevertheless rubbing their hands, which also felt cold to touch.

Table 1. The concerns of older adults of feeling and being cold.

Personal feelings about being cold	**Body regions susceptible to cold**	**Preferred clothing choices**	**Other coping strategies**
• Some have been told they feel cold to touch even though they don't feel cold themselves • Some describe feeling cold strongly, as 'pain' • Buying clothes that don't keep them warm is a frustrating waste of money • Some people report symptoms that may be related to cold, e.g. tiredness, joint pain, not sleeping, feeling 'tense and achy' • Not all older people will say they feel the cold	• In the extremities starting with the hands. • "My hands are always cold even in the house" • Commonly hands • Feel cold at the core.	• Tend to avoid (admitting to) wearing hat and gloves indoors. • This applies to all outdoor clothes. • Sometimes wear a dressing gown indoors. • Putting a cardigan on. • Fleece popular – substantial but not too heavy • Lightweight garments are preferred by many • Modern fabrics are acceptable to older people • Silk is warm and light • Ease of washing importance • Sense that what you wear at home matters more when someone is visiting • Personalised heating could be good. • Hot water bottle slippers suggested. • Wearing a thin cardigan under his shirt (man). • Potential influence of warming colours, e.g. rustic red.	• Going to bed early to watch TV (not clear if for warmth or just general comfort) • Electric blankets seemed popular. (does not seem to be any shame associated with them) • Supplementary heating. • Walk for 20 minutes to feel warm. • Recognised that home insulation was important. • Turn the heating on 'I've worked all my life and I'm not going to be cold' • Doing things quickly in the kitchen (as the room gets cold). • Sit with fleece blanket covering whole body. • Having a whiskey.

For electric aids to keeping warm, there was a positive attitude to electric blankets "an electric blanket is a great thing- slide in bed and it's lovely and warm". Cold was linked to poor sleep, however, with 4 of 9 people (men and women at one of the focus groups) reporting symptoms that suggested cold affected their sleep quality. However, some participants said they did not feel cold. One questioned the relevance of the question to him: 'What if you don't feel cold particularly?' Another said 'I don't feel any of these when I'm in the house, I'm comfortable,' and another 'I'm never cold'. It was not clear, however, to what extent these participants were cold habitually. One explained that he had worked hard all his life and was not going to be cold, so he

Proceedings of the Third European Conference on Design4Health 2015, Sheffield, 13 - 16 July 2015
ISBN 978-1-84387-385-3

turns the heating up. These responses may reflect the challenge of asking about experiences of cold, with perceptions being subjective and potentially mediated by the social situation.

2. How being cold feels

Participants expressed concerns about being cold. The level of potential impact was expressed by one participant's observations of cold i.e. that (cold) 'it is pain', not only discomfort. Some found that this was a normal feature of home life: 'My hands are always cold – even when I'm in the house' and many had various copying strategies such as going to bed early, just after 6pm for some. For others the experience of cold was a symptom of an on-going condition like Raynaud's disease. The participants told of ways in which feeling cold was manifested as 'getting tense and achy', feeling tired and affecting mood; "feel moody".

Sixteen of 17 participants completed the 'Faces Pain Scale'. Scores ranged from 2 to 7 (median 3) indicating that feelings of mild discomfort to severe pain were associated with being cold.

3. Body regions susceptible to cold

All but one (16/17) of the body region maps were decipherable. Fifteen of 16 participants indicated that they had cold extremities; hands only (n=3) feet only (n=6) hands and feet (n=6). In addition to cold extremities, five people reported a cold body core, typically upper or lower trunk, upper arms and legs.

The participants stated that it is the hands and extremities that are most vulnerable to cold: 'it's in the extremities that I get cold first. It starts with the hands.' Another commented, "my hands are always cold, even in the house". It was also the case for some that they do not feel the cold, but that other people would tell them that their hands were very cold.

