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Testing a cognitive model of menopausal hot flushes and night sweats

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ABSTRACT

Objective: Hot flushes and night sweats (HFNS) are commonly experienced by women during the menopause transition and are particularly problematic for approximately 25% having negative impact on their quality of life. We previously developed a cognitive model of HFNS, which outlines potential predictors of HFNS. This study aims to test the model by investigating the relationships between personality characteristics, perceived stress, mood, HFNS beliefs and subjective and physiological measures of menopausal HFNS.
Methods: 140 women (menopause transition or postmenopausal) who were experiencing at least 10 HFNS per week for at least a month, completed assessment interviews, including questionnaires assessing optimism, somatic amplification, perceived stress, depressed mood, anxiety, HFNS beliefs and HFNS frequency, problem-rating and 24-hour sternal skin conductance monitoring. Structural equation models (SEM) were used to investigate the optimum predictive model for HFNS Frequency and HFNS Problem-Rating.
Results: On average 63 HFNS per week and moderately problematic HFNS were reported. The physiological measure of HFNS frequency was not associated with socio-demographic variables, personality or mood. The final SEM explained 53.2% of the variance in problem rating. Stress, anxiety and somatic amplification predicted HFNS problem rating but only via their impact on HFNS beliefs; HFNS frequency, smoking and alcohol intake also predicted HFNS problem rating.
Conclusions: Findings support the influence of psychological factors on experience of HFNS at the level of symptom perception and cognitive appraisal of HFNS.

Introduction

Hot flushes and night sweats [HFNS] are commonly experienced during the menopause transition and early postmenopause [1,2] and are problematic for approximately 25% of women largely due to embarrassment, physical discomfort and sleep disruption, and their impact on quality of life [3,4]. While HFNS are highly prevalent in most western countries, their impact is not necessarily burdensome for women in general [5]. Risk factors for frequent and/or problematic HFNS include surgical menopause, body mass index (BMI), childhood neglect/abuse, race/ethnicity, smoking, lower levels of education, socioeconomic status, and prior anxiety [2]. The experience of HFNS may also be affected by culture [6] and environmental factors, such as climate [7].

HFNS can be measured using subjective measures of frequency and problem-rating or interference and also using physiological measures sternal skin conductance monitoring SSC. The Hot Flush Rating Scale includes a frequency rating plus the extent to which the symptoms are viewed as problematic [8]. Similarly, the Hot Flash Related Daily Interference Scale assesses the impact of hot flushes on daily life [9]. Physiological SSC and subjective measures of HFNS have been found to be only moderately associated in ambulatory settings, with on average 29% of HFNS being concordant, i.e. being apparent on both physiological and subjective measures [10]; physiologically measured HFNS tend to be under-reported by women [10]. Moreover, frequency of HFNS appears to measure a different dimension of HFNS from problem rating; it is problem rating which correlates highly with severity and quality of life and which is considered the most appropriate outcome measure in clinical trials [4,11,12]. Consequently measures of both subjective and physiological frequency and problem-rating are all relevant measures of different dimensions physiological, symptom detection and appraisal of HFNS [13].

The causal mechanisms of HFNS are not entirely understood but they are they are thought to result from disturbance of the temperature-regulating mechanism in the hypothalamus, triggered by a decline in oestrogen levels. Core body temperature is regulated between an upper threshold for sweating and a lower threshold for shivering; between these thresholds is a 'thermoneutral zone' (TNZ) within which sweating or shivering do not occur. The heat dissipation responses of the HFNS are triggered if the core body temperature crosses the upper threshold of the TNZ. A change in levels of oestrogens is believed to alter the function of brain neurotransmitters (serotonin, noradrenalin), which in turn may lead to narrowing of the TNZ, and there is also some evidence

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that stress potentiates HFNS by lowering the hot flush threshold. Therefore there is a rationale for the role of hormones and stress affecting central physiological mechanisms of HFNS [3,13].

A cognitive behavioural model of HF/NS has been developed that describes how a range of psychological factors might influence the physiological mechanisms as well as perception and appraisal of HFNS [13] (see Fig. 1). The model includes four stages of experience of HFNS: physiological processes, symptom perception, cognitive appraisal and behavioural reactions to symptoms. Theoretically, the model draws on symptom perception theory, self-regulation theory, and cognitive behavioural theories. Research examining the cognitive appraisals of HFNS suggests that negative thoughts and beliefs about HF/NS are associated with problematic HFNS, whereas calm thoughts, accepting the symptoms and not over-reacting, are associated with less problematic symptoms [14,15]. Negative attitudes to menopause have been found to be correlated with negative beliefs about HFNS [14,16], and depressed mood and anxiety have been found to be associated with more problematic HFNS. However, the relationships between depressed mood/anxiety, beliefs and HFNS are not clearly understood [2,11,13].

