Keeping warm and well in later life: a qualitative study

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Abstract

Objectives

To understand the influences and decisions of older vulnerable people in relation to keeping warm in winter.

Design

A qualitative study incorporating in-depth, semi-structured individual interviews, group interviews and consultation techniques, and Framework Analysis.

Setting

Rotherham, South Yorkshire, UK

Participants

50 older people (>55) and 25 health and social care staff underwent individual interview. The older people also had household temperature measurements. 24 older people and 19 health and social care staff participated in one of six group interviews. 107 local, regional and national representatives attended a consultation event.

Results

Older people's homes were cold, 13 (26%) to an unsafe level. The most vulnerable were in privately owned or rented accommodation. Cold homes were not always those in fuel poverty. There were huge variations of temperature in most homes. A complex interaction of factors emerged to explain whether people were able to keep warm. Influences combined in such a way that people were not able to or preferred not to access help or change behaviour. Behaviours and decisions related to use of heating, spending money, accessing cheaper tariffs, accessing benefits or asking for help. The three main categories of factors are situation, values and barriers. Barriers included poor knowledge and awareness, technology, disjointed systems and the invisibility of fuel and fuel payment.

Conclusions

Factors that conspire against older people being able to keep warm are complex. This makes it difficult for health and social care staff to identify people at risk and respond accordingly. Effort is required to raise the capacity of the NHS in identifying and responding to the needs of those vulnerable to cold related ill-health in line with the Cold Weather Plan. Greater focus is needed to ensure affordable warmth interventions achieve the desired outcome of safe indoor temperatures for elderly and other vulnerable people. *(299 words)*

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Introduction

Cold weather kills.[1-5] Throughout Europe and beyond higher rates of excess winter deaths are found in countries with less severe, milder winter climates.[6,7] In November 2011 the Department of Health and Health Protection Agency released the first Cold Weather Plan for England[1] along with the supporting evidence of why cold weather planning is essential to health and wellbeing.[2] In 2008-9 over 26000 excess winter deaths (EWD) were reported in England, with the majority occurring in those over 65.[8] EWD are calculated by comparing deaths in winter months (December to March) with the expected number of deaths (average non-winter months). EWD rates have been rising since 2003 and account for 1 in 20 of all deaths per year in England.[8] Approximately 40% are due to cardiovascular deaths and a third due to respiratory mortality.[1,9] England compares unfavourably to other northern European countries in terms of winter deaths with colder countries, like Finland, experiencing half the EWDs.[1] Countries such as Finland are better prepared for the cold in terms of thermal efficiency of properties and outdoor clothing.[1,10] In addition to mortality, cold weather reaps huge costs in terms of morbidity and health care use. Older people are amongst those most at risk of the negative health impact of cold weather along with children and young families, and those with multiple co-morbidities and disabilities. Risk of death is increased in winter particularly for older people with underlying health conditions such as heart and respiratory diseases.[1-5] Indirect impacts of cold weather include depression and poor mental health.[5]

Increasing fuel prices, reducing household incomes and energy inefficient homes have all contributed to the rising trend in England in rates of fuel poverty.[1,11] More than four million households were in fuel poverty in 2009, with rates increasing to over six million in 2011. Fuel poverty occurs when households have to spend more than 10% of their income to attain World Health Organisation minimum temperature standards (21℃ in the living room and 18° in the bedroom).[4] Those in fuel poverty are at risk greater risk of death and illness due to cold weather.[1,5] Older people, with underlying health conditions and a flat, pension-reliant income are amongst the largest population who are fuel poor.

The Cold Weather Plan[1] is one of a suite of measures the Department of Health has implemented in order to make an impact on reducing mortality and morbidity due to cold weather and reduce the avoidable demand on the NHS. It builds on previous initiatives such as flu vaccination of those at risk, the Keep Warm Keep Well information campaign[12], NHS winter pressures and resilience programmes and Winterwatch.[13] The plan sets out what needs to happen to prepare for and respond to cold weather and avoid the negative health

impacts. It advocates collaborative working between NHS, Local Authority, communities and individuals.

As the 2011/2012 winter weather becomes established, questions arise for frontline NHS staff and NHS organisations regarding their responsibility in delivering the Cold Weather Plan and what to do if an older person is suspected of living in a cold home or at risk of fuel poverty. In order to address these questions this paper reports selected findings from the Keeping Warm in Later Life projecT (KWILLT), a qualitative study funded by the National Institute for Health Research, Research for Patient Benefit Programme. To date policy and practice interventions to address fuel poverty and reduce the negative health impact of cold weather have focused on increasing household income available to afford fuel (e.g. cold weather and winter fuel payments, accessing benefits for those eligible), reducing fuel cost (e.g. introducing social tariffs for fuel, reduced direct debit / online payment rates, warm home discount), and increasing the energy efficiency of the property (e.g. Warm Front[14] and the planned Green Deal and Energy Company Obligation).[15] However, there is a concern that those most susceptible to the negative health impacts of cold weather are not always in a position to access initiatives or the interventions are not well targeted to those in most need.[4,16] In addition, the contribution of health professionals to this agenda is not always clear. In order to improve access and uptake of interventions and clarify the contribution of health professionals it is important to understand and identify influences the decisions of older, vulnerable people in relation to keeping warm in winter. KWILLT aimed to examine such influences on older people's decisions and behaviour. The purpose was to generate insight to inform the development of social marketing materials to increase the knowledge and awareness of the public regarding the risks of fuel poverty and cold weather and what can be done to help, and to improve service access for vulnerable people. Social Marketing is an approach used to develop activities aimed at changing or maintaining people's behaviour and encouraging behaviours that provide benefit for individuals and society as a whole.[17] Social marketing targets specific segments of a population that are at increased risk, in this case of EWD. The aim is to promote change at a population and individual level.[18]

This paper focuses on the study data from older people and presents generated insight to explain current vulnerability and need amongst older people and how NHS clinicians and organisations can respond to better meet that need.

Methods

Study approach

We conducted a qualitative study in two stages incorporating in-depth, semi-structured individual interviews, group interviews and consultation techniques. This paper focuses on responses of older participants. However, findings from this group resonated with that of participants in other stages. This use of different data collection techniques in each stage allowed us to triangulate findings, expand and verify the data and thus increase the rigour and transferability of the findings. The study was conducted in Rotherham, South Yorkshire, an area experiencing high levels of EWD and fuel poverty that are above the National average.[6,19] The study area also has non-traditional and old housing stock, that create challenges in terms of energy efficiency. NHS research ethics and governance approvals were obtained.

Sample and recruitment

Stage 1

In the initial stage we recruited 50 older people and 25 health and social care staff. Older people were over 55 years of age. This relatively young age was selected because of the early onset of chronic disease and accelerated aging experienced in the population due to the legacy of its industrial past, levels of deprivation and unemployment and behaviours such as smoking. Participants were recruited through older people's day care centres, community organizations working with vulnerable older people, and local faith groups. Snowball sampling was also used to recruit isolated participants. This approach helped ensure that a range of participants in relation to key characteristics including age, gender, type and tenure of housing, living alone or with spouse / family, and fuel poverty. Participants were approached about the study by someone known to them, either the relevant organisation or a previous participant. Those who agreed were telephoned by the researcher to arrange the interview. Health and social care professionals were recruited via email or phone through their employing organisations. Organisations included were from NHS, Local Authority and the community and voluntary sector. The criteria for recruitment was that they were involved at a strategic or practice level in the delivery of care or support to older people in their home

The older people who participated in individual interviews included a range in terms of age, ethnicity and gender (Table1) and type and tenure of housing (Table 2). There was an imbalance in the sample in favour of women and BME participants when compared to the population. Four interviews were conducted with couples. The majority conducted were with one person in the household.

Staff who participated in individual interviews represented a range of roles from general practitioners, community and specialist nurses, allied health professionals, housing, domiciliary care providers, wardens, telephone assessment and advice workers and housing officers (Table 3).

Stage 2

Six focus groups were conducted in total, one with health and social care staff involved in primary care clinical roles, on with elected members of the Council with related responsibility or interest, one with staff working at a strategic level in the organisations used to recruit staff for the individual interviews, and three were with older people recruited from day centres or community groups. Recruitment was conducted via the organiser or chair of the group. Table 4 gives a summary of the focus group participant numbers and gender and again demonstrates high participation by women.

A consultation event was held with 107 local, regional and national representatives from all the sectors and organisations involved in some way with older people keeping warm. These included people from NHS, Local Authority (elected members, officers and staff from energy efficiency, housing and health improvement), voluntary sector and academic organisations. This event provided an opportunity to test out and verify findings amongst a wider population.

Data Collection

All individual interviewees were contacted by telephone by one of the research team to discuss the study and arrange the interview. Consent was obtained prior to the interview which was digitally recorded. Interviews with older people were conducted in the winter months of 2009/10 and 20010/11. Interviews with staff took place between March and September of 2010. Interviews lasted between 20 and 60 minutes. Before interviewing older participants, a small device (Tinytag Ulta2) was placed in the rooms the participant spent most of the day and night to measure temperature and relative humidity. This was an objective measure that would check participants' perceptions of the warmth of their homes. Interviews were guided by an interview schedule.

Group interviews with staff and older people were held between January and March 2011 and took place in community venues where the recruiting organisation or group usually met. Participant information and consent forms were posted out to participants were possible. Full

information was provided prior to the group interview and consent obtained. A topic guide was used to guide the discussion. Two members of the research team attended the focus group, one to facilitate and one to scribe. They were also digitally recorded. Individual and group interview data were transcribed in full and any identifying data removed. Transcripts and field notes were entered onto NVivo8 software and temperature and humidity measurements entered onto SPSS software for analysis.

The consultation event was a structured event that took place in September 2011. Participants were grouped according to area of work. Facilitated workshops were conducted asking participants to comment on the findings which were presented in the form of six pen portraits. The pen portraits were not real people, but drawn from the KWILLT findings. Each portrait represents a group or "segment" of older people in society who share a combination of factors identified in KWILLT as influences in keeping warm. Participants were asked whether the findings resonated with their experience and what solutions could be employed to address the problems identified.

Data analysis

Data was analysed using a framework analysis approach.[20] All the interviews were analysed by one researcher (AL) and other researchers (AT, CH, JC) independently analysed selected transcripts to verify interpretation. NVivo was used to facilitate this using tree nodes, cross linking, coding reports and memos. Following the individual interviews conducted in the first winter an provisional thematic framework was developed after the core researchers (AL, AT, CH, JC) had familiarised themselves with the data and discussed them with the wider team. Following each stage of the study the new data was used to challenge and expand upon the existing thematic framework. This occurred during regular team discussions where consensus on the thematic framework was generated through negotiation. The findings and themes were then organised into two broad types, temperature measurements and factors that influence older people's decisions and behaviour. The findings are presented here using those headings.

Having identified factors influencing behaviour, data was reviewed to identify how the factors combine to create risk for different groups of people. From this a "segmentation model" was developed that described six "sub-groups" of older people at risk of the negative health impact of cold weather because of contextual or attitudinal factors or barriers. This segmentation model was used to develop pen portraits. These were used to verify the findings in the consultation event and form the main output from KWILLT, the use of which are discussed later.

