



STUDY ON BECOME TANK TOPS FOR MANAGING MENOPAUSAL HOT FLUSHES AND NIGHT SWEATS

Professor Andrea Davies, De Montfort University (formerly University of Leicester)

Professor Jo Brewis, The Open University

Dr Vanessa Beck, University of Bristol

Table of Contents

1 Executive Summary	3
2 Background	5
3 Research Objectives	6
4 Research Design	7
Sample	7
Exclusion criteria for sample:	8
Timeframe for study	8
5 Reporting Context	9
6 Pre-intervention Study Data	10
Background information	10
Understanding and perception of menopause	10
Respondents' menopause experience	12
Menopause experience and work	13
7 Mobile App Data	16
Total hot flushes and night sweats per day	16
Severity of hot flushes and night sweats assessment	16
Effectiveness assessment using hot flushes and night sweats interference scale	16
8 Exit Survey Data	18
Comfort and wearability	18
Pricing	19
Adverts and positioning	19
Effectiveness of the Become tank top for reducing heat, sweat and coldness of hot flushes and night sweats ...	21
Overall effectiveness of Become tank tops	22
9 Concluding Summary	23
10 References	24

1 Executive Summary

- i. The objective of this study was to examine Become tank tops as an item of menopause clothing that has been launched in the UK. We assessed the impact of wearing Become tank tops on the severity and frequency of women's menopausal hot flushes, their work efficacy and quality of life.
- ii. The research design consisted of a pre-intervention evaluation and a product trial evaluation. Research tools consisted of a pre-intervention survey, a daily diary of hot flushes during the day and night, which was collected via a phone-based app, and a post-trial, exit survey. Participants kept the diary for two weeks prior to the trial and for two weeks during the product trial.
- iii. The sample consisted of 59 women aged 45 to 60 who reported severe hot flushes/ night sweats on average 5 times per 24 hours in the day time and night sweats at least three times per week. It included women at different menopausal stages. Individuals with any severe illness or who were participating in another intervention study at the same time were excluded from taking part. The pre-intervention study confirmed that the sample had a reasonable understanding of their menopause and had significant hot flushes and night sweats, with the former being the indicator with the most negative effect on their work life.
- iv. The study was conducted between 2 and 29 November 2018.
- v. Wearing the Become tank top reduced the incidence of hot flushes and night sweats in the sample by 35%.
- vi. The Become tank top reduced the severity of hot flushes and night sweats in the sample by 39%.
- vii. Wearing the Become tank top reduced the severe daily interference of hot flushes and night sweats from 61.6% to 36.5% between weeks one and two (without the tank tops) to weeks three and four (with the tank tops) of the study. In turn, there was an increase in moderate (from 25.6% to 34.6%) and mild (from 12.8% to 28.8%) daily interferences between these two time periods.
- viii. Participants' initial impression (after seven days of wear) of the tank tops was extremely favourable with 93% rating them as comfortable. By the end of the trial, 88% of women rated the tank top as comfortable.
- ix. 76% of respondents rated the tank top as easy to wear with work clothes.
- x. 81% of respondents rated the tank top as easy to wear with non-work or leisure wear.
- xi. 86% of respondents rated the tank top as easy to wear for or with their sleep wear.
- xii. The majority of trial participants (80%) felt that the tank tops were not affordable.

- xiii. Having tried the tank tops, 80% of participants said they would recommend them to others experiencing hot flushes and night sweats, and 48% said it was likely that they would purchase the tank tops.
- xiv. Only 20.3% of participants had previously seen an advertisement for Become tank tops, most of these on social media, in particular Facebook.
- xv. Commenting on the content of the advertisement, 93% of respondents felt that menopause should be explicitly mentioned.
- xvi. Considering the 2017 and 2018 advertisements, 73% preferred the latter as a result of the colours, and an increase in diversity in the models.
- xvii. The issue of diversity and representativeness of the models in the advertisements was a key issue that divided the sample with some liking the fact that they were not stereotypical models whilst others thought they were not representative of menopausal women.
- xviii. 73% of women said that wearing the tank tops made them feel more confident to manage their hot flushes.
- xix. 90% of participants described the Become tank top as effective in reducing the feeling of heat during hot flushes and night sweats and 91% said they reduced sweating.
- xx. Overall, our quantitative and qualitative data suggests that Become tank tops are highly effective at reducing heat, sweat and coldness caused by hot flushes and night sweats amongst this sample of women.

2 Background

Become tank tops are an innovative cooling technology clothing positioned to target menopausal women suffering from hot flushes. Hot flushes are a common menopausal symptom that occur during the period of transition to menopause due to hormone levels fluctuating (Brewis *et al.*, 2017). Post-menopausal women also report hot flushes. For some these remain at the same intensity as during peri-menopause but for others hot flushes diminish or disappear.

Hot flushes are unpredictable, which is one of the things that women find distressing about them. Hot flushes impact women in both in their working lives and at home during their daytime activities and at night, often affecting sleep. Night time hot flushes are usually referred to as night sweats.

At work women report that hot flushes affect their ability to perform their work tasks to their usual standards and their overall productivity (Griffiths and Hunter, 2014, Park *et al.*, 2008, 2011). However, it is coping with feelings of embarrassment or humiliation, when their bodies become very visible in the work environment and do not perform according to the expected work etiquette, that women find equally if not more distressing (Griffiths *et al.*, 2016). This, women say, makes them feel less confident at work and about their professional work identities (Jack *et al.*, 2014). There is no known research that has examined work clothing, such as uniform or the clothing women wear to work, in terms of its ability to alleviate hot flush menopause symptoms.

At home night sweats are known to have a significant impact on sleep and, when severe, can significantly disrupt sleep leading to a domino effect for other symptoms reported in menopause, such as poor concentration and irritability (de Araújo Moraes *et al.*, 2012). Family activities and marital relationships are also changed or disrupted when hot flushes are “bothersome” to women.

The objective of this study is to examine Become tank tops as a form of menopause (under)-clothing that has been launched into the UK market. It is significant to see a brand that is positioned as menopausal given the persistence of a cultural taboo around menopause. In recent months, menopause has been discussed in the UK media¹, in some workplaces², and by the government (Brewis *et al.*, 2017). It is noticeable that there are initiatives to change the perceptions and attitudes around menopause, and this is therefore a timely market entry for a menopausal clothing brand. Support for the brand benefits as evidenced by a credible research base would significantly enhance the marketing claims that can be made for Become. Customer feedback on wearability and perception of the clothing can also provide feedback and inform marketing strategy going forward.

