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Empirical Articles

The Portuguese Version of the Perceived Control over Hot Flushes Index: Evaluation of its Psychometric Properties

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Abstract

Aim: This research aims at validating an instrument to assess the perception of control over hot flushes, frequent symptoms during menopause. *Method:* A sample of 243 symptomatic women completed the Perceived Control over Hot Flushes Index, PCoHFI (Reynolds, 1997), two subscales from the Menopause Symptoms' Severity Inventory, MSSI-38 (Pimenta et al., 2011) to assess perceived loss of control and vasomotor symptoms, as well as a socio-demographic questionnaire. The construct, criterion and external validity, reliability and sensitivity were explored. *Results:* The exclusion of item 15 is suggested since it presents a negative factorial weight ($\lambda = -.105$; $p = .134$) and only 1.1% of its variance is explained by the construct. The PCoHFI manifested two factors: internal and external control attribution. It does not present convergent validity, but it has discriminant validity. Criterion validity is confirmed by a significant correlation with other similar constructs. Moreover, the PCoHFI evidences a good reliability and sensitivity. *Conclusion:* The PCoHFI manifests good psychometric properties and is an adequate instrument to assess this variable, which has been identified as a strong predictor of vasomotor symptoms' severity. Research and interventions with women who evidence severe hot flushes can benefit from the assessment of such construct.

Keywords: perceived control, index, hot flushes, menopause, Portuguese version

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Introduction

During menopause women can manifest vasomotor symptoms, that is, hot flushes and night sweats. Although the pathophysiologic understanding of these symptoms is still limited, the decrease of endogenous estrogens – that occurs during menopausal transition – seems to be critical for their appearance (Bachmann, 2005). Their manifestation can occur in an unforeseen way and, besides hormonal fluctuations other triggers of vasomotor symptoms also include stressful situations (Chedraui et al., 2010; Reynolds, 2000).

Hot flushes might assume different degrees of intensity, from a mild and brief hotness sensation to a sudden and intense heat in the upper body and face, which may lead to redness and strong perspiration (Deecher & Dorries, 2007). A high frequency and intensity of these symptoms can lead to sleep disorders, mood swings, fatigue and anxiety (Chedraui et al., 2010).

Around 50-80% of the female world population, aged over 45 years, experiences hot flushes (Mohyi, Tabassi, & Simon, 1997); however, only 10-25% of these women consider these symptoms as bothersome in terms of

frequency and intensity (Hunter & Liao, 1996). Vasomotor symptoms might start in the peri-menopause (phase when the hormonal fluctuations occur) and can be maintained until the post-menopause (Rödström et al., 2002).

The literature evidences that the prolonged and frequent occurrence of these symptoms might interfere with the well-being, the ability to work and the social life of women (Bachmann, 2005). Therefore, and given that women spend a third of their life in the phase of post-menopause, it is crucial to preserve a good quality of life and a good functional ability in this period, which has been identified as significantly productive (Utian, 2005).

Hormone therapy, which has demonstrated a significant efficacy in the management of such symptomatology (MacLennan, Broadbent, Lester, & Moore, 2004), has also been be associated with health-related risks, in particular in women who might present vulnerability to certain diseases, and if used for more than five years (International Menopause Society Executive Committee, 2005; Writing Group for the Women's Health Initiative Investigators, 2002). For that reason, certain women who manifest vasomotor symptoms might have the necessity of using other strategies to manage them (Reynolds, 2000). Specific behavioural changes, which involve smoking cessation, moderated alcohol intake, a balanced nutrition and physical exercise, have been emphasized as important modifications that will enable a better climacteric period (International Menopause Society Executive Committee, 2005; Neves-e-Castro, 2003). In addition, a literature review has highlighted that psychological interventions might result in a decrease, to a certain degree, of hot flushes' frequency or intensity (Pimenta, Leal, & Branco, 2007).