Results

Temperature measurements: The temperature measurements revealed three key findings. First, people were not always able to warm their homes to safe, recommended levels (18° in the bedroom and 21° in the living room).[3] Most homes were cold at some point in the day but it was not always clear if this was when the home was empty. This is a limitation of the data. 13 homes were very cold, consistently and to unsafe levels. Some of the most vulnerable were in privately owned or rented accommodation (Chart 1). These participants were referred to relevant agencies for support and help. Second, there were huge variations of temperature in most homes over a 24 hour period. Thirdly, cold homes were not always those in fuel poverty or with inefficient systems. Some participants could afford their heating and had made the home energy efficient (e.g. had decent homes/warm front upgrades) but they did not keep the home warm (Chart 2). Factors influencing decisions, behaviour and ability to keep warm are detailed next.

Factors influencing decisions and behaviour: There was a complex interaction of factors identified to explain whether people were able to or chose to keep warm. Influences combined in such a way that people were to able to or preferred not to access help or change their behaviour. Behaviours and decisions related to using their heating, spending money, accessing cheaper tariffs, accessing benefits or asking for help. The three main categories of factors are situation, values and barriers:

Situation or context factors. The participants described how factors related to personal situation and environmental context affect how people are able to keep warm or not. People who differ with regard to these factors will make different decisions regarding home heating. Key factors are listed/explained below and their importance illustrated in part by the quotes in Box 1.

Income: The participant's current and previous income influenced heating behaviour, for example whether someone had been or was in fuel poverty or not, whether they have a history of living on a low income or being in debt, on a flat income, or on a pension.

Age: The generation that a participant came from was seen to influence decisions and behaviour. If someone was of an older (80+) or younger generation (55-65) it impacted upon the social norms and influences they had been exposed to or espoused regarding heating, familiarity to different heating technology, expectations regarding hardship, payment methods.

Social connections: How socially isolated someone was seen to influence knowledge, awareness and behaviour. This was partly because the socially isolated people lacked

sources of information and help. However, some who were socially connected were exposed to and influenced by incorrect information from social contacts. When social connections changed, for example bereavement, retirement or isolation due to illness, this created trigger points for older people to change heating behaviour and become vulnerable to being cold at home.

Housing type and tenure: Many of the most vulnerable participants were in privately rented housing as they lacked confidence, control and money to change their environment. However some participants in social, privately owned and energy efficient properties were still cold.

Health: The underlying health status and frailty of an older person was seen to impact upon ability to keep warm. Some of the younger participants were amongst the most vulnerable because of physical and mental health problems and multi-morbidities.

Values and beliefs. Numerous examples emerged to explain how values and beliefs that were built up over a lifetime influenced decisions and behaviour. These interacted with the situational and contextual factors and the barriers in such a way that people would end up being cold at home. In order to explain how these worked we "clustered" values and beliefs that were developed from life's experiences. The "clusters" describe a stance that would increase someone's risk of being cold. Participants were seen to ascribe to more than one cluster of values and beliefs. In combination it was possible to see how someone might make decisions that result in them being cold, not accessing cheaper fuel tariffs or help available. Whilst irrational to others, these decisions are sensible from the perspective of the participants and at the time were part of their way of coping with life.

"Making ends meet": This describes people who value thrift, are proud and would not welcome interference or help from others, would prefer to struggle on their own and keep independent, whilst managing competing priorities financially and make choices regarding money

"I can manage": This cluster describes people who are also thrifty, but who place great store on hardiness and stoicism. Part of their coping strategy would be to put a brave face on things and not publically be seen to be in need.

"It's my business": People in this cluster had learnt to be mistrustful of others by default. This, alongside pride and a deep-rooted desire to stay independent made them fiercely private and could lead to social isolation.

"I'm frightened": Some participants valued independence and privacy, but this was based on a fear of losing these and becoming dependent on others. Worries about personal safety, security of tenure and vulnerability exacerbated these fears and values.

"I'll stay as I am": This cluster described people who struggled with change, and valued routine in their lives. This was partly due to fear and mistrust of others, whether individuals or organisations. They would keep their own council and keep things as they were, for example methods of paying fuel bills and not changing to cheaper modes of payment.

Barriers. These were the obstacles that older people encounter that interact with keeping warm and make them vulnerable to the negative impacts of fuel poverty and a cold home. Four main barriers emerged.

Awareness: Across all the participants there were low levels of knowledge and awareness on why it is important to keep warm, what temperatures are recommended, where to get information from and how to access help.

Technology: Low levels of knowledge, experience and literacy regarding different technologies put older people at a disadvantage when trying to keep warm especially regarding heating technology (boilers and programmers), information technology (internet and electronic media) and banking (direct debit and online payment systems)

Disjointed systems: Some of the most vulnerable participants lived in an unfamiliar world where structures, systems and organisations had changed tremendously since their youth. This made it difficult to access them for help. One change was how fragmented things were and how difficult it was to navigate your way to information and support. For example many participants had lived most of their lives in solid fuel housing and with nationalised energy industries. The world of privatised energy suppliers was unfamiliar and bewildering.

Invisibility: Older people in our sample were used to solid fuel housing where fuel was tangible and payments were in cash. They found it difficult to make judgements about fuel use when fuel and its payment were invisible e.g. gas central heating and payment by direct debit. This increased the risk that an older person would self-disconnect or only heat one room due to fear of fuel debt.

Discussion

The study has provided a unique understanding of the complex environment within which vulnerable older citizens live and the factors that conspire against them being able to keep warm. The temperature measurement data indicate that many people did not understand how to use their heating systems efficiently or were reluctant to heat the home consistently. The study provides some insight into why older people at risk of being cold are not always able to make decisions to keep them warm. It reinforces and expands the findings of others who suggest factors such as low levels of awareness and knowledge regarding heating, and

underlying beliefs and values can influence heating decisions and behaviours to the detriment of health.[21-23]

The findings challenge assumptions held by health professionals and others about who is at risk from cold at home. For example some of our younger participants (55-60 years of age) were the most vulnerable because they lived on a low income, in privately rented accommodation, had mental and physical health problems, lacked the ability to access and understand information and were fiercely protective of their privacy and pride. Also, some older people with family, who at first glance appeared supported and in decent homes, were vulnerable because of mistrust of energy companies and unfamiliar fuel payment methods, had family who were uninformed, poor understanding of their heating systems and values such as hardiness and thrift.

Limitations

The main limitation of the study is that it was conducted on a single site. Whilst this could restrict the transferability of findings, the adoption of different data collection methods, and associated triangulation mitigated against this. Of particular use here was the consultation event where local, regional and national representatives from health, local government, housing, energy, community and voluntary sector were brought together to challenge the findings. Participants reinforced the resonance of the KWILLT data and interpretation supporting its application to similar populations elsewhere.

The temperature measurements were conducted as an objective measure and were not intended for in-depth analysis. The measurements revealed that most homes were cold at some point in the day but it was not always clear if this was when the home was empty. Whilst this was a limitation of the data and could have been overcome with more surveillance or recording of movement within the home for example by using diaries. However, such strategies may have been burdensome for older participants and may have resulted refusal to participate by some who provided insight into the importance of factors such as mistrust, protecting privacy and be fearful of change.

Expected impact on the relevant field

The first challenge for health and social care staff is how to identify those older people vulnerable to cold related ill health, even if not fuel poor, and those whose vulnerability may not be apparent? In order to translate the complex KWILLT findings into a format that can inform practice we have devised a social marketing segmentation model (Table 5). The segmentation model identifies six “types” of older people who are at risk of being cold for different reasons. For each group we have developed a pen portrait which can be used to

help health and social care staff understand the range of people at risk and identify and assess them. In addition, National Energy Action recommends three simple questions that can be integrated into patient assessment (Box 4).

The second challenge for busy front line staff is to know how to help those identified as vulnerable in terms of keeping warm. In England there is now a strategic requirement for public health, newly formed Health and Wellbeing Boards and Clinical Commissioning Groups, to ensure that clinical staff are supported by appropriate systems and processes in line with the requirements in the new Cold Weather Plan,. This means, if they do identify a vulnerable patient, they can be referred for appropriate help. Partnership referral schemes can help with this but such schemes need to be responsive, particularly for clinical staff to engage with them. The KWILLT pen portraits can be used at a strategic level to help organisations think through what referral processes need to be in place, how they can work, and who has responsibilities to make this happen. The segmentation model allows localities to use geo-demographic modelling to identify where in their area those at risk live, which in England can form part of the Joint Strategic Needs Assessment.

It is clear that health services can not work alone in meeting the needs of vulnerable older people and avoiding preventable winter deaths and illness. Strategic partnerships with local government, voluntary and community groups are essential to open up referral and access to community services. An Affordable Warmth Strategy Group which reports into the Health and Wellbeing Board will help to achieve the required partnership and boundary spanning approaches.[24] Interventions such as older people's energy champions or energy coaching, that adopt health trainer and health champion models, can be an invaluable referral option to clinical staff.[25] They can provide the information, support and help required to increase awareness, address inaccurate beliefs, change mindsets and increase access to help. A broad, but co-ordinated partnership that involves health and social care but adopts a boundary spanning approach will also help to build capacity and awareness within communities where those at risk live. KWILLT indicates how social isolation and poorly informed families can worsen the risk of cold related ill health for vulnerable older people.

Importantly, our findings indicate that neither partnerships nor practitioners can rely on risk assessment and interventions alone since many people in receipt of home improvements remained cold. As public health delivery in England shifts to an outcomes based approach it is critical that front line staff visiting older people take the opportunity to provide information about safe temperatures and check ambient temperatures in the home, particularly during

cold spells. This echoes recent calls for health care professionals to "make every contact count" to prevent ill health and promote healthy lifestyles and decisions.[26]

Finally, we consider that our research has implications for the implementation of aspects of the new Energy Bill, particularly the Green Deal and the Energy Company Obligation[15] which will target energy efficiency measures at vulnerable people on low incomes and those in hard to treat housing. For example, the reluctance of some older people to deal directly with energy companies because of perceived lack of trust may suggest that an 'honest broker' may help them access entitlements.

Conclusion

The policy and economic environments regarding cold weather and health are continually changing. As fuel poverty levels and fuel costs continue to escalate there is an ever increasing need to address some of the barriers and drivers to decision making that make older people susceptible to preventable winter death and illness. Whist this is challenging, there are opportunities. The current Health and Social Care Bill moves directors of public health and their teams to local authorities, thus aligning them with local government housing, energy, environment and adult services. KWILLT provides insight of value in informing the NHS and Health and Wellbeing Boards at a strategic as well as clinical level, in responding to the needs of older people. If we become more efficient in identifying those at risk ,improving access to help and close the loop by ensuring our interventions result in warmer homes, there is potential to make an immediate public health impact by reducing excess winter deaths and avoidable cold related NHS use.

What is already known on this topic

- Current data suggests that there are approximately 26000 excess winter deaths in England, the majority of which are in those over 65. Fuel poverty and excess winter deaths are increasing.
- From November 2011 the Cold Weather Plan for England requires NHS, local government and communities to improve preparation and response to cold weather and reduce the negative impact of cold weather.
- Very little is known about the influences on older people's decision making and behaviour regarding keeping warm in winter.