¹ To provide just one example: www.theguardian.com/news/2018/aug/16/it-feels-impossible-to-beat-how-i-was-floored-by-menopause

² For a range of organisations who have engaged with menopause issues see: <https://menopauseintheworkplace.co.uk/testimonials/>

3 Research Objectives

The objectives of this research are to:

1. Assess the impact of wearing Become tank tops as a cooling clothing garment on:
 - the severity and frequency of women's self-reported menopausal hot flushes
 - women's self-reported work efficacy and quality of life
2. Assess women's attitudes to and images of menopause from exposure to the Become brand, its positioning and market communications.
3. Provide a wearability analysis in terms of consumer feedback on the garment and how consumers have used the garment.

4 Research Design

The study design consisted of a pre-intervention evaluation (2 weeks) and a product trial evaluation (2 weeks). The main research tools included a daily diary of hot flushes during both daytime and night-time for 4 weeks, and a survey to assess self-reported work productivity, quality of life and attitudes to/ images of menopause that was completed once at the beginning of the study, and once at the end. The post product trial survey also captured customer feedback on the garment's wearability and the contexts where it was worn. During the product trial period of 2 weeks the participants were asked questions on wearing the Become tank top. The experience diary took around 15 minutes per day to complete, and the pre-intervention and post-product trial surveys took around 20 minutes each to complete.

The experience diary method assessed the severity of hot flushes on two scales. Women rated a hot flush immediately after experiencing it in terms of "bothersomeness". A phone-based app device supported the experience diary method. It was specifically designed for the study by CrowdLab, using an existing app but adding bespoke questions, and the participants were recruited and managed by LEJ Contracts, a market research agency. LEJ also oversaw the process of sending out the tank tops to the participants and arranging for their remuneration. As suggested above, during the product trial additional questions to assess women's use of the Become garment were added so as to gather customer feedback at the early novice/novelty stages of product use, the familiarity stage of product use and the accustomed stage of product use.

The main measures in the survey included work productivity self-assessment, the Management Standards Indicator Tool (MSIT), the Menopause-related Quality of Life (MENQOL) indicator, bespoke menopause attitudes and image items and garment wearability measures.

Participants were paid a fee of £70 for completing the study to compensate for their time. This is slightly below equivalent market rates per hour for focus group participation. Recruitment needed to ensure that a larger sum would not bias the sample or contravene the Market Research Society code which is sensitive to bribery, and also to ensure that there was no compensation inflation associated with this research. Given participants' personal interest in the study as hot flushes and night sweats are symptoms of menopause they are experiencing, the slightly lower rate proved to be sufficient.

Sample

A total of 59 participants aged 45-60 years old who reported severe hot flushes/night sweats on average of *5 times per 24 hours day-time and night-sweats (3 times per week)* were recruited. All sample participants were in employment, in social grade ABC1 which is appropriate given the price point for the tank tops, and geographically dispersed across England rather than concentrated in one or several regions. The recruitment also allowed for variation across the employment categories of full-time/part-time and public/private sector places of work.

The sample size allows for sub-group analysis and comparison along key dimensions including

- a. early peri-menopausal women, late peri-menopausal women and early post-menopausal women
- b. women who wear work uniforms and those who do not, and
- c. women who are in managerial positions and women who do not hold managerial positions.

Early peri-menopause women had self-identified menstrual periods but also noticeable changes in menstruation. Late peri-menopausal women self-identified as experiencing short periods of amenorrhea (2-3 months). Post-menopausal women were those with amenorrhea of 12 months or longer, and early post-menopausal women were those who had their last menstrual period 13-24 months previously.

All sample participants met the criteria of self-reported hot flushes of noticeable severity on average 5 times per 24 hours of day time and night sweats at least 3 times a week. These criteria were checked via self-report in a recruitment screening questionnaire, distributed by LEJ Contracts. All participants had their own mobile phones and were willing to download the app.

All participants were in good health and completed informed consent forms. They may have been taking prescribed hormonal treatments as long as they met the criteria for experiencing hot flushes. All participants knew they had the right to withdraw at any time in the study. All participants were also willing to complete the research tools.

The study received full ethical approval from the relevant University of Leicester Research Ethics Committee and was also approved by similar committees at the Open University and the University of Bristol.

Exclusion criteria for sample:

The following exclusion criteria were applied and actioned by self-reported responses to questions in the recruitment questionnaire

- Any severe illness, e.g., breast or ovarian cancer, seizure disorders etc.
- Current participation in another intervention study.

Timeframe for study

Activity/milestone	Time completed
2 week pre-intervention study	02 November – 15 November 2018
Survey #1 complete	12-15 November 2018
2 week product trial	16 November – 29 November 2018
Survey #2 complete	26 -29 November 2018

5 Reporting Context

The data reported here comes from the pre-trial and exit surveys and the mobile phone app where women were able to diary their hot flushes and night sweats. 59 women participants make up the analysed sample for the data reported for this study. The attrition of 9% from our planned sample recruitment of 65 is within the normal expectations for a diary study involving activities and using several data collection methods.

The average age in the sample is 53 years old. The average age for reaching menopause – the date when a woman has not had a period for 12 months - is 51 in the UK (Brewis *et al.*, 2017) and the average age of the sample therefore confirms the intention of the study to capture the experiences of early peri-menopausal women, late menopausal women and early post-menopausal women, considered by the Become team and the research team as the core target consumers for an examination of the Become tank top.

The mobile app collected diary data for daily hot flushes and night sweats (HFNS), recording incidence and severity/ “bothersomeness”. The app also collected an evaluation of the Become tank top at day 7 of wearing as the respondents’ first impressions. Further, the app collected weekly summaries of hot flushes’ and night sweats’ interference with daily life that was measured by ten items to examine these symptoms’ interference with women’s work, social activities, leisure activities, sleep, mood, concentration, relations with others, sexuality, enjoyment of life and overall quality of life.

The exit survey consists of 32 questions and was completed after Day 28 by study participants. The survey records self-reported evaluations of the Become tank top wearability (comfort and ease of wearing), effectiveness (confidence in managing menopause symptoms, change in experience of heat, sweat and chill), affordability and brand communications.

The analysis has been conducted to two decimal places. Statistical manipulation of the data was completed using SPSS. Descriptive frequencies, statistical averages and comparison of mean analysis are used to report the findings.

The results of the pre-intervention study, mobile app data, and exit survey will be reported in turn.

6 Pre-intervention Study Data

Background information

The survey collected background information on participants to contextualise the findings. Participants were all based in England (55% Yorkshire and Humber; 16.7% Greater London, 16.7% North West, 5% South East, 3.3% West Midlands, 1.7% East of England and 1.7% North East). This meant the sample fulfilled our criterion to be dispersed across England.