Perceived control has been observed as being associated to a less symptomatic experience in many areas (Doerfler, Paraskos, & Piniarski, 2005; Hoedemaekers, Jaspers, & van Tintelen, 2007; Rivard & Cappeliez, 2007; Schnoll et al., 2011) and, specifically, in relation to the vasomotor symptoms (Pimenta, Leal, Maroco, & Ramos, 2011; Reynolds, 1997; Thurston, Blumenthal, Babyak, & Sherwood, 2005).

Therefore, it is pertinent to have adapted measures to assert the particular perceived control over hot flushes.

Method

Participants

A community sample of 243 women with vasomotor symptoms, and with ages ranging from 42 to 60 years old, participated in this research. Table 1 summarizes the participants' characteristics.

Materials

The vasomotor subscale from the Menopause Symptoms' Severity Inventory (MSSI-38) (Pimenta, Leal, Maroco, & Ramos, 2012) was used to assess hot flushes and night sweats during the previous month, in terms of both frequency and intensity, on a five-point Likert scale (from 0 to 4) that ranged from *'never'* to *'daily or almost every day'*, and from *'not intense'* to *'extreme intensity'*. This study included women who scored at least 1 in terms of frequency in the hot flushes or in the night sweats items, independently of their intensity. From MSSI-38, the perceived loss of control subscale was also used.

To evaluate perceived control, the Perceived Control over Hot Flushes Index was applied (Reynolds, 1997). This instrument includes 15 items (e.g., If I do all the right things, I can successfully manage hot flush symptoms) and explores the construct in a 4-point Likert-type scale (ranging from *'strongly disagree'* to *'strongly agree'*).

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Table 1

Characterization of participants in relation to socio-demographic and menopause-related variables

Characteristics	Participants	
	n	%
Age (*M* = 51.8; *SD*= 4.501)		
Marital status		
Married or in a relationship	171	70.7
Not married nor in a relationship	71	29.3
Parity		
0	25	10.6
1	84	35.6
2	99	41.9
3	21	8.9
>3	7	2.9
Education		
Primary school	34	14.3
Middle school	65	27.4
High school	60	25.3
University degree	78	32.9
Professional status		
Active	197	82.8
Inactive	41	17.2
Family annual income		
≤ 10.000 €	56	26.7
10.001 – 20.000 €	52	24.8
20.001 – 37.500 €	54	25.7
37.501 – 70.000 €	34	16.2
≥ 70.001 €	14	6.7
Search for medical help to deal with menopause		
Yes	155	70.8
No	64	29.2
HT, herbal/soy therapy or Nothing		
HT	23	10.5
Herbal/soy therapy	31	14.1
Nothing	166	75.5
Menopausal status		
Pre-menopause	15	6.3
Peri-menopause	75	31.5
Post-menopause	148	62.2

Menopausal status was defined according to the Stages of Reproductive Aging Workshop criteria (Soules et al., 2001). Pre-menopausal women were those who had not experienced any changes in their menstrual cycle. Peri-menopausal participants were those who reported a variable cycle length (a difference of more than 7 days from the 'usual') or who had missed two or more cycles and had had an episode of amenorrhea lasting more than 60 days. Post-menopausal women were those who had had at least 12 months of amenorrhea. The socio-demographic characteristics (namely, age, marital status, parity, professional status, educational level, and

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family's annual income), and menopause-related variables (medical help-seeking to manage menopause, and use of hormone therapy and herbal/soy products), were also assessed.

Procedure

The community sample was recruited mainly through schools and universities in the city of Lisbon. The American Psychological Association's standards on ethical treatment of participants were followed. The informed consent form explained the aims of the study; it emphasized that the participation in the research was voluntary and that participants could interrupt their collaboration at any time, without any consequences. Each participant kept a copy of the informed consent form, on which contact details of the responsible researcher were included.

Statistical Analysis

The construct validity of the Perceived Control over Hot Flushes Index (PCoHFI) was asserted by confirmatory factor analysis, convergent and discriminant validity.