What this study adds

- Older people's homes can be cold to unsafe levels with huge variations in temperatures.
- Knowledge and awareness of safe temperatures, the health impact of cold and how to use heating efficiently were low across the study participants.
- Older people's values and beliefs interact with the contextual factors and barriers in such a way that they often end up being cold at home. An Affordable Warmth Strategy Group will help bring about the required partnership, systems, boundary spanning approaches and capacity development in staff and communities needed to reduce excess winter deaths.
- Greater focus is needed to ensure affordable warmth interventions achieve the desired outcome of safe indoor temperatures for elderly and other vulnerable people

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Table 1 Older People's Demographic Data

AGE		ETHNICITY		GENDER		
55-69	65+	BME	ENGLISH	FEMALE	MALE	COUPLES
14	36	19	31	36	10	4

[1] BME = Black and minority ethnic

Table 2. Tenure of property

TENURE	NUMBER
Private owned	33
Private rented	5
Council	11
Sheltered	1

Table 3 Health and social care professionals

SETTING	NUMBER
Strategic NHS	**2**
Community/primary care NHS (nursing, physiotherapy, GP)	**7**
Community Occupational Therapy	**2**
Domiciliary care providers - Local Authority	**2**
Domiciliary care providers - voluntary sector	**2**
Housing	**6**
Voluntary sector	**2**
Fire and Rescue	**1**
Pensions advice	**1**
Total	**25**

Table 4. Summary of Focus Groups

Focus Group	MALE	FEMALE	TOTAL
FGOP1	3	7	10
FGOP2	0	8	8
FGOP3	1	5	6
FGS1 (Strategic)	4	4	8
FGS2 (Elected members of the council)	3	2	5
FGS3 (Clinical staff)	1	5	6
Total	12	31	43

FGOP = focus group for older people and FGS focus group for staff/Council

Chart 1. Temperature measurements for OP25. 73 year old South Asian man living alone in privately rented accommodation. Traditional, terraced property.

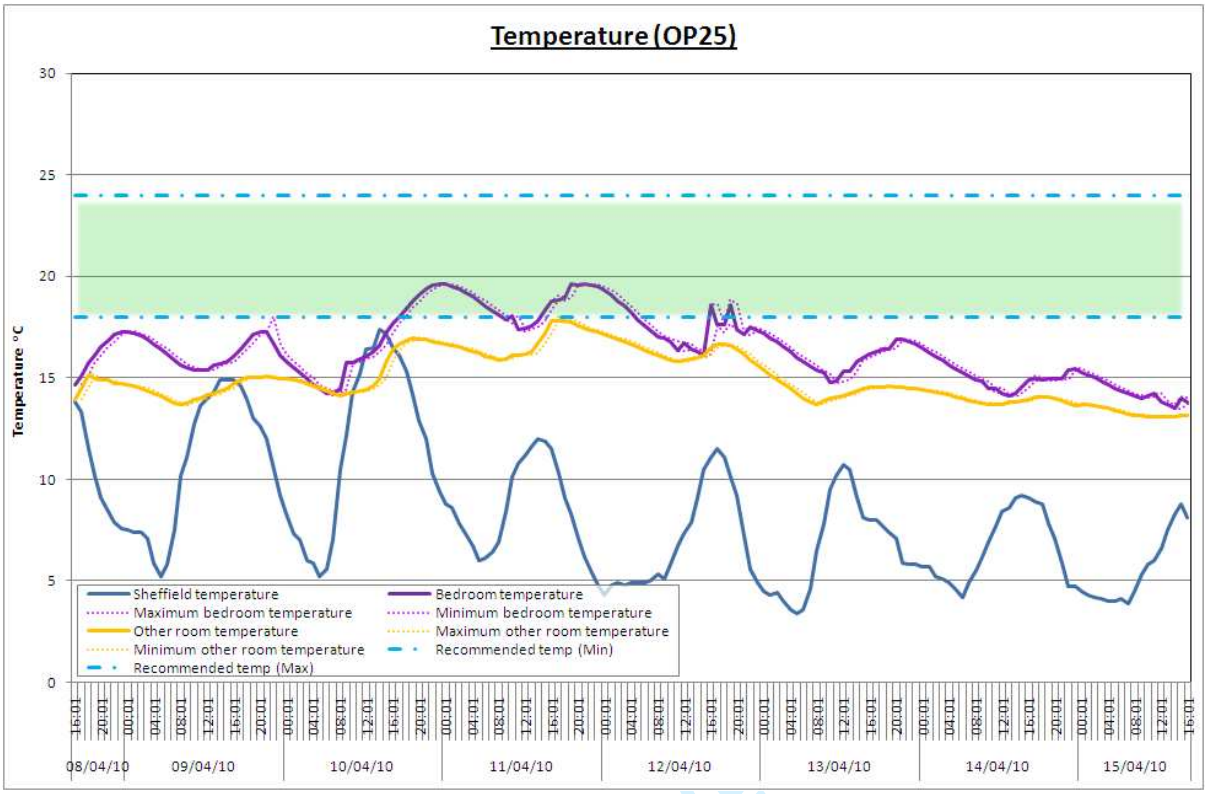
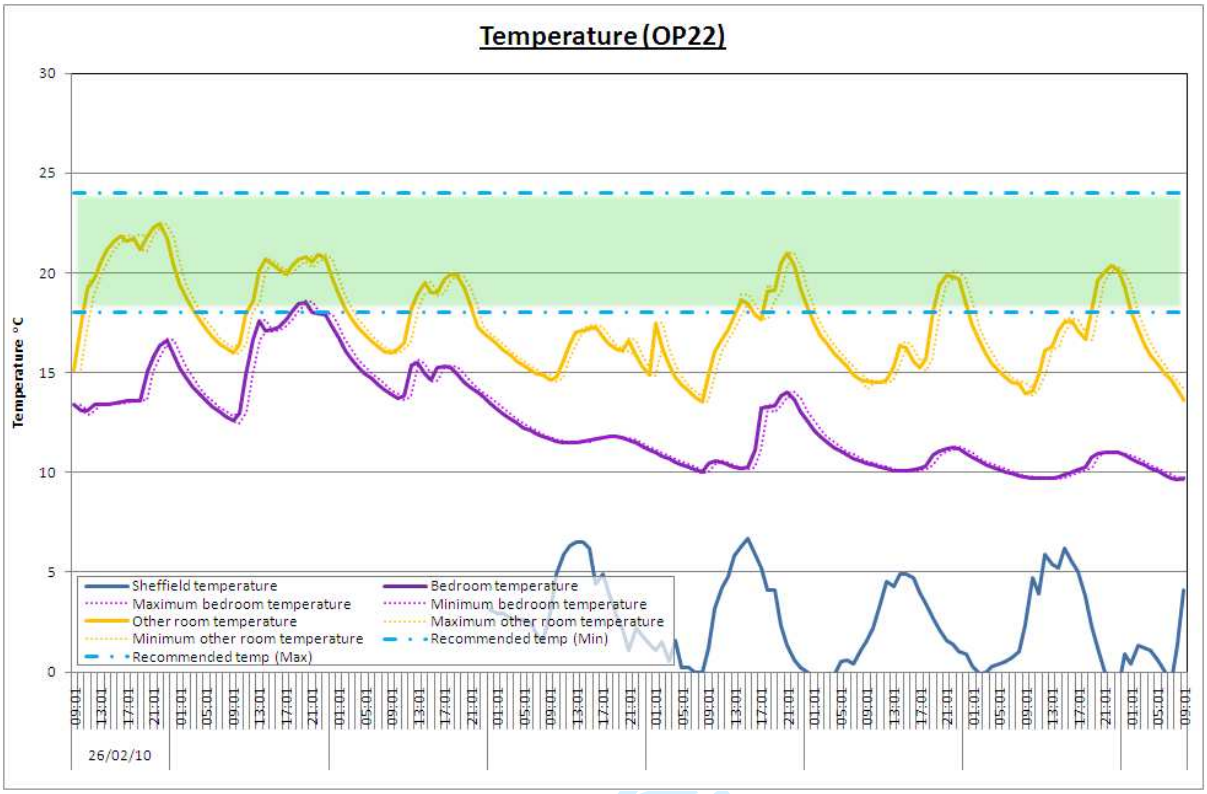


Chart 2. Temperature measurements for OP22. 84 year old white British woman living alone in a Council owned property that has been upgraded to Decent Homes standard. Bedroom and living room often at unsafe temperature.



Box 1. Situational and context influences

Income:
"I haven't got a bank account that's got any savings in anyway. I've got one that it's, my husband's pension is paid into it, but that just about covers my bills, and there's nothing left over, you know what I mean"? (OP8. Female/76)

Age:
"But if it gets cold I put more clothes on or wrap a fleece round me rather than turn the heating up. That is always my last resort, to turn the heating up. I was trained to be frugal, it was part of my upbringing. You didn't have a lot so you were careful with what you did have. And with the costs rising now, I'm certainly not extravagant with the heating, I'm very wary". (OP34. Female/76)

Social connections:
"My son-in-law says, his very words was take no bloody notice of the buggers [energy companies offering social tariffs], he says carry on as you are" (OP21. Male/81)
"My sister is methodological... she checks, she's online and she is following all the time and whichever is the cheapest.... a month ago we swopped from [energy supplier 1] to [energy supplier 2] ..... she tracks them all" (OP11. Couple/early 70's)

Housing type and tenure:
"but in the sitting room where the telly is that room is very, very cold. I mean they do put the heating on but still that room is very cold so he does suffer can't stay in that room for long. (OP33. Male/77)
"It's cold but what can I do. If it's cold then I use it even if it's a bit risky. The council people will not help you because it's private now; I bought the property, I'm on a mortgage and council don't help private you know". (OP6. Female/55)
"I said to the gas man can't you tell him [the landlord] that I want central heating putting in..... I'm frightened if I say anything to him he'll tell me to get out, you know what I mean". (OP29. Female/59)

Health:
"I've got health problems but I think it's the fact that I'm older now and my circulation's not as good as it was". (OP16 Female/82)

Box 2. Values and beliefs

"Making ends meet": thrift, pride, struggling, competing priorities

Interviewer: If you were eligible would you apply for grants?
I don't think so, no. I've always been independent. I don't think you should have to do [apply for grants]. That's why I say I think you should get, I mean on the Continent they all get better pensions, you know. I think we should have better pensions and there shouldn't be handouts because it's open, wide open to people not genuine which I know happens because I know people that do it.... I don't spend a lot. I don't go out to Bingo and things like that like some do and expect expensive holidays or anything2 (OP 16 Female/82).

"I think there's occasions when you'd have to go hungry to stay comfortable, but then on the other hand if you're feeling hungry you might think I'll sort of, I don't know, to hell with it I'll put another two jumpers on and have something to eat instead" (OP 29 Female/59).

"I can manage": thrift, hardiness, stoicism

"I mean growing up there would have been ice on the inside of the bedroom windows quite regularly because it would be really, really cold in the bedrooms in winter. So, I don't know, I think you are influenced to think a little bit, in our generation I think you tend to think they're [younger generations] a bit nannied. Talk about a nanny state, you know, but they're so coddled with everything and that it shouldn't really be much of a hardship to be cold occasionally". (OP5. Female/58)

"I've never been spoilt, and I'm not bothered about being right warm" (OP22 Female/84)

"It's my business": mistrust, pride, independence, privacy

"One of my other friends found what she thought was marvellous but it was an offer and she couldn't get it through her brain that it was an offer, and although they didn't say it was an offer, next year it came a lot dearer**.** I think the energies are wrong though because what they've done is they've made people never believe them any more about it's costing that, they're not putting it up just for their own greed or because they can get away with it.... we don't need to heat the whole house, we definitely don't need to heat the whole house. What I'm trying to say is that I can put that on [gas heater] and that's plenty for me in the daytime, I don't want anything else, and therefore it can't be as expensive as heating the whole house." (OP 27 Female/77)

"The only help I ever get is people ringing me with unsolicited phone calls saying do you know about the grants that you can have? I don't want that because that's just somebody trying to sell me something. You know, I find it very confusing actually..... I wouldn't use the internet for paying [energy bills] because I don't trust it..... I mean there have been one or two haven't there, incentives from some of the big energy companies to sort of help you through insulating your home, you know, as a sort of financial incentive, but again I don't trust them. I think that whatever incentive they give us, they'll sneak it onto your bill, you know, across the board.". (OP40 Male/63)

"I'm frightened": independence, privacy, personal safety, vulnerability

I wear fewer clothes, but if it gets cold I put more clothes on or wrap a fleece round me rather than turn the heating up. That is always my last resort, to turn the heating up.