The majority (79.7%) identify as white. Most (85.7%) have children and although these were mainly older, 42.2% had caring responsibilities for children or for another family member (29.7%). The majority (62.5%) were married. Participants worked mainly in the public sector (56.5%) but also included private sector (38.7%) and third sector (11.3%) workers. The largest group worked in Education (26.6%), followed by Administrative and support service activities as well as Human health and social work activities (both 18.8%), and Wholesale and retail trade (10.9%). In terms of occupation, the majority of respondents have Administrative occupations (25%), followed by Teaching/ educational professional jobs (23.4%), Other manager/ proprietor occupations make up 10.9% of the sample and Health professionals, Secretarial or related occupations, and Customer services tied at 9.4%. This constitutes a good range and a valid sample.

The majority (43.1%) of participants worked in large organisations with 250+ employees, but micro, small and medium-sized organisations were also represented. Most respondents had permanent jobs, either full-time (33.3%) or part-time (39.7%), with only small numbers being self-employed (7.9%), a business owner (4.8%), on a zero/ minimum hours contract (4.8%), on a temporary part-time contract (3.2%), agency staff (3.2%) or other (3.2%) which included freelance work and volunteering. A good variety of employment categories are thus represented in the sample. The vast majority of respondents' workplaces do not provide any information about the menopause (85.9%) although 50% of respondents' workplaces have a menopause policy or menopause guidance. The other half didn't know whether their workplace had such a policy or guidance.

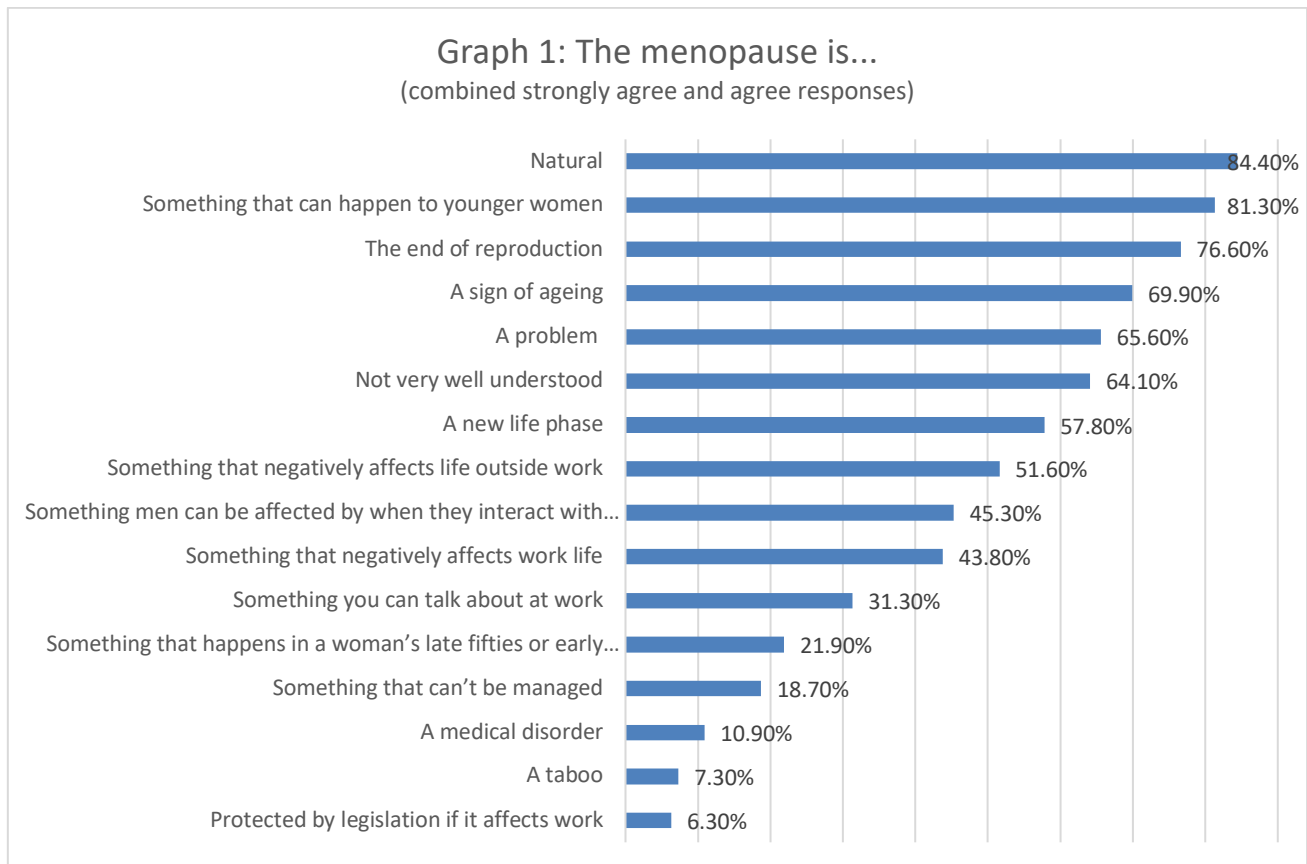
Understanding and perception of menopause

To establish respondents' understanding and perception of menopause, they were asked to record their agreement or disagreement with a series of statements on a seven scale Likert rating. Graph 1 below provides an overview of their combined "strongly agree" and "agree" responses. In terms of general perceptions about menopause, respondents were almost unanimous in their assessment that menopause is natural: none indicated that they "disagreed" or "strongly disagreed" with this label. Almost as many showed awareness that menopause can happen to younger women. Most respondents accepted that menopause is the end of reproduction with only 1.6% disagreeing and 4.7% somewhat disagreeing with this statement. The views on menopause as a sign of ageing were not quite as strong but only 3.2% strongly disagreed, 1.6% disagreed and 4.8% somewhat disagreed with the statement. A solid majority of respondents perceive the menopause to be a problem. However, more than half (57.8%) of the respondents also see menopause as a new life phase.

Although the majority of respondents see menopause as something you can talk about at work, 20% disagree. Menopause is something that negatively affects the work life of 43.8% of respondents but affects life outside work for more than half (51.6%). Only a minority (just under 2 in 10) see menopause as something that cannot be

managed. Yet respondents have mixed thoughts about this statement as 9.4% strongly disagreed and 26.6% disagreed that menopause cannot be managed. This suggests that the sample is divided in terms of their expectations that something (such as Become tank tops) might help them manage menopause.

The vast majority of respondents do not see menopause as a medical disorder with only 1 in 10 agreeing with this statement. Responses to menopause as a taboo were split. Although 7.3% agree that it is, 8.3% strongly disagree and 26.7% disagree. The single biggest group of respondents (36.7%) somewhat agreed that menopause is a taboo. Overall, the lowest response was to menopause being protected by legislation if it affects work – only 6.3% strongly agreed or agreed with this statement.