The goodness of fit of the measurement model was given by chi-square statistics (χ^2/df), comparative fit index (CFI), goodness of fit index (GFI) and root mean square error of approximation (RMSEA). Reference values indicative of good model fit were those currently used in structural equation modelling (Byrne, 2001; Maroco, 2010a).

The convergent validity of the instruments was analysed through the average variance extracted (AVE). An adequate value should be higher than .45. The discriminant validity was explored comparing the inter-factors' squared correlation with the AVE of each individual factor. To demonstrate the factors' discriminant validity, the squared correlation between factors should be smaller than the individual (Maroco, 2010a).

Criterion validity was explored through concurrent-oriented validity of scales, using Pearson's correlation with similar constructs, namely the vasomotor symptoms and the perceived loss of control subscales from MSSI-38.

In addition, to demonstrate the stability of the original structure of the instruments and assert external validity of the measurement model, initial confirmatory factor analysis was performed in 60% of the sample, randomly selected, and the factor weights and correlations' stability were confirmed in the remaining 40% of the sample (Maroco, 2010a).

Sensitivity was explored through the analysis of minimum and maximum values, skewness and kurtosis. Values are expected to range through the overall Lykert-type scales (from the minimum to the maximum scores) and skewness and kurtosis are expected to have absolute values below 3 and 7 respectively (Kline, 2005; Maroco, 2010a). Finally, reliability was studied applying the Cronbach's alpha; alpha scores should be above .70 (Maroco, 2010b).

Results

Construct Validity

Confirmatory Factor Analysis — The item 15 ("I want to learn as much as I can about hot flushes and the menopause") was not significantly correlated with the construct, presenting a negative standardized estimate ($\lambda = -.105$; $p = .134$) and only 1.1% of its variance was explained by the construct. Moreover, the modification index

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(MI = 33.785) evidenced this item as the strongest negative influence on the quality of fit of the measurement model. Therefore, it was excluded.

Although in the original study of PCoHFI there is no reference to a two-factor structure, in this research this bi-dimensional organization presented itself as the best possible measurement model. Hence, items 2, 3, 5, 6, 8, 9, 11 and 13 evidenced what was called internal control attribution; and items 1, 4, 7, 10, 12 and 14, the external control attribution.

The instrument without item 15 and the two-factor structure presented a measurement model with a good fit (X^2/df = 2.786; CFI = .891; GFI = .910; RMSEA = .077; p < .001; C.I. 90% =].065; .090[).

Convergent Validity — Both internal control attribution (.401) and external control attribution (.285) presented weak AVE's scores (i.e. lower than .450).

Discriminant Validity — The two subscales presented discriminant validity, given by a squared correlation of .1024.

Criterion Validity

The perceived loss of control (r = -.156; p = .012) and vasomotor symptoms (r = -.209; p = .001) subscales, from the MSSI-38, evidenced a significant, although weak, correlation with the internal control attribution from PCoHFI. The same is observed for PCoHFI's external control attribution, again in relation with perceived loss of control (r = .162; p = .010), although the magnitude of association was moderate for the vasomotor symptoms' factor (r = .483; p < .001).

External Validity

The model presents an acceptable adjustment (χ^2/df = 1.640; CFI = .864; GFI = .856; RMSEA = .052; p = .395; C.I. 90% =].041; .062[) in both groups (60% and 40% of the total sample).

The unconstrained measurement model does not have a significantly better fit than the model with constrained factorial weights ($X^2(12)$ = 12.488; p = .407), hence confirming the external validity of the measurement model. Therefore, there are no significant differences in the factorial measurement weights between both groups (60% of the sample versus 40%) confirming the assessment's stability of the Perceived Control over Hot Flushes Index.

Reliability

The internal consistency of the PCoHFI (without item 15), given by the Cronbach's alpha was good, as evidenced in Table 2.