"Oh yes, because I was trained to be frugal, it was part of my upbringing. You didn't have a lot so you were careful with what you did have. And with the costs rising now, I'm certainly not extravagant with the heating, I'm very wary. I worry about my independence not my fuel bills. I don't want to be dependent". (OP34 Female/76)

"I'll stay as I am": struggle with change, like routine, fear, mistrust

"I pay cash. I don't trust them [energy companies]; they might charge more with direct debit". (OP6 Female/55)

"I don't believe in using [bank] cards because you have to remember so many numbers, and I don't believe in doing that, and I once said that at the bank, and she said well it's perfect, I says no it isn't. She says well you could come and use the card thing in the bank. I says yeah but if I'm coming in the bank why can't I stand in the queue and do it that way, I says at least you can have a moan to the person in front or the person behind about the weather or something, you have a little bit of conversation, whereas, you know. .....well besides which when you pay by direct debit you've got no receipt". (OP8 Female/76)

Box 3. Barriers

Awareness: *of healthy temperatures, how to heat the home and energy efficiency*

"But not too warm, that's unhealthy isn't it"? (OP34 Female/76)

"If you get overheated it makes you feel ill" (OP27 Female/77)

Interviewer: Why do you prefer to use the gas fire and not central heating?
"Because it's economical. Central heating is expensive. Rather than put in a central heating with seven or eight radiator, it's cheaper to just warm one room instead of all the house". (OP 31 Male/67)

"I can remember my grandma saying, you know, as long as you keep one room warm and stay in there" (OP29 Female/59)

Technology: *heating, information and banking technology*

"Sometimes I feel quite cold, and I don't know why that is. The radiators were altered when Warm Front came in .....I don't know how to work that one [boiler] in there. That's why I just said to him [heating engineer], when he set it for me, I said look I want to work it manually. I want it going off and coming on when I want to do it. So I just work from the thermostat in the hall and just come down in the morning, switch it on, and when I go up at night I switch it off. You know, so I don't know the first thing about working that boiler" (OP1 Female/71)

"The boiler got something wrong with it. I never use it love" (OP24 Male/84)

"I don't actually have to touch the boiler; I've got a switch on the wall in the hall that I can regulate it with.... I can't actually set it", (OP37 Female/76)

"I haven't got a computer, I don't want a computer, I can't get online, so therefore I am barred from 90% of things [cheaper fuel tariffs] because I'm not computer literate". (OP8 Female/76)

Disjointed systems:

"...energy pricing as well, the fact that there are many suppliers and it's not, again it's not transparent. It's difficult to weave through it all" (OP40 Male/63)

"I stopped with the same one. I don't want any hassle. I don't think I would change, no. I wouldn't like the hassle, no, because nothing's straightforward". (OP16 Female/82)

Invisibility: *cost and use of fuel is invisible now compared to coal*

"I mean because we have had coal fires, I mean I used to love making coal fires. Yeah but we had coal fires, that's what they were there was no, central heating were rare weren't it". (OP11 Couple/early70's)

Box 4. Assessment questions

Patients may be vulnerable to the negative health impact of cold weather if they answer yes to any of the following:

- Is your whole house warm in winter?
- Do you have difficulty paying your energy bills?
- Do you have difficulty heating your house?

Table 5. The KWILLT segmentation model and pen portraits

Segmentation Group	Pen Portrait Name	Description
Isolated and not wanting to cause a bother	Pat	Low income household and fuel poor, over 55, socially isolated and frightened, lacks information and understanding about keeping warm, private rented housing, long term mental health problems (depressions/anxiety)
Getting by cautiously	Ben and Joan	Low income household and fuel poor, over 65, some social connections but not well informed about keeping warm, privately owned house, one partner has chronic health problems
Dependent and poorly informed	Meena	Low income household and fuel poor, over 55, limited social connections, poorly informed about keeping warm, privately owned housing, poor health and mobility and very dependent on close family.
Just about managing	Enid	Can pay for home heating but values thrift , over 70, some social connections but is private and trusts few people so is poorly informed about keeping warm, social housing, physical health problems and sensory impairment
Lonely and out of touch	Pearle	Financially secure but lives in a cold home, over 70, widowed, and socially isolated, poorly informed about keeping warm, privately owned house, physically well but bereaved
Proud and wants to be self sufficient	Fred	Low income but not fuel poor, over 70, regular but superficial social connections, poorly informed but values stoicism and hardiness and thinks he doesn't need any help, social housing, good health, minor ailments.

Copyright

Competing interest declaration

"All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare that (1) AMT, AL, CH, JA, JC, AS, KM, have support from NHS Rotherham for the submitted work; (2) AMT, AL, CH, JA, JC, AS, KM, have no relationships with any companies that might have an interest in the submitted work in the previous 3 years; (3) their spouses, partners, or children have no financial relationships that may be relevant to the submitted work; and (4) AMT, AL, CH, JA, JC, AS, KM, have no non-financial interests that may be relevant to the submitted work."

Details of contributors

We thank all the participants who contributed their time, shared their experiences and their personal stories. We also thank Terri Roche who was instrumental in developing the study in her previous role as Public Health Specialist at NHS Rotherham. We also acknowledge and thanks Cathy Read for her valuable comments on an early version of the paper.

Contributors: AT and TR had the idea for the study. AT was principal investigator, participated in data collection and analysis, and wrote drafts of the manuscript. AL took the lead for the data collection. AL, JC, JA, KM and AS helped design the study, develop the methods, collected and analysed the data, and helped with interpretation. All authors have seen and approved the final version of the manuscript. AT is the guarantor.

Ethics approval

The KWILLT study obtained ethics approval from Leeds East NHS Research Ethics Committee. (REC reference 09/H1306/90) and Research Governance approval from NHS Rotherham (Reference 28841/54078/14/727)
All participants gave informed consent before taking part.

Funding

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Study sponsor

The study sponsor was NHS Rotherham. They hosted the study and held the NIHR RFPB grant. JA was a member of the research team and a co-author of this paper. She is research lead for the sponsor organization. The organisation itself employed AL, the main researcher on the project. AT, the principal investigator, held an honorary contract with the sponsor organisation. NHS Rotherham has supported the collection, analysis, and interpretation of

data but has taken no active role outside of members of the team. They have supported the decision to submit the article for publication

Data integrity
All authors, external and internal, had full access to all of the data (including data reports and tables) in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis.

Data sharing
No additional data available

Research checklist: Keeping warm and well in later life: a qualitative study

No	Item	Guide questions/description
Domain 1: Research team and reflexivity		
Personal Characteristics		
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group? AT, AL, CH
2.	Credentials	What were the researcher's credentials? *PI qualifications PhD MSc, MMedSci, Ba, RGN*
3.	Occupation	What was their occupation at the time of the study? Researcher
4.	Gender	Was the researcher male or female? *Female*
5.	Experience and training	What experience or training did the researcher have? *PhD. Over 15 years experience as a health services researcher*
Relationship with participants		
6.	Relationship established	Was a relationship established prior to study commencement? *No*
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? *Research goals, reasons for doing the research, outputs*
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. *Reasons and interests in the research topic*
Domain 2: study design		
Theoretical framework		
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *Qualitative inquiry,*

No	Item	Guide questions/description
		framework analysis and social marketing
Participant selection		
10.	Sampling	How were participants selected? *e.g. purposive and snowball*
11.	Method of approach	How were participants approached? e*.g. Older people face-to-face via trusted contact. Staff by telephone, mail, email*
12.	Sample size	How many participants were in the study? *50 older people and 25 staff*
13.	Non-participation	How many people refused to participate or dropped out? *No drop out*
Setting		
14.	Setting of data collection	Where was the data collected? e*.g. home, and workplace*
15.	Presence of non-participants	Was anyone else present besides the participants and researchers? *No*
16.	Description of sample	What are the important characteristics of the sample? *e.g. age, gender*
Data collection		
17.	Interview guide	Were questions, prompts, guides provided by the authors? *Examples of questions and list of issues covered provided*
18.	Repeat interviews	Were repeat interviews carried out? *No*
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data? *Audio*
20.	Field notes	Were field notes made during and/or after the interview or focus group? *Yes*
21.	Duration	What was the duration of the interviews or focus group? *20-60 mins*
22.	Data saturation	Was data saturation discussed? *No, not a grounded theory study*
23.	Transcripts returned	Were transcripts returned to

No	Item	Guide questions/description
		participants for comment and/or correction? *No*
Domain 3: analysis and findingsz		
Data analysis		
24.	Number of data coders	How many data coders coded the data? *4*
25.	Description of the coding tree	Did authors provide a description of the coding tree? *Thematic framework summary used to present findings. Segmentation model given*
26.	Derivation of themes	Were themes identified in advance or derived from the data? *Initial thematic framework developed a priori and then developed during analysis*
27.	Software	What software, if applicable, was used to manage the data? *NVIVO*
28.	Participant checking	Did participants provide feedback on the findings? *Some attended the consultation event*
Reporting		
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? *Yes*
30.	Data and findings consistent	Was there consistency between the data presented and the findings? *Yes*
31.	Clarity of major themes	Were major themes clearly presented in the findings? *Yes*
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes? *NO*

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24/1/12

Dear Sir/ Madam

Re: Keeping warm and well in later life: a qualitative study

I would be grateful if you would consider the attached article for peer review and publication. The paper reports findings of the Keeping Warm in Later Life projecT, funded by the NIHR Research for Patient Benefit Programme, with a focus on the data from older people. The project completed on 30 November 2011. the final report was approved on 19th December 2011.

The study has formed the basis of one publication (details attached). This previous paper was directed more at a social science audience and focused on a specific element of the findings i.e. social connectedness and technology. The aim of the article we are submitting to you is to provide an overview of the insight generated by the study in such a way that it is useful to medical and NHS staff at a clinical and strategic level.

Further information about the project is available on the KWILLT website: http://kwillt.org/ This includes details of presentations at meetings, powerpoint presentations and responses to national consultations.

If you think it appropriate, we would like you to consider the publication for fast track review. The reasons for this are:

- We are mid winter and the topic is of seasonal relevance as we anticipate a spell of cold weather at any time. Fuel poverty and excess winter death rates have been steadily rising since 2003.
- The Department of Health has recently released its first Cold Weather Plan. Clinicians and public health department around the country will be reflecting

on how to meet the requirements of the plan, including how to raise awareness, develop clinical pathways and develop capacity in clinical staff. The insight and outputs from KWILLT have potential to help with this. A rapid publication would be timely.

- The Department of Health has just released a funding stream of £5million Warm Homes: Healthy People. This was announced early December and decisions made and funding allocated 20 December. Delivery will be 30 March 2012. The paper also has potential to inform Public Health, NHS, local government plans to achieve the aims of their bids.

We would also like to suggest the following as peer reviewers of the paper:

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We can give assurance that the study was funded by the NIHR. The final report has been approved. It received all necessary NHS Research ethics and governance approvals.