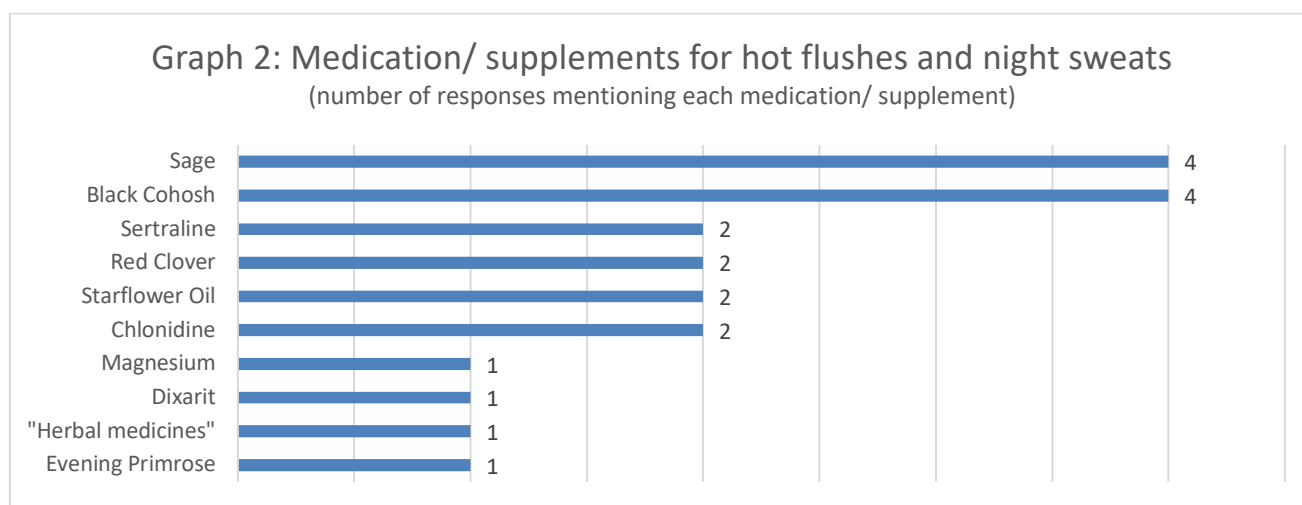


Despite this data, when respondents were asked directly how they would describe their knowledge about menopause, none saw themselves as very knowledgeable. The majority thought they had quite a bit (34.4%) or some (56.3%) knowledge about menopause. This makes it likely that they would make conscious and reasonably informed decisions about menopause, including how to deal with symptoms, and are likely to search for potential support or solutions for their menopause symptoms. This makes them a good target group for Become tank tops.

Moreover, most felt confident or extremely confident to discuss menopause with female friends (79.7%), with their partner (53.2%), with their children (39.1%), but lacking in confidence or not at all confident to discuss menopause with male friends (32.8%). At work, the majority of respondents felt confident or extremely confident talking about menopause with friends at work (43.8%) but less so with their line manager (21.9%) or other colleagues (18.8%). There is potential here for word of mouth discussion of ways to manage menopause symptoms amongst groups of workplace friends (and perhaps also recommendations of solutions like the Become tank top). However, more is still required to make menopause an unremarkable conversation in UK workplaces.