The model [13] hypothesises that:

(i) stress will influence the frequency of HFNS at the physiological level, i.e. physiologically measured HFNS,
(ii) somatic amplification, stress, depressed mood and anxiety will influence symptom perception, i.e. the self reported HFNS frequency,
(iii) cognitive factors, i.e. HFNS beliefs, will lead to negative appraisals of HFNS i.e. problem rating of HFNS, and
(iv) personality, mood, stress and somatic amplification will influence HFNS problem rating through their effect on HFNS beliefs.

The model also specifies possible mechanisms and mediating factors that can be targeted in randomised controlled trials of cognitive behavioural interventions [17,18].

The current study aims to test the cognitive behavioural model by investigating predictors of HFNS frequency subjective and physiological SSC and HFNS problem-rating, using Structural Equation Models (SEM) in a cross sectional sample of women with HFNS. Predictors include personality measures trait optimism and somatic amplification, mood and perceived stress, as well as beliefs relating to HFNS. The impact of level of education, menopausal status, hysterectomy, surgical menopause, past use of hormone therapy, BMI, exercise, alcohol intake and smoking were also examined. We aimed to test the hypotheses outlined above.

Methods

Participants

Women recruited to MENOS2 randomised controlled trial of CBT for HFNS [17] formed the sample. Well women with variable menstrual cycles (menopause transition) or who were more than 1 year from their last menstrual period (postmenopause) with problematic HF/NS were recruited from South London general practices, breast screening clinics, a menopause website and local newspaper advertisements between March 2009 and May 2010. Inclusion criteria were: English speaking women, aged 18 plus, having problematic HF/NS (score above 2 on the HFRS [8] for at least 1 month and minimum weekly frequency of 10), and living within travelling distance of London. Exclusion criteria: non-English speaking, having medical or psychiatric conditions that would affect ability to participate. Ethical approval was obtained from Kings College London Research Ethics Committee Psychiatry, Nursing and Midwifery Research Ethics Subcommittee, reference: PNM/08/09-42.

Procedure

Potential participants opted into the study in response to posters and leaflets and were screened by telephone and sent study information. Those who were interested in participating attended an assessment interview, completed a consent form, socio-demographic and baseline questionnaires, and were fitted with a sternal skin conductance (SSC) hot flush monitor Bahr Monitor™, Simplex Scientific LLC, which they wore for 24 hours and returned the next day.

Demographic information age, height, weight, ethnicity, level of education, marital and employment status, smoking (current, never, past), alcohol intake (none, less than 1, 1–3, 4–6, 7–10, 11–15, 16–20, 21+ units per week) and exercise behaviours (any exercise — rarely/never, less than once a week, once a week, 2–3 times a week, 4–6 times a week, everyday), menopausal status as defined by the stages of reproductive aging workshop — STRAW [1], and treatment use (hormone therapy (HT)) were recorded at baseline. Women were asked about their menopause symptoms and medical history. Questionnaire measures included are as follows.

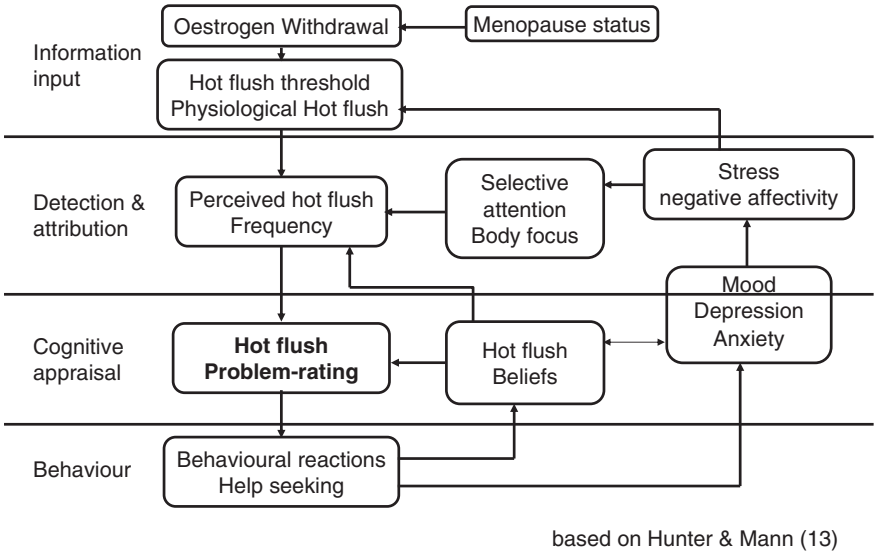

Fig. 1. A cognitive model of hot flushes and night sweats.