Many thanks for your consideration. We look forward to hearing from you.

Yours sincerely

Angela Tod

Principal Investigator for KWILLT

Lusambili AM. **Tod AM.** Homer C. Abbott J. Cooke J. McDaid K. (2011) Keeping Warm: Social Connectedness and Technology (A Case Study of Rotherham (England): Technology and Health in the Elderly *The International Journal of Health, Wellness and Society*, 2011; 1: 3. 27-42.

Keeping Warm: Social Connectedness and Technology - A Case Study of Rotherham, England 'Technology and Health in the Elderly'

Adelaide M. Lusambili, Angela Mary Tod, Catherine Homer, Jo Abbott, Jo Cooke, Kathleen Anne McDaid,

Abstract: The purpose of this paper is to discuss the relationship between social connectedness and modern technology with the ability of older people to keep warm during winter. Findings from previous research in England found that high fuel prices, low income and changing patterns of fuel consumption are key barriers to keeping warm in winter for many families. Living in a cold home increases the risk of winter hospital admissions, especially among the elderly with respiratory problems. This multi-disciplinary interview-based project conducted in Rotherham (England) involved social care professionals, public health specialists, and user–representatives, sociologists and medical anthropologists.

We have identified many ways in which modern technology is a barrier in heating homes in winter. Using the sociological theory of Symbolic Interaction (SI) we will discuss how social connectedness and use of modern technology influences older people in heating their homes and ultimately how these factors affect their health and well being. This paper is aimed at social care professionals, policy makers, public health specialists and governments.

Understanding factors influencing older, vulnerable people keeping warm and well in winter: a qualitative study

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Understanding factors influencing older, vulnerable people keeping warm and well in winter: a qualitative study

Abstract

Objectives

To understand the influences and decisions of older vulnerable people in relation to keeping warm in winter.

Design

A qualitative study incorporating in-depth, semi-structured individual and group interviews, Framework Analysis and social marketing sementation techniques.

Setting

Rotherham, South Yorkshire, UK

Participants

50 older people (>55) and 25 health and social care staff underwent individual interview. The older people also had household temperature measurements. 24 older people and 19 health and social care staff participated in one of six group interviews.

Results

Multiple, complex factors emerged to explain whether older people were able to keep warm. These influences combined in various ways that meant older people were not able to or preferred not to access help or change home heating behaviour. Factors influencing behaviours and decisions relating to use of heating, spending money, accessing cheaper tariffs, accessing benefits or asking for help fell into three main categories. These were situational and contextual factors, attitudes and values, and barriers. Barriers included poor knowledge and awareness, technology, disjointed systems and the invisibility of fuel and fuel payment. Findings formed the basis of a social marketing segmentation model used to develop six pen portraits that illustrated how factors that conspire against older people being able to keep warm

Conclusions

The findings illustrate how and why older people may be at risk of a cold home. The pen portraits provide an accessible vehicle and reflective tool to raise the capacity of the NHS in responding to their needs in line with the Cold Weather Plan. *(251 words)*

Understanding factors influencing older, vulnerable people keeping warm and well in winter: a qualitative study

Introduction

Cold weather kills.[1-5] Throughout Europe and beyond higher rates of excess winter deaths are found in countries with less severe, milder winter climates.[6,7] In November 2011 the Department of Health and Health Protection Agency released the first Cold Weather Plan for England[1] along with the supporting evidence of why cold weather planning is essential to health and wellbeing.[2] In 2008-9 over 26000 excess winter deaths (EWD) were reported in England, with the majority occurring in those over 65.[8] EWD are calculated by comparing deaths in winter months (December to March) with the expected number of deaths (average non-winter months). EWD rates have been rising since 2003 and account for 1 in 20 of all deaths per year in England.[8] Approximately 40% are due to cardiovascular deaths and a third due to respiratory mortality.[1,9] England compares unfavourably to other northern European countries in terms of winter deaths with colder countries, like Finland, experiencing half the EWDs.[1] Countries such as Finland are better prepared for the cold in terms of thermal efficiency of properties and outdoor clothing.[1,10] In addition to mortality, cold weather reaps huge costs in terms of morbidity and health care use. Older people are amongst those most at risk of the negative health impact of cold weather along with children and young families, and those with multiple co-morbidities and disabilities. Risk of death is increased in winter particularly for older people with underlying health conditions such as heart and respiratory diseases.[1-5] Indirect impacts of cold weather include depression and poor mental health.[5]

Increasing fuel prices, reducing household incomes and energy inefficient homes have all contributed to the rising trend in England in rates of fuel poverty.[1,11] More than four million households were in fuel poverty in 2009, with rates increasing to over six million in 2011. Fuel poverty occurs when households have to spend more than 10% of their income to attain World Health Organisation minimum temperature standards (21°C in the living room and 18° in the bedroom).[4] Those in fuel poverty are at risk greater risk of death and illness due to cold weather.[1,5] Older people, with underlying health conditions and a flat, pension-reliant income are amongst the largest population who are fuel poor.

The Cold Weather Plan[1] is one of a suite of measures the Department of Health has implemented in order to make an impact on reducing mortality and morbidity due to cold weather and reduce the avoidable demand on the NHS. It builds on previous initiatives such as flu vaccination of those at risk, the Keep Warm Keep Well information campaign[12], NHS winter pressures and resilience programmes and Winterwatch.[13] The plan sets out what

needs to happen to prepare for and respond to cold weather and avoid the negative health impacts. It advocates collaborative working between NHS, Local Authority, communities and individuals.

Questions arise for frontline NHS staff and NHS organisations regarding their responsibility in delivering the Cold Weather Plan and what to do if an older person is suspected of living in a cold home or at risk of fuel poverty. In order to address these questions this paper reports selected findings from the Keeping Warm in Later Life projecT (KWILLT), a qualitative study funded by the National Institute for Health Research, Research for Patient Benefit Programme. To date policy and practice interventions to address fuel poverty and reduce the negative health impact of cold weather have focused on increasing household income available to afford fuel (e.g. cold weather and winter fuel payments, accessing benefits for those eligible), reducing fuel cost (e.g. introducing social tariffs for fuel, reduced direct debit / online payment rates, warm home discount), and increasing the energy efficiency of the property (e.g. Warm Front[14] and the planned Green Deal and Energy Company Obligation[15]). However, there is a concern that those most susceptible to the negative health impacts of cold weather are not always in a position to access initiatives or the interventions are not well targeted to those in most need.[4,16] In addition, the contribution of health professionals to this agenda is not always clear. In order to improve access and uptake of interventions and clarify the contribution of health professionals it is important to understand and identify influences the decisions of older, vulnerable people in relation to keeping warm in winter.

Little is known about the factors influencing older people's home heating behaviour and barriers regarding keeping warm at home. There is however, a small but growing literature that does provide some insight. How older people view and identify themselves in terms of vulnerability and risk related to cold weather has been examined. Evidence suggests older people may not respond to messages regarding safer temperatures or accessing affordable warmth interventions because they do not define or see themselves as old. Explanations for resistance to public awareness messages include age related stigma, resistance of media representations of older people, and conflict between policy and campaign messages with existing beliefs and behaviour.[17-20] There is an indication that older people may see extreme temperatures as something to "put up with" and that little can be done to help outside of common-sense, reactive behaviours such as wearing extra clothes and consuming hot food and drink.[19] Uptake and use of affordable warmth and heating installations by older people is also compromised by perceptions of central heating being unhealthy[21] and the complex nature of attitudes to comfort.[22] In an evaluation of the "Warm Front"

affordable warmth installation scheme in England preferences for low temperatures and a belief these make you hardy accounted for persistent cold home temperatures *after* installation.[22] Fear of high fuel bills, and adversity in childhood and early adulthood, also explained frugality and low temperatures regarding heating.[19,22,23] Factors usually associated with fuel poverty do not fully explain why some older people live in cold homes. Low temperatures in the home are not always explained by income and fuel cost and preferences for low temperatures not just held by those living in deprived areas.[22] Questions have been raised, regarding the adequacy of policy to address needs of diverse populations who collectively defined within policy as vulnerable on the basis of age alone.[20] The ability of policy and vulnerable households to be prepared for cold weather, as well as just react to it, has also been questioned.[19]

The environment within with older people make decisions about home temperatures is therefore complex. KWILLT aimed to add to existing understanding and evidence and examine influences on older people's heating decisions and behaviour. The aim was to explore extrinsic and contextual factors (income, fuel cost and energy efficiency of property) alongside intrinsic factors (values, beliefs, knowledge and perceptions) and how these two groups of factors interrelated. The purpose was to generate insight to inform the development of social marketing materials to increase the knowledge and awareness of the public regarding the risks of fuel poverty and cold weather and what can be done to help, and to improve service access for vulnerable people. Social Marketing is an approach used to develop activities aimed at changing or maintaining people's behaviour and encouraging behaviours that provide benefit for individuals and society as a whole.[24] Social marketing targets specific segments of a population that are at increased risk, in this case of EWD. The aim is to promote change at a population and individual level.[25] Social marketing can include involve interventions at various levels. In addition to public campaign and information interventions, social marketing insight can lead to redesign of services, environmental change and legislative or regulatory change.[26] The social marketing product that was developed and is discussed in this paper was a series of six 'pen portraits' that illustrated the complex interaction of the influences on older people in terms of keeping warm. The pen portraits aim to capture the diversity of experience and therefore the need for multi-faceted response from policy and services.

This paper focuses on the study data from older people and presents the insight that was generated to explain current vulnerability and need amongst older people. This is

used to consider how NHS clinicians and organisations can respond to better meet that need and how the pen portraits can be used to help.

Methods

Study approach

We conducted a qualitative study in two stages incorporating in-depth, semi-structured individual interviews, and group interviews. This use of different data collection techniques in each stage allowed us to triangulate findings, expand and verify the data and thus increase the rigour and transferability of the findings. The study was conducted in Rotherham, South Yorkshire, an area experiencing high levels of EWD and fuel poverty that are above the National average.[6,27] The study area also has non-traditional and old housing stock, that create challenges in terms of energy efficiency. NHS research ethics and governance approvals were obtained.

Sample and recruitment

Stage 1

In the initial stage we recruited 50 older people and 25 health and social care staff. Older people were over 55 years of age. This relatively young age was selected because of the early onset of chronic disease and accelerated aging experienced in the population due to the legacy of its industrial past, levels of deprivation and unemployment and behaviours such as smoking. With reference to the existing literature recruitment was not just conducted in areas with the most deprivation populations and poor housing stock. Areas with the highest winter hospital admissions for falls, cardiovascular disease and respiratory complains in over 55 groups were also included. **This ensured the inclusion of those who may be asset rich (live in a large property) but cash poor (with limited income to heat, maintain or insulate the home), those who's vulnerability and behaviour may be influenced by preferences, perceptions and beliefs as well as those who were fuel poor. The aim was to recruit a diverse sample of older people vulnerable to EWD and the negative health impacts of cold homes, whether fuel poor or not.**

Participants were recruited through older people's day care centres, community organizations working with vulnerable older people, and local faith groups. Snowball sampling was also used to recruit isolated participants. This approach helped ensure that a range of participants in relation to key characteristics including age, gender, type and tenure of housing, living alone or with spouse / family, and fuel poverty. Participants were approached about the study by someone known to them, either the relevant organisation or

a previous participant. Those who agreed were telephoned by the researcher to arrange the interview. Health and social care professionals were recruited via email or phone through their employing organisations. Organisations included were from NHS, Local Authority and the community and voluntary sector. The criteria for recruitment was that they were involved at a strategic or practice level in the delivery of care or support to older people in their home

The older people who participated in individual interviews included a range in terms of age, ethnicity and gender (Table1) and type and tenure of housing (Table 2). There was an imbalance in the sample in favour of women and BME participants when compared to the population. Four interviews were conducted with couples. The majority conducted were with one person in the household.