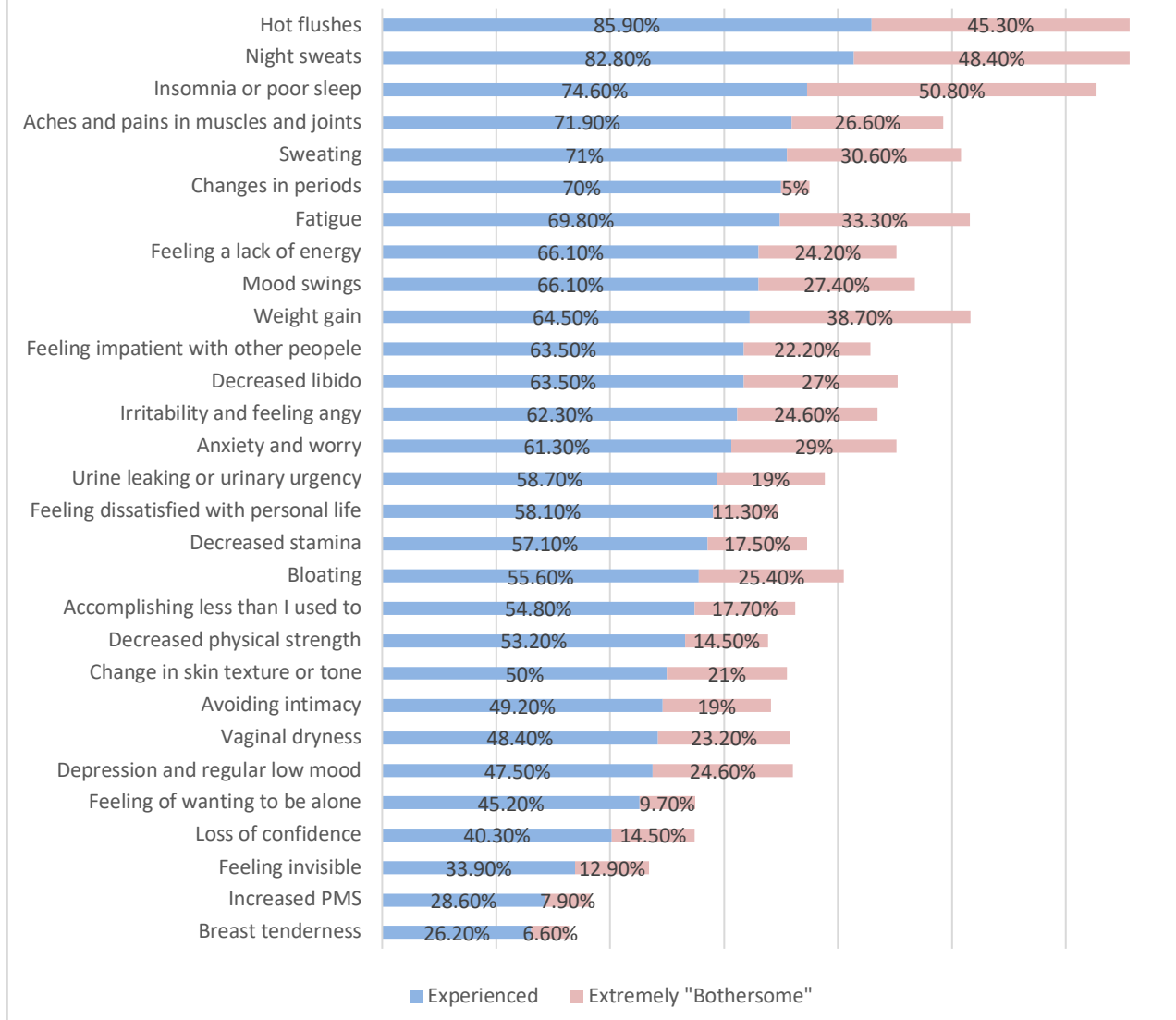
Respondents' menopause experience

A large majority (70.3%) of respondents are postmenopausal in that they have not had a period for 12 months or more. Some women had had gaps in their periods (10.9%) and others indicated that their menstrual cycle was changing (10.9%) with the remainder (7.8%) not being sure where they were in relation to their menopause because of highly erratic periods, medication (the contraceptive pill) or a hysterectomy. The vast majority of respondents were taking HRT (93.8%) and a smaller proportion than intended (6.2%) were not on HRT. In addition, 20.3% of the sample were taking medication or supplements specifically for hot flushes and/or night sweats. Graph 2 provides a summary of qualitative responses about which medications and supplements were being used. Some participants indicated use of multiple medications/ supplements in parallel.



Respondents were also asked which menopause symptoms they had experienced. Hot flushes and night sweats were not only the symptoms mentioned most often but also some of the symptoms perceived to be extremely “bothersome”. Related symptoms (e.g. ‘sweating’) also ranked highly. This provides an indicator as to the need for clothing to help with these symptoms of the menopause. Moreover, these symptoms also had a large impact (hot flushes 60.3%, night sweats 45.8%) or some impact (hot flushes 36.5%, night sweats 32.2%) in affecting work life negatively. Respondents indicated that hot flushes were the single one indicator with the most negative effect on work life. Graph 3 presents the overall findings for this aspect of the study.

Graph 3: The Experience of menopause symptoms



Menopause experience and work

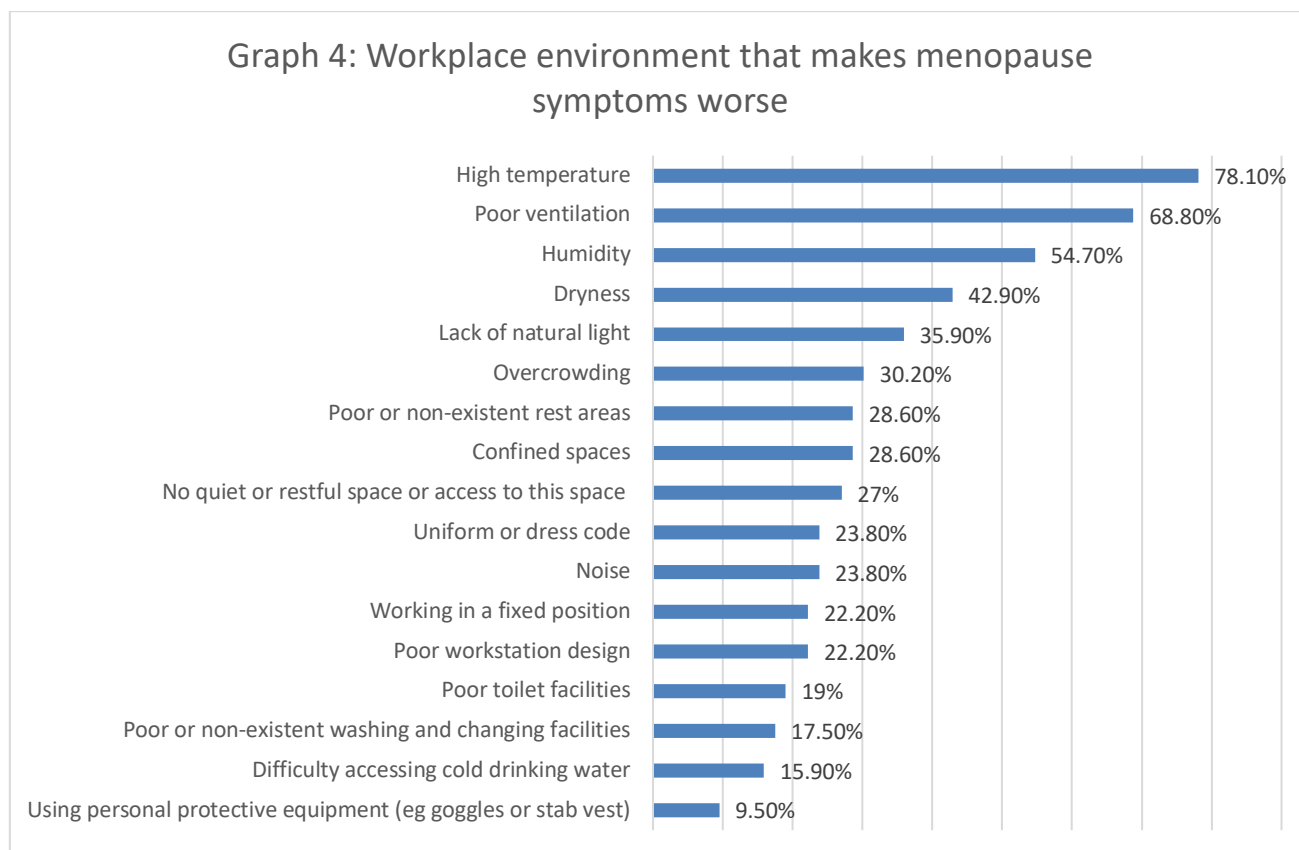
Respondents were subsequently asked how they dealt with their menopause symptoms at work. The qualitative answers revealed that 27.87% of answers provided directly mentioned clothing and/or sweating, covering: attempts to layer clothes so that items can be removed; issues with uniforms, attention needing to be paid to the colour of clothes in case of menstrual flooding; the need for body spray to cover the smell of sweat; and embarrassment about hot flushes. Examples of such statements include:

Discuss with friends who are also going through the menopause at work. Ensure that I go to the toilet as much as I can and wear clothes and underwear that makes peeing quick. E.g. not hard zips or all in one garments

Chose to sit by the window I can open when I work in a particular area. Wearing loose clothes and a cardigan so I can take it on and off when the need arises. I am customer faced too and it is embarrassing when I break out into a dripping sweat. I've had no support at work

The statements about clothing and sweating are all the more significant in light of the fact that in only 22.2% of respondents' organisations is a uniform or work wear required for all employees. However, almost half (48.4%) of respondents' work roles require a uniform or a dress code. Moreover, 39.3% could choose an alternative uniform or type of work wear. It is thus clear that clothing, whether it is in the form of a uniform or other work wear, has a significant effect on women's experience of menopause, as well as a significant relationship to hot flushes.