4. Perspectives on current clothing choices and other coping strategies for keeping warm

The most popular *first choice* garments for keeping warm were fleece/lightweight cardigan (n=8) thick wool garments (n=4) and thermals (n=3). With the exception of one person (who listed gloves as a first choice) none of the participants first choice was to wear outdoor clothing (hat, coat) indoors. These were most commonly listed as last choice. Of the ''other'' clothing items listed, blankets were used by two people, socks (four people) thick pyjamas (one) and slippers (one).

Proceedings of the Third European Conference on Design4Health 2015, Sheffield, 13 - 16 July 2015
ISBN 978-1-84387-385-3

Feedback that challenges current advice and assumptions

It was evident that older adults did not heed some of the recommendations promoted in public information campaigns. For example, when questioning participants about wearing layers, one comment that was opposite to public health advice about layering up was, "well I don't put layers on". On wearing a hat indoors in extreme cold weather the response was negative. Most participants were vocal in expressing the view that wearing hats (or gloves, or scarves) indoors was just 'not done' and was considered socially unacceptable. When questioned about fabric suitability a key concern for the participants was weight. Although heavy woolen fabrics were perceived as warm, they were largely avoided because they were considered heavy and uncomfortable. One woman stated that weight of clothes was really important as you get older. The weight of garments sparked an interest amongst the groups in new, modern lightweight synthetic materials as alternative options. On putting a modern, feather-filled lightweight garment over her legs, one woman commented ''its lovely, like a furnace on your legs, it's a good material''. This lady was one of very few people who commented that cold was ''bad for your health". Many participants felt that style was an important contributor in determining clothing choices, and that remaining smart or stylish was important whether staying at home or venturing outside. In addition to clothing preferences, a range of coping strategies were identified; having a hot drink, going to bed early, putting on socks and a cardigan, using an electric blanket in bed.

Two particular reactions indicated a potential influence of the social setting and a reluctance to admit certain practices in front of peers. There was a strong denial of having to wear hats and gloves indoors, or for wearing any outdoor clothing. One female participant who went to bed at 8pm to watch television with a hot drink tried hard to emphasise that this was also about comfort and enjoying the enclosed space in her house rather than not being able to heat her home.

Discussion

Older people become cold at home for a number of reasons; not all are due to fuel poverty and inadequate home heating. One possible explanation is that older people are not as able as younger adults to 'know'' when they are getting cold. In 'Making the Case' (Public Health England, 2013) for long-term strategic planning to reduce harm from cold, existing resources such as "Keep Warm Keep Well', NHS Choices (Winter Health), Health and Winter Warmth 2007, Warm Homes, Healthy People Fund (DOH) and Keeping Warm In Later Life project (KWILLT) highlight the problem of cold on symptoms of arthritis, muscle strength and dexterity with strategies to 'keep moving' as well as to 'wrap up' to keep warm. Bearing in mind, that these messages are targeted at a wide age range of older people, broadly of an age of 65 years or older, this group spans a personal preference for clothing style, fashion, fabrics and wearability extending over a time interval of 30-40 plus years. We have shown a vast range of different perspectives and opinions even in a relatively small population of older people. Even so, it is clear that the body regions most

Proceedings of the Third European Conference on Design4Health 2015, Sheffield, 13 - 16 July 2015
ISBN 978-1-84387-385-3

vulnerable to thermal discomfort are consistently reported to be extremities (feet, hands) and trunk. Given the anxiety, discomfort, pain, reduced activity (including taking to their bed to keep warm in early evening) there are significant textile and engineering design challenges ahead for today's (and tomorrow's) older people.