Staff who participated in individual interviews represented a range of roles from general practitioners, community and specialist nurses, allied health professionals, housing, domiciliary care providers, wardens, telephone assessment and advice workers and housing officers (Table 3).

Stage 2

Six focus groups were conducted in total. Three groups were conducted with older people recruited from day centres or community groups. Three with staff were conducted with primary care health staff, social and voluntary sector staff and another with elected members of the Council with related responsibility or interest. Recruitment was conducted via the organiser or chair of the group. Table 4 gives a summary of the focus group participant numbers and gender and again demonstrates high participation by women.

Data Collection

All individual interviewees were contacted by telephone by one of the research team to discuss the study and arrange the interview. Consent was obtained prior to the interview which was digitally recorded. Interviews with older people were conducted in the winter months of 2009/10 and 20010/11. Interviews with staff took place between March and September of 2010. Interviews were guided by an interview schedule.

Group interviews with staff (n=19) and older people (n=24) were held between January and March 2011 and took place in community venues where the recruiting organisation or group usually met. Participant information and consent forms were posted

out to participants by the organisation or group were possible. Full information was provided at the beginning of the group prior to the interview commencing and consent being obtained. A topic guide was developed based on the findings from stage 1 and used to guide the discussion. **Two members of the research team attended the focus group, one facilitated the discussion and the other acted as a scribe.** They were digitally recorded. Individual and group interview data were transcribed in full and any identifying data removed. Transcripts and field notes were entered onto NVivo8 software and temperature and humidity measurements entered onto SPSS software for analysis.

Data analysis

Data was initially analysed using a framework analysis approach.[28] Following this social marketing techniques were applied.[26] All the interviews were analysed by one researcher (AL) and other researchers (AT, CH, JC) independently analysed selected transcripts to verify interpretation. NVivo was used to facilitate this using tree nodes, cross linking, coding reports and memos. Following the individual interviews conducted in the first winter, interim analysis was conducted and a provisional thematic framework was developed. Following each subsequent stage of the study the new data was used to challenge and expand upon the existing thematic framework. This occurred during regular research team discussions where consensus on the thematic framework was generated through negotiation. The thematic framework mapped out the information and awareness issues, behavioural factors and barriers to keeping warm (Table 5)

For the social marketing stage a series of research team meetings were held to review the thematic framework and underpinning data. The situational or contextual factors, attitudinal factors and barriers influencing heating decisions and behaviour were mapped out (Table 6). Diagrams, charts and matrices were developed to aid interpretation and to cluster linked factors and items which were then compared back to the original data for verification. Segmentation criteria were identified through this process. Segmentation is a way of looking at the population of concern and identifying distinct sub-groups or segments with similar characteristics, situations, needs, attitudes or behaviour. The criteria was used to develop the "segmentation model" from which six "sub-groups" of older people were identified who were at risk of the negative health impact of cold weather because of contextual or attitudinal factors or barriers. These six groups form the basis for the pen portraits (Table 7). Three pen portraits (Ben and Joan, Pat, and Meena) provide insight into how factors may coincide to mean older people who are fuel poor live in a cold home. Three

others (Enid, Peale and Fred) present experiences of those who are not fuel poor. The number of participants who broadly fit within each pen portrait segment or sub-group is given in Table 7. The findings that informed the development of the pen portraits are presented here.

Results

Factors influencing decisions and behaviour: **There was a complex interaction of factors identified to explain whether people were able to or chose to keep warm. Influences combined in such a way that people were to able to or preferred not to access help or change their behaviour. Behaviours and decisions related to using their heating, spending money, accessing cheaper tariffs, accessing benefits or asking for help. The three main categories of factors are situational and contextual factors, attitudes and values, and barriers:**

Situation or context factors. The participants described how factors related to personal situation and environmental context affect how people are able to keep warm or not. People who differ with regard to these factors will make different decisions regarding home heating. Key factors are listed/explained below and their importance illustrated in part by the quotes in Box 1.

Income: The participant's current and previous income influenced heating behaviour, for example whether someone had been or was in fuel poverty or not, whether they have a history of living on a low income or being in debt, on a flat income, or on a pension.

Age: The generation that a participant came from was seen to influence decisions and behaviour. If someone was of an older (80+) or younger generation (55-65) it impacted upon the social norms and influences they had been exposed to or espoused regarding heating, familiarity to different heating technology, expectations regarding hardship, payment methods.

Social connections: How socially isolated someone was seen to influence knowledge, awareness and behaviour. This was partly because the socially isolated people lacked sources of information and help. However, some who were socially connected were exposed to and influenced by incorrect information from social contacts. When social connections changed, for example bereavement, retirement or isolation due to illness, this created trigger points for older people to change heating behaviour and become vulnerable to being cold at home.

Housing type and tenure: Many of the most vulnerable participants were in privately rented housing as they lacked confidence, control and money to change their environment.

However some participants in social, privately owned and energy efficient properties were still cold.

Health: The underlying health status and frailty of an older person was seen to impact upon ability to keep warm. Some of the younger participants were amongst the most vulnerable because of physical and mental health problems and multi-morbidities.

Attitudes and values. Numerous examples emerged to explain how attitudes, values and beliefs that were built up over a lifetime influenced decisions and behaviour. These interacted with the situational and contextual factors and the barriers in such a way that people would end up being cold at home. In order to explain how these worked we "clustered" attitudes and values that were developed from life's experiences. The "clusters" describe a stance that would increase someone's risk of being cold. Participants were seen to ascribe to more than one cluster of attitudes and values. In combination it was possible to see how someone might make decisions that result in them being cold, not accessing cheaper fuel tariffs or help available. Whilst irrational to others, these decisions are sensible from the perspective of the participants and at the time were part of their way of coping with life.

"Making ends meet": This describes people who value thrift, are proud and would not welcome interference or help from others, would prefer to struggle on their own and keep independent, whilst managing competing priorities financially and make choices regarding money

"I can manage": This cluster describes people who are also thrifty, but who place great store on hardiness and stoicism. Part of their coping strategy would be to put a brave face on things and not publically be seen to be in need.

"It's my business": People in this cluster had learnt to be mistrustful of others by default. This, alongside pride and a deep-rooted desire to stay independent made them fiercely private and could lead to social isolation.

"I'm frightened": Some participants valued independence and privacy, but this was based on a fear of losing these and becoming dependent on others. Worries about personal safety, security of tenure and vulnerability exacerbated these fears and values.

"I'll stay as I am": This cluster described people who struggled with change, and valued routine in their lives. This was partly due to fear and mistrust of others, whether individuals or organisations. They would keep their own council and keep things as they were, for example methods of paying fuel bills and not changing to cheaper modes of payment.

Barriers. These were the obstacles that older people encounter that interact with keeping warm and make them vulnerable to the negative impacts of fuel poverty and a cold home. Four main barriers emerged.

Awareness: **Across all the participants there were low levels of knowledge and awareness on why it is important to keep warm, what temperatures are recommended, where to get information from and how to access help. Some were not aware that cold had a negative health impact. Others adhered to beliefs that hot rooms or central heating was bad for you. This meant many people did not access or see as relevant the existing public information or campaigns.**

Technology: Low levels of knowledge, experience and literacy regarding different technologies put older people at a disadvantage when trying to keep warm especially regarding heating technology (boilers and programmers), information technology (internet and electronic media) and banking (direct debit and online payment systems)

Disjointed systems: Some of the most vulnerable participants lived in an unfamiliar world where structures, systems and organisations had changed tremendously since their youth. This made it difficult to access them for help. **One change was how fragmented things appeared. For example the number of organisations involved in relation to keeping warm were vast e.g. energy companies, advice and grant awarding bodies, heating instalations compaies and contractors. People said it was to navigate your way to information and support which meant if you tried to access something like a cheaper fuel tarrif or initiative like Warm Front, you gave up or didn't bother trying.** Many participants had lived most of their lives in solid fuel housing and with nationalised energy industries. The world of privatised energy suppliers was unfamiliar and bewildering.

Invisibility: Older people in our sample were used to solid fuel housing where fuel was tangible and payments were in cash. They found it difficult to make judgements about fuel use when fuel and its payment were invisible e.g. gas central heating and payment by direct debit. This increased the risk that an older person would self-disconnect or only heat one room due to fear of fuel debt.

Discussion

The study has provided understanding of the complex environment within which vulnerable older citizens live and the factors that conspire against them being able to keep warm. The study provides some insight into why older people at risk of being cold are not always able to make decisions to keep them warm. It reinforces and expands the findings of others who suggest factors such as low levels of awareness

and knowledge regarding heating and that existing messages do not reach or connect with older peoples perceptions of themselves or their risk in cold weather, cold homes or cold realted illness.[18-20,22,23,29] The study provides additonal insight into how underlying beliefs, perceptions and values of older people can influence heating decisions and result in behaviours to the inadvertently detriment of health.[2]

The research builds on the assertion of from other research that the diversity of sub-groups mean current interventions (such as public campaigns) don't reach the full range of older people ar risk of negative impacts of cold weather.[22] The findings challenge assumptions about who is at risk from cold at home that may be derived from current knowledge and definitions. For example, if the current definition of fuel poverty was to guide perceptions of who is at risk, only those with limited income with hard to heat homes would fall under the scrutiny of health and social care professionals. However, this study shows that others are at risk because of the complexity of the type and interelation of influences on behaviour. People who were not fuel poor were also at risk because of broader social, contextual and attitudinal factors. In addition, the study demonstrated it was not just the very old who were vulnerable. Some of our younger participants (55-60 years of age) were the most vulnerable because they lived on a low income, in privately rented accommodation, had mental and physical health problems, lacked the ability to access and understand information and were fiercely protective of their privacy. Also, some older people with family, who at first glance appeared supported and in decent homes, were vulnerable because of mistrust of energy companies and unfamiliar fuel payment methods, had family who were uninformed, did not understand their heating systems and valued hardiness and thrift.

Limitations

The main limitation of the study is that it was conducted on a single site. Whilst this could restrict the transferability of findings, the study team engaged in extensive consultation following the study to discuss the resonance and verify findings and the pen portraits with local, regional and national representatives from health, local government, housing, energy, community and voluntary sector were brought together to challenge the findings. Consultation participants reinforced the resonance of the KWILLT data and interpretation, supporting its application to similar populations elsewhere.

Expected impact on the relevant field

An aim of the study was to develop findings and social marketing outputs that could inform staff, services and organisations in addressing EWD and implementing the Cold Weather plan. The first challenge for health and social care staff in doing this is to identify those older people vulnerable to cold related ill health, even if not fuel poor and those whose vulnerability may not be apparent. The pen portraits and social marketing segmentation model provide an instrument to assist in this by identifying six "types" of older people who are at risk of being cold for different reasons. The pen portraits can be downloaded from the internet and used to help health and social care staff understand the range of people at risk and identify and assess them.[30] For example, clinical staff can consider the factors contributing to vulnerability that are highlighted in the model and pen portraits when administrering care such as flu vacinations. The pen portraits are assessibleenough to be used by staff from various sectors, not just health, including housing advisors, fire and rescue, debt advisors, and community groups. For those involved in identifying older people who are at risk or vulnerable to cold homes they can first consider if any patients, clients or contacts fall into the broad segments or sub-groups. If they do, National Energy Action recommends that an easy way to assess risk is to ask three simple questions that can easily be integrated into routine contact (Box 4).