The following graph (4) testifies to the importance of high temperature as a crucial workplace factor influencing the experience of menopause symptoms. A majority (78.1%) of respondents indicated that this was an aspect of their workplace environment that made their menopause symptoms worse.



Similarly, statements provided by the respondents when asked whether they would like to add anything else on their experience of the menopause give an indication of how significant and potentially debilitating it can be and what an impact hot flushes, night sweats and general sweating have on their lives. Examples of such statements include:

“Sometimes the feelings can become overwhelming. When a flush starts you have a feeling that’s hard to describe, it’s like you are going to become unwell for a few minutes until it washes over you.”

“Feeling that I’m not myself anymore.”

“I am just so very uncomfortable as I get very hot and can sweat profusely. This makes me feel unclean despite showering at the beginning of day. I use body sprays often to make me smell fresher. I am scared of smelling unwashed.”

“Embarrassed to see clients in case my face starts dripping and I have to wipe it.”

“I just feel like an old woman since hitting menopause at 50, I was the life and soul of the party with lots of energy. I feel fat and unattractive and uncomfortable. Lack of sleep leaves me exhausted most days. I feel like shutting myself away from people and not socializing like I used to. Drinking alcohol makes my hangovers feel like brain tumours and I'm not naturally a "sweaty" person usually so to have the [fl]ushes and sweats is really uncomfortable.”

Data presented provide clear and compelling evidence that menopause symptoms in general, but hot flushes, night sweats and sweating specifically, are significant and, at times, debilitating for the women experiencing them. This makes the sample appropriate for the tank top trial.

7 Mobile App Data

Women reported their hot flushes and night sweats in the mobile app for 14 days, days 1-14 without wearing the tank top (Time 1) and days 15-28 wearing the tank top (Time 2). The first 4 days in each time period are excluded to factor in novelty in using the mobile app (Time 1) and getting accustomed to wearing the Become tank top (Time 2).

The data reported here are therefore for 2 time periods:

Time 1 refers to Days 5-14

Time 2 refers to Days 19-28

The results are a comparison of two 10 day periods. Time 2 allows us to assess the effectiveness of the Become tank top compared to when women in the sample did not wear the tank top. Measures in the study include an *incidence* report for each hot flushes and night sweats per day and self-reported hot flushes' and night sweats' *severity* as mild, moderate or severe. Analysis to compare Time 1 and Time 2 has been completed using a paired sample t-test with associated statistical significance.

Total hot flushes and night sweats per day

A substantial statistically significant reduction is observed for the total number of hot flushes and night sweats per day in Time 2 compared with Time 1, demonstrating the effectiveness of the Become tank top in reducing the incidence of hot flushes and night sweats for the sample of women in the study ($t=6.29$, $df=58$, $p<.000$).

The mean average incidence of hot flushes and night sweats in Time 1 is 47 and reduces to 31 in Time 2. The percentage reduction of daily hot flushes and night sweats in Time 2 compared with Time 1 is 35%. The Become tank top reduces the incidence of hot flushes and night sweats in the sample by 35%.

Severity of hot flushes and night sweats assessment

Numerical weighting to appreciate severity is included in the data reported here, i.e. the scale is weighted for moderate and severe hot flushes, and severe hot flushes contribute more to the index than moderate hot flushes.

A substantial statistical reduction in severity of hot flushes and night sweats is observed in Time 2 compared to Time 1 ($t=6.39$, $df=8$, $p<.000$), demonstrating that the Become tank top is effective in reducing the self-reported severity of hot flushes and night sweats amongst our sample.

The mean severity index is 146 in Time 1 and reduces to 80 in Time 2.

The percentage reduction in hot flushes and night sweats severity in Time 2 compared to Time 1 is 39%. The Become tank top reduces the severity of hot flushes and night sweats amongst our sample by 39%.

Effectiveness assessment using hot flushes and night sweats interference scale

The mobile app collected weekly summaries of hot flushes' and night sweats' interference with daily life that was measured by ten items to examine effects on women's work, social activities, leisure activities, sleep, mood,

concentration, relations with others, sexuality, enjoyment of life and overall quality of life. Hot flushes' and night sweats' interference with daily life as a retrospective weekly evaluation is provided here as further evidence of the effectiveness of the Become tank top.

Study participants rated weekly interference for days 1-7 (week 1), days 8-14 (week 2), days 15-21 (week 3) and days 22-28 (week 4). Each of the 10 evaluations of interference in daily life are ranked by study participants on a 10 point scale. A weekly average across the 10 items is derived. A statistical assessment of the 10 item scale shows the scale to be robust (alpha reliability week 1 = .92; week 2 = .97; week 3 = .95, week 4 = .95).

In weeks 3-4 study participants wore the Become tank top and comparison of the hot flushes' and night sweats' daily interference index for weeks 3-4 with weeks 1-2 when the vest was not worn shows the product to be effective across a range of activities and aspects of these women's lives. Mean averages are reported for each of the weeks 1-4. In addition an average of hot flushes' and night sweats' daily interference for Time 1 (weeks 1-2) and Time 2 (weeks 3-4) have been subject to statistical testing using paired sample t tests.

A substantial statistical reduction in hot flushes' and night sweats' daily interference is observed in Time 2 (weeks 3-4) when the Become tank top was worn when compared to Time 1 ($t=5.76$, $df=8$, $p<.000$; mean time 1=8.46, mean time 2 = 6.42). This demonstrates that the Become tank top is effective in reducing the self-reported daily interference of hot flushes and night sweats with these women's lives.

Daily Interference is classified as mild (values 0-3.9), moderate (values 4-6.9), and severe (values 7-10). Frequency analysis observes a reduction in the severity of daily hot flushes and night sweats interference in Time 2 when the Become tank top is worn by women in the study (Time 1 severe hot flushes and night sweats Interference = 61.5% compared to Time 2 = 36.5%; reported in Table 1 below).

Table 1: Comparison of Daily hot flushes and night sweats Interference in groupings of mild, moderate and severe daily interference

	Time 1 (weeks 1-2)	Time 2 (weeks 3-4)
Mild daily interference	12.8%	28.8%
Moderate daily interference	25.6%	34.6%
Severe daily interference	61.6%	36.5%

Sleep and concentration are the two aspects of women's lives where hot flushes and night sweats daily interference are consistently the highest ranking across weeks 1-4. Notably work and mood are ranked as third and fourth highest respectively in terms of daily interference in weeks 1-4. Sexual practices, relationships and enjoyment of life are the three aspects where hot flushes and night sweats daily interference are ranked lowest in interference-impact on women's daily lives.

8 Exit Survey Data

We now turn to the views of participating women in the exit study after completion of the trial of the Become tank tops. Where appropriate we compare these with data collected in week 3, when they had been wearing the tops for a week.