We know, of the limited studies available, that the thermal properties of clothing have typically focused on testing either the textile material and/or fibre used in garments for hot/cold climates or in specific locations (e.g. workplace). Others have assessed the textile material and its application in specific clothing products for a defined user, for example clothing for performance sportswear, outdoor pursuits or adaptive clothing. Of the limited studies that have explored thermal clothing for older adults most have focused on innovative solutions for outdoor cold, for example outdoor textile-led solutions for active older adults (McCann, Bougourd and Stevens, 2011) and outdoor winter clothing for functionally-impaired older adults (Fernie and Row, 2004). While these investigations provide insight, the literature that explores the clothing needs of frail, older adults to improve thermal comfort in a domestic environment is much less common.

Summary of our findings

In summary, our findings indicate that while there are some common practices adopted by older adults for keeping warm at home, several strategies promoted in public information advice are ignored. A refusal to wear clothing items such as gloves or hats indoors because of social dress conventions indicates that older adults sometimes place a higher value on clothing as a representation of self ahead of its seemingly practical application. At the same time, personal preferences appear to differ greatly between younger old, old and older old adults, which points to a need to better define the age cohorts within the older adult population so that clothing can be developed in response to specific demographic needs and characteristics. Encouragingly the participants were receptive to new product innovations designed to improve thermal comfort, and specifically were highly responsive to new lightweight textile materials that provided both comfort and warmth. In general these observations suggest that older adults, regardless of their specific age, have innate preferences for colour, style and design, in clothing items, which should not be overlooked when developing new products.

It is pleasing that, at the end of one of the focus groups, we received thanks from one of the ladies for talking on the topic because she felt "older people often get ignored". The limitations of the study are the small numbers of participants and the potential that some older people may not fully discuss personal health issues in a mixed group or may feel embarrassed at discussing matters that could reflect fuel poverty. However, the study has established evidence for further work investigating the development of new products to provide older adults with personalised thermal comfort solutions for health and wellbeing at home.

Acknowledgements

Proceedings of the Third European Conference on Design4Health 2015, Sheffield, 13 - 16 July 2015
ISBN 978-1-84387-385-3

We thank the Research Design Service, South Yorkshire and Humber for their financial support of this study and the community groups who welcomed us and embraced the topic.

References

ISBN 978-1-84387-385-3

AGE UK (2014) *Winter Wrapped Up. A guide to keeping warm and well this winter.* [online]. http://www.ageuk.org.uk/get-involved/spread-the-warmth1/warm-up-for-winter/

LI,Y., HSU, J., and FERNIE, G. (2010) *Design Resources: DR-07 Protective Winter Clothing.* [online]. Centre for Inclusive Design and Environmental Awareness. http://www.udeworld.com/documents/designresources/pdfs/ProtectiveWinterClothing.pdf.

MCCANN, J., BOUGOURD, J., AND STEVENS, K. (2011) Design for Ageing Well: Product that is fit for Purpose Driven by User Engagement [online]. In: *Include 2011*, London, April 18-20 2011, Helen Hamlyn Centre. Include11.kinetixevents.co.uk/rca/rca2011/paper_final/F456_2322.PDF

PUBLIC HEALTH ENGLAND (2014) *Cold Weather Plan for England 2014: Protecting health and reducing harm from cold weather* [online] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/365756/CWP_2014.pdf

PUBLIC HEALTH ENGLAND (2013) *Cold Weather Plan for England 2013: Making the case: why long-term strategic planning for cold weather is essential to health and wellbeing.* [online] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/252854/Cold_Weather_Plan_2013_Making_the_Case_final_v2.pdf

SCHERDER, E.J.A and BOUMA, A. (2000) Visual Analogue Scales for Pain Assessment in Alzheimer's Disease. [online] *Gerontology* **46**, 47–53 (DOI:10.1159/000022133)

TOD, A.M., LUSAMBILI, A., HOMER, C., ABBOTT, J., COOKE, J.M., STOCKS, A.J., AND MCDAID, K.A., (2012). Understanding factors influencing vulnerable older people keeping warm and well in winter: a qualitative study using social marketing. [online] *BMJ Open* **2** (4) http://bmjopen.bmj.com/content/2/4/e000922.full

ISBN 978-1-84387-385-3