The second challenge for busy front line staff is to know how to help those identified as vulnerable in terms of keeping warm. In England there is now a strategic requirement for public health, newly formed Health and Wellbeing Boards and Clinical Commissioning Groups, to ensure that clinical staff are supported by appropriate systems and processes in line with the requirements in the new Cold Weather Plan. **The new Public Health Outcomes Framework also requires these groups to address EWD and fuel poverty as a public health priority.[31] This means, if mechanisms exist to identify a vulnerable person, mechanisms and services also need to be available so that they can be referred for appropriate help. Partnership referral schemes, can help with this but such schemes need to be responsive, particularly for clinical staff to engage with them. An example is the South Yorkshire Hotspots scheme, a partnership involving NHS departments, Local Authorities, Pension Service and Fire and Rescue Service to assess and refer people to a range of support and service including home safety checks, pensions and benefits assessment and affordable warmth interventions. The KWILLT pen portraits can be used at a strategic level to help organisations think through what referral processes need to be in place, how they can work, and who has responsibilities to make this happen.**

It is clear that health services can not work alone in meeting the needs of vulnerable older people and avoiding preventable winter deaths and illness. Strategic partnerships with local government, voluntary and community groups are essential to open up referral and access to community services. An Affordable Warmth Strategy Group which reports into the Health and Wellbeing Board will help to achieve the required partnership and boundary spanning approaches.[32] Interventions such as older people's energy champions or energy coaching, that adopt health trainer and health champion models, can be an invaluable referral option to clinical staff.[33] They can provide the information, support and help required to increase awareness, address inaccurate beliefs, change mindsets and increase access to help to the broad range of older people captured in the pen portraits. A broad, but co-ordinated partnership that involves health and social care but adopts a boundary spanning approach will also help to build capacity and awareness within communities where those at risk live. KWILLT indicates how social isolation and poorly informed families can worsen the risk of cold related ill health for vulnerable older people.

Importantly, our findings indicate that neither partnerships nor practitioners can rely on risk assessment and interventions alone since many people in receipt of home improvements remained cold. As public health delivery in England shifts to an outcomes based approach it is critical that front line staff visiting older people take the opportunity to provide information about safe temperatures and check ambient temperatures in the home, particularly during cold spells. **By building cold weather messages into initiatives like the NHS "make every contact counts"[34] the broader health workforce, not just clinicians, will be able to deliver basic health messages and signpost people to further support.[35] In this way messages may become accessible to people who would not ask for help because they are proud or isolated. Increasing the range of people who are delivering basic messages or signposting increasing the chance that older people will obtain information from people they trust.**

Finally, we consider that our research has implications for the implementation of aspects of the new Energy Bill, particularly the Green Deal and the Energy Company Obligation[15] which will target energy efficiency measures at vulnerable people on low incomes and those in hard to treat housing. For example, the reluctance of some older people to deal directly with energy companies because of perceived lack of trust may suggest that an 'honest broker' may help them access entitlements.

Conclusion

The policy and economic environments regarding cold weather and health are continually changing. As fuel poverty levels and fuel costs continue to escalate there is an ever increasing need to address some of the barriers and drivers to decision making that make older people susceptible to preventable winter death and illness. Whist this is challenging, there are opportunities. The current Health and Social Care Bill moves directors of public health and their teams to local authorities, thus aligning them with local government housing, energy, environment and adult services. KWILLT provides insight of value in informing the NHS and Health and Wellbeing Boards at a strategic as well as clinical level, in responding to the needs of older people. If we become more efficient in identifying those at risk ,improving access to help and close the loop by ensuring our interventions result in warmer homes, there is potential to make an immediate public health impact by reducing excess winter deaths and avoidable cold related NHS use.

What is already known on this topic

- Current data suggests that there are approximately 26000 excess winter deaths in England, the majority of which are in those over 65. Fuel poverty and excess winter deaths are increasing.
- From November 2011 the Cold Weather Plan for England requires NHS, local government and communities to improve preparation and response to cold weather and reduce the negative impact of cold weather.
- The existing literature illuminating the influences on older people's decision making and behaviour regarding keeping warm in winter is limited but indicates that there is a complex range of factors at play.

What this study adds

- Knowledge and awareness of safe temperatures, the health impact of cold and how to use heating efficiently were low across the study participants.
- Older peoples values and beliefs interact with the contextual factors and barriers in such a way that they often end up being cold at home.
- The segmentation model illustrates the diversity of older people at risk of living in a cold home.
- An Affordable Warmth Strategy Group will help bring about the required partnership, systems, boundary spanning approaches and capacity development in staff and communities needed to reduce excess winter deaths.
- Greater focus is needed to ensure affordable warmth interventions achieve the desired outcome of safe indoor temperatures for older and other vulnerable people

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Table 1 Older People's Demographic Data

AGE		ETHNICITY		GENDER		
55-69	65+	BME	ENGLISH	FEMALE	MALE	COUPLES
14	36	19	31	36	10	4

[1] BME = Black and minority ethnic

Table 2. Tenure of property

TENURE	NUMBER
Private owned	33
Private rented	5
Council	11
Sheltered	1

Table 3 Health and social care professionals

SETTING	NUMBER
Strategic NHS	**2**
Community/primary care NHS (nursing, physiotherapy, GP)	**7**
Community Occupational Therapy	**2**
Domiciliary care providers - Local Authority	**2**
Domiciliary care providers - voluntary sector	**2**
Housing	**6**
Voluntary sector	**2**
Fire and Rescue	**1**
Pensions advice	**1**
Total	**25**

Table 4. Summary of Focus Groups

Focus Group	MALE	FEMALE	TOTAL
FGOP1	3	7	10
FGOP2	0	8	8
FGOP3	1	5	6
FGS1 (Strategic)	4	4	8
FGS2 (Elected members of the council)	3	2	5
FGS3 (Clinical staff)	1	5	6
Total	12	31	43

FGOP = focus group for older people and FGS focus group for staff/Council

Table 5. Thematic framework: Core themes and subthemes

Theme	Sub theme	Examples
Awareness	*Knowledge* *Information* *Past experience*	Safe / recommended temperatures Health impacts of cold weather Using technology (heating, information and finance) Fuel payment and tariffs
Behavioural influences	*Age*	Different generations > or < 75
	Mindset and values	Thrift Protective of privacy Protective of independence Hardiness and stoicism Pride Trust Fearful Prefer routine to change
	Social connections	Living with or near family/friends Trusting of family/friends Family / friends informed and supportive Dependent/independent Isolated
Barriers	*Money*	Income Fuel costs Household expenditure
	Technology	Heating e.g. boilers. programmers, central heating, controls, radiators, heaters. Communication e.g. information and campaign materials, media representations of older people, internet and electronic communication, digital displays. Banking e.g. direct debits, online banking
	Money and finance	Prefer cash Dislike credit Prefer post office Closing down of high street banks Electronic and online banking
	Visibility	Past experience fuel and payment visible (coal and cash) Now fuel and payment invisible (gas/electric and direct debit/online banking) Older people invisible in society Affordable warmth schemes and incentives invisible to older people
	Disjointed systems	Fragmentation Duplication Referral disjointed

Table 6. Factors informing segmentation model development

Situation or context factors	Attitudinal factors	Barriers

• Money
• Age
• Social connections
• Housing type and tenure
• Health
	• Making ends meet
	  ○ Thrift
	  ○ Competing priorities
	  ○ Pride
	  ○ Struggling
	• I can manage
	  ○ Thrift
	  ○ Hardiness
	  ○ Stoicism
	• It's my business
	  ○ Mistrust
	  ○ Pride
	  ○ Privacy
	• I'm frightened
	  ○ Privacy
	  ○ Personal safety/ vulnerability
	• I'll stay as I am
	  ○ Struggle with change
	  ○ Like routine
	  ○ Fear
	  ○ Trust
		• Awareness
		  ○ Knowledge
		  ○ Information
		  ○ Experience
		• Technology
		  ○ Heating
		  ○ Information
		  ○ Banking
		• Disjointed systems
		  ○ Fragmentation or services
		  ○ Local differences
		  ○ Lack of referral systems
		• Visibility
		  ○ Fuel
		  ○ Money
		  ○ Information
		  ○ Older people

Table 7. The KWILLT segmentation model and pen portraits

Segmentation Group (number of participants who broadly "fit" within the segment)	Pen Portrait Name	Description
Isolated and not wanting to cause a bother (5)	Pat	Low income household and fuel poor, over 55, socially isolated and frightened, lacks information and understanding about keeping warm, private rented housing, long term mental health problems (depressions/anxiety)
Getting by cautiously (10)	Ben and Joan	Low income household and fuel poor, over 65, some social connections but not well informed about keeping warm, privately owned house, one partner has chronic health problems
Dependent and poorly informed (10)	Meena	Low income household and fuel poor, over 55, limited social connections, poorly informed about keeping warm, privately owned housing, poor health and mobility and very dependent on close family.
Just about managing (9)	Enid	Can pay for home heating but values thrift , over 70, some social connections but is private and trusts few people so is poorly informed about keeping warm, social housing, physical health problems and sensory impairment
Lonely and out of touch (6)	Pearle	Financially secure but lives in a cold home, over 70, widowed, and socially isolated, poorly informed about keeping warm, privately owned house, physically well but bereaved
Proud and wants to be self sufficient (10)	Fred	Low income but not fuel poor, over 70, regular but superficial social connections, poorly informed but values stoicism and hardiness and thinks he doesn't need any help, social housing, good health, minor ailments.

Box 1. Situational and context influences (Gender/Age/Segmentation group)

Income:
"I haven't got a bank account that's got any savings in anyway. I've got one that it's, my husband's pension is paid into it, but that just about covers my bills, and there's nothing left over, you know what I mean"? (OP8. Female/76/Isolated)

Age:
"But if it gets cold I put more clothes on or wrap a fleece round me rather than turn the heating up. That is always my last resort, to turn the heating up. I was trained to be frugal, it was part of my upbringing. You didn't have a lot so you were careful with what you did have. And with the costs rising now, I'm certainly not extravagant with the heating, I'm very wary". (OP34. Female/76/Managing)

Social connections:
"My son-in-law says, his very words was take no bloody notice of the buggers [energy companies offering social tariffs], he says carry on as you are" (OP21. Male/81/Managing)
"My sister is methodological... she checks, she's online and she is following all the time and whichever is the cheapest.... a month ago we swopped from [energy supplier 1] to [energy supplier 2] ..... she tracks them all" (OP11. Male/65/Getting by)

Housing type and tenure:
"but in the sitting room where the telly is that room is very, very cold. I mean they do put the heating on but still that room is very cold so he does suffer can't stay in that room for long. (OP33. Male/77/Dependent)
"It's cold but what can I do. If it's cold then I use it even if it's a bit risky. The council people will not help you because it's private now; I bought the property, I'm on a mortgage and council don't help private you know". (OP6. Female/55/Isolated)
"I said to the gas man can't you tell him [the landlord] that I want central heating putting in..... I'm frightened if I say anything to him he'll tell me to get out, you know what I mean". (OP29. Female/59/Isolated)

Health:
"I've got health problems but I think it's the fact that I'm older now and my circulation's not as good as it was". (OP16. Female/82/Lonely)

Box 2. Values and beliefs (Gender/Age/Segmentation group)

"Making ends meet": thrift, pride, struggling, competing priorities

Interviewer: If you were eligible would you apply for grants?
I don't think so, no. I've always been independent. I don't think you should have to do [apply for grants]. That's why I say I think you should get, I mean on the Continent they all get better pensions, you know. I think we should have better pensions and there shouldn't be handouts because it's open, wide open to people not genuine which I know happens because I know people that do it.... I don't spend a lot. I don't go out to Bingo and things like that like some do and expect expensive holidays or anything2 (OP 16. Female/82/Lonely).