Comfort and wearability

Data from 7 days into the study show that first impressions of comfort wearing the tank top are extremely high with 93% of participants overall rating it as comfortable and 71% of this number identifying the tank top as extremely comfortable. In the exit survey only a slightly lower number - 88% - of women rated the tank top as comfortable. Of this number, 51% identified it as extremely comfortable. 76% also rated it as easy to wear with work clothes, with 28% of this number identifying the Become tank top as extremely easy to wear with work clothes. Initial impressions of the tank tops 7 days into wearing them were similar with 75% of women rating them as easy to wear with work clothes. In fact, 41% rated the tank tops as extremely easy to wear with their work clothes.

81% rated the tank top as easy to wear with non-work (leisure) wear, with 32% stating of this group that the tank tops were extremely easy to wear with their non-work clothing. Initial impressions 7 days after wearing the tank top were the same.

86% rated the tank top as easy to wear for sleep/with their sleep wear, with 70% of this group rating the Become tank top as extremely easy to wear as their sleep wear or combined with their sleep wear. Initial impressions 7 days after wearing the tank top were the same. Qualitative statements by participants backed up this positive assessment.

“Very flattering and easy to wear.”

“I’m not aware that I’ve got it on which is a good thing.”

“The feeling is so soft, satin like material. You forget that you are wearing it as it’s so soft.”

“I forgot I had them on they were so comfy.”

“It’s actually incredibly comfortable and makes my starchy work uniform feel comfy.”

“I’m not bothered about wearing any sleep wear, I just wear my vest now!”

Women’s feedback in the survey does however raise questions about calling the garment a tank top. Several participants suggested that it is more of a vest. It is worth pointing out that tank top is actually a North American term and that a garment of this type would be more commonly referred to as a vest in the UK. Other comments focussed on the high neck line and wide shoulder straps of the design, explaining that this has made it difficult to wear with clothes including blouses, wrap dresses and tops with open necks. The tank tops were also sometimes seen as small or restrictive on the arms. Suggestions include options with lower neck lines and thinner straps would be welcomed to alleviate these issues. Other comments included suggestions that the tank tops could be designed so that they don’t look “just functional”, so they were more “attractive/sexy and feminine with spaghetti straps or camisole style”. Some felt the tank tops could be longer in length, with a couple of participants commenting that they were difficult to tuck into clothing. However, other participants noted that the tank top was easy to tuck into

trousers and skirts.

Pricing

This element of the data does suggest that price point may be an issue. 80% felt that the tank tops were not affordable. Qualitative comments also focus on the affordability of the tank tops, suggesting an impression that the price point was high, and a price in the region of £20-£25 was identified as reasonable. This is significant given that we deliberately recruited women in ABC1 social groups, thus those with higher incomes compared to women in other social groups. The following provides examples of these qualitative comments:

“This is outside my price range, women with two incomes or if their kids have left home probably spend more money on themselves :) The tops feel good quality and are nicely packaged but I’d say that’s expensive.”

“I personally don’t feel I would be able to afford both the tank top and knickers set as I would want at least 6 sets of varying colours to go with my wardrobe.”

“I do think they’re expensive and had been wanting to purchase before this research opportunity but I was worried about paying for them and them not working”.

“Even knowing that they do work for me I would struggle to pay out for the amount that I would need. You’d be looking at £200 to be able to get vests to last you all week (unless you’re washing all the time but I work full time and it gets done at weekends). I do think this will put some people off. I would expect a vest to cost £25 for one.”

However, many respondents said that they were extremely impressed with the effectiveness of the tank tops and having tried them 80% said they would recommend the tank tops to others experiencing hot flushes and night sweats. Nearly half of this group (49%) said they would definitely recommend buying the tank tops to others. Only 3% said they would not recommend the tank tops, and a further 17% said they were unsure whether they would recommend them.

48% of women surveyed said it was likely that they would purchase the tank top again, with 27% of this number saying that they felt it was extremely likely that they would purchase it again.

Adverts and positioning

Only 20.3% of participants had previously seen an advertisement for Become tank tops but 80% of women reported that they had not seen any Become adverts previously. Of the respondents who had previously seen an advertisement, the vast majority had done so on Facebook or other social media. Turning now to these elements of the marketing mix, 93% of women felt menopause should be explicit in the advertising messaging as opposed to the tank tops being presented as a clothing brand that has cooling technology. The main reason for women wanting to see menopause explicitly addressed are that menopause is natural, nothing to be ashamed of, and has been a taboo for too long. Moreover, being explicit was seen to be honest as this is what the Become tank tops are about and this would also make it easier for women searching for menopause products.

However, some women reflected on the fact that mention of the menopause might put some women off or might make the purchase embarrassing. Yet, again, using the term menopause explicitly was seen to have some

emancipatory potential. The following provides an insight into their qualitative comments:

"I think we have kept quiet about the menopause for too long and it is good to get it "out there", then women wouldn't feel so isolated with it and hopefully men would understand it more too."

"It will be easier for women to find on the internet if the menopause is part of the advertisement."

"Because not enough is known about it for women. It should be common knowledge like periods."

"In terms of the product[']s potential the word 'menopause' may well put women off from buying it. It has the potential to be more than just a menopausal product. I could imagine that it would be saleable for a number of different reasons. However, if you want it to be only for menopausal women then it does need to say that."

"I've thought long and hard about this question but think it should say for menopause (or hormonal overheating). Some women don't realise (or don't want to acknowledge the fact) that they are going through the menopause and don't always attribute the flushes and sweats to that. If you did promote it as "cooling technology" I would ensure it mentions "great for menopausal flushes" in there somewhere. When I searched online looking for something I typed in "clothing for menopausal flushes" and the Become site came up."

A number of women commented that the women in the advertisements were not stereotypical models, though others thought that this did not go far enough.

"The women looked more like me not models which was nice. They were wearing a black vest which I didn't have and made me want theirs instead!"

"I thought the adverts were clear in what they were promoting but for me personally not sure I would have used Andrea McLean as the spokesperson. I'm sure if she says she's going through the menopause then she is (!) but found her too slim and put together to be an advocate. I appreciate you can't use someone who's a sweaty mess to do the adverts (although I am available :) but for me someone like Nadia Sawalha or Dawn French - maybe a slightly bigger and more "real" woman - like they've been using in the Dove campaign or Boots No 7. You don't look at the lovely Andrea and think "hot flush"."

73% preferred the 2018 advert when asked to choose between the 2017 and 2018 adverts. The main reasons mentioned for this preference was that the latter adverts were more colourful and a better reflection of menopausal women, with more diversity in the models. Yet not all women agreed and there were some respondents who liked or disliked both advertisements, usually on the basis of the models not being representative of menopausal women. Individual preferences, e.g. for co-ordinated underwear, also played a role, as the following comments show.

"It doesn't have the strong in-your-face message re-dry vagina, so it's easier to connect with, and it needs clear messaging about menopause being a normal thing."

"Because it was obvious that it was for a taboo subject, and things that are associated with the menopause."

"It covers [a] cross section of our society showing women can cope with menopause and it should not limit their lives."

“2017 by far. Thought the 2018 is a bit staid and dull in comparison. 2017 says to me that you can still be a sexy, liberated woman whilst going through the menopause.”

“I don't really like either. First one seems to imply sexual freedom and I prefer the consistency of coordinated under wear. Just a personal preference towards coordinated under wear which I always adhere to.”

The qualitative data showed a mixed picture when women were asked how menopausal women were portrayed in the adverts. Many thought that the images showed attractive, happy, active, carefree, and confident women, yet others commented that the women in the adverts were too young, stylish, slim and happy as this did not tally with their experience of menopause.

“I think the women are portrayed in a positive light and that they are coping with menopause by wearing the vests.”

“Beautiful, happy, relaxed which I don't think we feel when we are having the symptoms.”

“The women look happy and carefree and also supportive of other women – the bottom photos in particular show female solidarity and closeness. The women are portrayed as attractive and sexy (to some degree).”

“As young fit women who are not going through the menopause.”

Finally, respondents were asked about the “Become – Be-Unstoppable” strap-line. Again, responses were mixed, though the overall message of strength and support was well perceived and thought to be encouraging. However, for some this felt unachievable or an attempt to enforce change rather than a confirmation of who they are:

“Because the menopause can make you feel like "stopping" doing many things in your life I like the phrase "Be Unstoppable" because it gives hope to many that have felt so wretched that nothing can help in the past.”

“It tells me to be strong and not to let the menopause rule my life.”

“It doesn't inspire me... feels like a race that's not achievable.”

“I don't like it. It is an exaggeration. Become doesn't make you unstoppable, it just eases/removes some of the obstacles.”

“I like the strapline but not certain about the word unstoppable. It makes me think of the sanitary adverts where women are roller skating etc which used to get on my nerves somewhat. I think the message that I would want to see conveyed is that you can continue with your life - it's not an end to anything - just a new phase so prefer "Become - carry on being unstoppable" or "Become - continue to be you." Effectiveness of the Become tank top for reducing heat, sweat and coldness of hot flushes and night sweats

Results from the exit survey provide further evidence of the Become tank top's effectiveness.

The Become tank top is reported to increase women's confidence to manage hot flushes both at work and out of work.

73% of women identified that wearing the tank tops made them feel much more confident to manage their hot flushes. 90% of women identified the tank top as effective for reducing the feeling of heat during hot flushes and night sweats and 91% of women identified the tank tops as reducing sweating.

Significantly, 66% of women said that the tank tops were very or highly effective for heat reduction and 71% identified a very high or high reduction in their sweating. The tank tops were also seen as effective in reducing the chilly feeling after a hot flush. 86% of women said the tank tops were effective in reducing the chilly feeling, with 63% of this number rating the effect as very highly or highly noticeable.

Overall effectiveness of Become tank tops

The following comments provide further qualitative evidence of how effective our sample found the tank tops to be.

"I can't do without it...how exactly does it work? I know my hot flushes have reduced."

"It really helped to reduce the number and severity of my hot flushes. It gave me the confidence as I put one on each day, that even if I had a hot flush, I could trust it to help me reduced my symptoms and cool me down again quicker than without it so I could get on with my day. It was like a bit of armour."

"At the start of the study I honestly didn't believe that the vest could make any difference. I was very, very sceptical, but I [am] happy to have been proved wrong!"

"Just to say thank you for introducing me to your products. I feel as though my life can go on."

"I'm scared now not to wear the vest in case the flushes are worse than ever!"

"[M]enopause is hell but these vests have really really helped. I love them."

"[R]ecommend because they work!"

"I have only had a few hot flushes and no sweats since wearing them – amazing."

"[V]ery effective. Really helped with my sweats."

"Since I stopped wearing the vest at night my flushes have reverted back to sweats. I shall therefore continue to wear it at night."

9 Concluding Summary

This study on Become tank tops and their impact on managing menopausal hot flushes and night sweats presents substantial and positive results.

The data shows:

Significant reductions in the incidence of hot flushes and night sweats (by 35%) and the severity of hot flushes and night sweats (by 39%) among our sample.

The severe daily interference of hot flushes and night sweats among our sample reducing between the period without and with wearing the tank top (from 61.6% to 36.5%).

Very high ratings for overall comfort (88%) and wearability with work wear (75%), leisure wear (81%) and as or with sleep wear (86%) among our sample.

Significant and positive evaluation on the effectiveness of the Become tank top on reducing the feeling of heat during hot flushes and night sweats (90%) and in reducing sweating (91%).

73% of respondents stating that the Become tank tops made them more confident in managing their hot flushes.

There are two caveats to the overall very positive results of this research. First, 80% of respondents did not feel that the Become tank top is affordable. This is despite the fact that the women participating in the study were in ABC1 social groups, meaning they have a comparably higher income than other social groups. Second, despite the overall very good evaluations on comfort and wearability, there were concerns about the high neckline and wide shoulder straps, sizing (in particular restrictions on the arms) and the length of the garment, which was perceived to be too short.

As a final point, we would also highlight some unease about calling the garment a tank top as this is a North American term. It was noticeable that the majority of qualitative comments referred to the Become tops as vests.

10 References

- Brewis J, Beck V, Davies A and Matheson J (2017) *The effects of menopause transition on women's economic participation in the UK*, London: Department for Education
- De Araújo Moraes SDT *et al.* (2012) 'Sleep disorders in climacteric women' *HealthMED*: volume 6, issue 3, pages 846-854
- Griffiths A *et al.* (2016) 'EMAS recommendations for conditions in the workplace for menopausal women' *Maturitas*: volume 85, March issue, pages 79-81
- Griffiths A and Hunter MS (2014) 'Psychosocial factors and the menopause: the impact of the menopause on personal and working life' in *Annual Report of the Chief Medical Officer. The Health of the 51%: Women*, edited by SC Davies, pages 109-120
- Jack G *et al.* (2014) *Women, Work and the Menopause: Releasing the Potential of Older Professional Women*, final project report, La Trobe University, Melbourne, Australia
- Park M *et al.* (2008) 'Mental workload under time pressure can trigger frequent hot flashes in menopausal women' *Industrial Health*: volume 46, issue 3, pages 261-268
- Park M *et al.* (2011) 'Effects of menopausal hot flashes on mental workload' *Industrial Health*: volume 49, issue 5, pages 566-574