"I think there's occasions when you'd have to go hungry to stay comfortable, but then on the other hand if you're feeling hungry you might think I'll sort of, I don't know, to hell with it I'll put another two jumpers on and have something to eat instead" (OP 29. Female/59/Isolated).

"I can manage": thrift, hardiness, stoicism

"I mean growing up there would have been ice on the inside of the bedroom windows quite regularly because it would be really, really cold in the bedrooms in winter. So, I don't know, I think you are influenced to think a little bit, in our generation I think you tend to think they're [younger generations] a bit nannied. Talk about a nanny state, you know, but they're so coddled with everything and that it shouldn't really be much of a hardship to be cold occasionally". (OP5. Female/58/Lonely)

"I've never been spoilt, and I'm not bothered about being right warm" (OP22. Female/84/Managing)

"It's my business": mistrust, pride, independence, privacy

"One of my other friends found what she thought was marvellous but it was an offer and she couldn't get it through her brain that it was an offer, and although they didn't say it was an offer, next year it came a lot dearer**.** I think the energies are wrong though because what they've done is they've made people never believe them any more about it's costing that, they're not putting it up just for their own greed or because they can get away with it.... we don't need to heat the whole house, we definitely don't need to heat the whole house. What I'm trying to say is that I can put that on [gas heater] and that's plenty for me in the daytime, I don't want anything else, and therefore it can't be as expensive as heating the whole house." (OP 27. Female/77/Proud)

"The only help I ever get is people ringing me with unsolicited phone calls saying do you know about the grants that you can have? I don't want that because that's just somebody trying to sell me something. You know, I find it very confusing actually..... I wouldn't use the internet for paying [energy bills] because I don't trust it..... I mean there have been one or two haven't there, incentives from some of the big energy companies to sort of help you through insulating your home, you know, as a sort of financial incentive, but again I don't trust them. I think that whatever incentive they give us, they'll sneak it onto your bill, you know, across the board.". (OP40. Male/63/Getting by)

"I'm frightened": independence, privacy, personal safety, vulnerability

I wear fewer clothes, but if it gets cold I put more clothes on or wrap a fleece round me rather than turn the heating up. That is always my last resort, to turn the heating up.

"Oh yes, because I was trained to be frugal, it was part of my upbringing. You didn't have a lot so you were careful with what you did have. And with the costs rising now, I'm certainly not extravagant with the heating, I'm very wary. I worry about my independence not my fuel bills. I don't want to be dependent". (OP34. Female/76/Managing)

"I'll stay as I am": struggle with change, like routine, fear, mistrust

"I pay cash. I don't trust them [energy companies]; they might charge more with direct debit". (OP6. Female/55/Isolated)

"I don't believe in using [bank] cards because you have to remember so many numbers, and I don't believe in doing that, and I once said that at the bank, and she said well it's perfect, I says no it isn't. She says well you could come and use the card thing in the bank. I says yeah but if I'm coming in the bank why can't I stand in the queue and do it that way, I says at least you can have a moan to the person in front or the person behind about the weather or something, you have a little bit of conversation, whereas, you know. .....well besides which when you pay by direct debit you've got no receipt". (OP8. Female/76/Getting by)

Box 3. Barriers (Gender/Age/Segmentation group)

Awareness: *of healthy temperatures, how to heat the home and energy efficiency*

"But not too warm, that's unhealthy isn't it"? (OP34. Female/76/Managing)

"If you get overheated it makes you feel ill" (OP27. Female/77/Proud)

Interviewer: Why do you prefer to use the gas fire and not central heating?
"Because it's economical. Central heating is expensive. Rather than put in a central heating with seven or eight radiator, it's cheaper to just warm one room instead of all the house". (OP 31. Male/67/Getting by)

"I can remember my grandma saying, you know, as long as you keep one room warm and stay in there" (OP29. Female/59/Isolated)

Technology: *heating, information and banking technology*

"Sometimes I feel quite cold, and I don't know why that is. The radiators were altered when Warm Front came in .....I don't know how to work that one [boiler] in there. That's why I just said to him [heating engineer], when he set it for me, I said look I want to work it manually. I want it going off and coming on when I want to do it. So I just work from the thermostat in the hall and just come down in the morning, switch it on, and when I go up at night I switch it off. You know, so I don't know the first thing about working that boiler" (OP1. Femaile/71/Isolated)

"The boiler got something wrong with it. I never use it love" (OP24. Male/84/Dependent)

"I don't actually have to touch the boiler; I've got a switch on the wall in the hall that I can regulate it with.... I can't actually set it", (OP37. Female/76/Proud)

"I haven't got a computer, I don't want a computer, I can't get online, so therefore I am barred from 90% of things [cheaper fuel tariffs] because I'm not computer literate". (OP8. Female/76/Getting by)

Disjointed systems:

"...energy pricing as well, the fact that there are many suppliers and it's not, again it's not transparent. It's difficult to weave through it all" (OP40. Male/63/Getting by)

"I stopped with the same one. I don't want any hassle. I don't think I would change, no. I wouldn't like the hassle, no, because nothing's straightforward". (OP16. Female/82/Lonely)

Invisibility: *cost and use of fuel is invisible now compared to coal*

"I mean because we have had coal fires, I mean I used to love making coal fires. Yeah but we had coal fires, that's what they were there was no, central heating were rare weren't it". (OP11. Male/65/Getting by)

Box 4. Assessment questions

Patients may be vulnerable to the negative health impact of cold weather if they answer No to question one or yes to question two or three:

- Is your whole house warm in winter?
- Do you have difficulty paying your energy bills?
- Do you have difficulty heating your house?

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Competing interest declaration

"All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare that (1) AMT, AL, CH, JA, JC, AS, KM, have support from NHS Rotherham for the submitted work; (2) AMT, AL, CH, JA, JC, AS, KM, have no relationships with any companies that might have an interest in the submitted work in the previous 3 years; (3) their spouses, partners, or children have no financial relationships that may be relevant to the submitted work; and (4) AMT, AL, CH, JA, JC, AS, KM, have no non-financial interests that may be relevant to the submitted work."

Details of contributors

We thank all the participants who contributed their time, shared their experiences and their personal stories. We also thank Terri Roche who was instrumental in developing the study in her previous role as Public Health Specialist at NHS Rotherham. We also acknowledge and thanks Cathy Read for her valuable comments on an early version of the paper.

Contributors: AT and TR had the idea for the study. AT was principal investigator, participated in data collection and analysis, and wrote drafts of the manuscript. AL took the lead for the data collection. AL, JC, JA, KM and AS helped design the study, develop the methods, collected and analysed the data, and helped with interpretation. All authors have seen and approved the final version of the manuscript. AT is the guarantor.

Ethics approval

The KWILLT study obtained ethics approval from Leeds East NHS Research Ethics Committee. (REC reference 09/H1306/90) and Research Governance approval from NHS Rotherham (Reference 28841/54078/14/727)
All participants gave informed consent before taking part.

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Study sponsor

The study sponsor was NHS Rotherham. They hosted the study and held the NIHR RFPB grant. JA was a member of the research team and a co-author of this paper. She is research lead for the sponsor organization. The organisation itself employed AL, the main researcher on the project. AT, the principal investigator, held an honorary contract with the sponsor

organisation. NHS Rotherham has supported the collection, analysis, and interpretation of data but has taken no active role outside of members of the team. They have supported the decision to submit the article for publication

Data integrity
All authors, external and internal, had full access to all of the data (including data reports and tables) in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis.

Data sharing
No additional data available

Research checklist: Keeping warm and well in later life: a qualitative study

No	Item	Guide questions/description
Domain 1: Research team and reflexivity		
Personal Characteristics		
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group? AT, AL, CH
2.	Credentials	What were the researcher's credentials? *PI qualifications PhD MSc, MMedSci, Ba, RGN*
3.	Occupation	What was their occupation at the time of the study? Researcher
4.	Gender	Was the researcher male or female? *Female*
5.	Experience and training	What experience or training did the researcher have? *PhD. Over 15 years experience as a health services researcher*
Relationship with participants		
6.	Relationship established	Was a relationship established prior to study commencement? *No*
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? *Research goals, reasons for doing the research, outputs*
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. *Reasons and interests in the research topic*
Domain 2: study design		
Theoretical framework		
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *Qualitative inquiry,*

No	Item	Guide questions/description *framework analysis and social marketing*
Participant selection		
10.	Sampling	How were participants selected? *e.g. purposive and snowball*
11.	Method of approach	How were participants approached? e*.g. Older people face-to-face via trusted contact. Staff by telephone, mail, email*
12.	Sample size	How many participants were in the study? *50 older people and 25 staff*
13.	Non-participation	How many people refused to participate or dropped out? *No drop out*
Setting		
14.	Setting of data collection	Where was the data collected? e*.g. home, and workplace*
15.	Presence of non-participants	Was anyone else present besides the participants and researchers? *No*
16.	Description of sample	What are the important characteristics of the sample? *e.g. age, gender*
Data collection		
17.	Interview guide	Were questions, prompts, guides provided by the authors? *Examples of questions and list of issues covered provided*
18.	Repeat interviews	Were repeat interviews carried out? *No*
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data? *Audio*
20.	Field notes	Were field notes made during and/or after the interview or focus group? *Yes*
21.	Duration	What was the duration of the interviews or focus group? *20-60 mins*
22.	Data saturation	Was data saturation discussed? *No, not a grounded theory study*
23.	Transcripts returned	Were transcripts returned to

No	Item	Guide questions/description
		participants for comment and/or correction? *No*
Domain 3: analysis and findingsz		
Data analysis		
24.	Number of data coders	How many data coders coded the data? *4*
25.	Description of the coding tree	Did authors provide a description of the coding tree? *Thematic framework summary used to present findings. Segmentation model given*
26.	Derivation of themes	Were themes identified in advance or derived from the data? *Initial thematic framework developed a priori and then developed during analysis*
27.	Software	What software, if applicable, was used to manage the data? *NVIVO*
28.	Participant checking	Did participants provide feedback on the findings? *Some attended the consultation event*
Reporting		
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? *Yes*
30.	Data and findings consistent	Was there consistency between the data presented and the findings? *Yes*
31.	Clarity of major themes	Were major themes clearly presented in the findings? *Yes*
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes? *NO*

Correction

Tod AM, Lusambili A, Homer C, *et al*. Understanding factors infuencing vulnerable older people keeping warm and well in winter: a qualitative study using social marketing techniques. *BMJ Open* 2012;**2**:e000922. There are two errors in this article:

1. The abstract makes note of individual and group interviews with health and social care staff in addition to the older people who participated. This article focuses on the older people data.
2. In table 3, the last column should add up to 24 not 20.

BMJ Open 2013;**3**:e000922corr1. doi:10.1136/bmjopen-2012-000922corr1