Table 2

Perceived Control over Hot Flushes Index: reliability

Scale	Cronbach's Alpha
Internal Control Attribution subscale	.851
External Control Attribution subscale	.703
Overall scale	.782

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Sensitivity

To address sensitivity, the range of the Likert-type scale was explored, as well as the skewness and kurtosis values for the 14 items. All items presented answers ranging from 1 to 4 and evidenced values of kurtosis and skewness below 7 and 3, respectively, as recommended (Table 3).

Table 3

Perceived Control over Hot Flushes Index: sensitivity

Items	Maximum	Minimum	Skewness	Kurtosis
1	1	4	-.784	.310
2	1	4	.041	-.826
3	1	4	-.369	-.192
4	1	4	.303	-.676
5	1	4	-.042	-.724
6	1	4	-.289	-.471
7	1	4	-.121	-.635
8	1	4	.067	-.462
9	1	4	-.081	-.567
10	1	4	-.839	.212
11	1	4	.936	.540
12	1	4	-.274	-.504
13	1	4	-.556	-.265
14	1	4	.403	-.456

Discussion

Overall, the instrument presented acceptable psychometric properties. The confirmatory analysis showed that item 15, which expressed the will of learning as much as possible concerning both hot flushes and menopause, was not associated with the general construct being assessed by the other items. Therefore, in this Portuguese version, its exclusion is recommended.

Other studies have evidenced that knowledge of a specific clinical condition or acquisition of health-related information is not positively associated with perceived control (either related with internal or external factors) (Boot et al., 2005; Prince-Embury, 1992). Moreover, the fact that this item conglomerates two different subjects, being one regarding a symptom (hot flushes) and the other to a normative process (menopause), might have contributed to this absence of association with the theoretical construct being measured, that is, the perceived control over hot flushes.

The significant correlations between similar constructs (namely, perceived loss of control and vasomotor symptoms severity, with both internal and external control attribution) evidence the criterion validity. The associations were manifested in the expected direction, that is, a higher perceived loss of control was associated with a lower internal control attribution and with a higher external control attribution; in addition, a higher severity of the vasomotor symptoms was related with a decreased internal control attribution and with an increased external control attribution. However, it is important to emphasize that three out of the four correlations calculated were weak; the only correlation that was moderate was the association between vasomotor symptoms' severity and external control

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attribution. This last result is congruent with what was concluded in the study regarding the development of PCoHFI: low levels of perceived control were the most predictive characteristic of hot flushes distress (Reynolds, 1997).

The confirmation of external validity allows a generalization regarding the quality of the measurement model; therefore, it is acceptable to hypothesize that when used in other samples, the PCoHFI will be able to assess the construct in a similar way, manifesting analogous psychometric properties.

Reynolds (1997) emphasizes the need to address, in future studies, whether coping with hot flushes can be enhanced by psychological interventions that focus on strategies which develop the perceived control.

During the last decade, several non-medical interventions have been explored concerning their efficacy in vasomotor symptoms' (and especially hot flushes) decrease. These include cognitive-behavioural treatments (Carpenter, Neal, Payne, Kimmick, & Storniolo, 2007; Keefer & Blanchard, 2005), yoga, meditation and mindfulness (Carmody, Crawford, & Churchill, 2006), relaxation (Wijma, Melin, Nedstrand, & Hammar, 1997), and clinical hypnosis (Younus, Simpson, Collins, & Wang, 2003), with evidences of some degree of effectiveness. However, most studies are done with small samples or with a methodology which does not allow a generalization of the attained results.

Hunter and Liao (1995) have explored the psychological differences between women with vasomotor symptoms who wanted a treatment, and the ones who did not. Socio-demographic characteristics and symptoms' frequency were not different between these two groups. Nonetheless, women seeking treatment perceived their hot flushes as more problematic, manifested higher levels of anxiety, were less able to manage stress, and had lower self-esteem and lower internal locus of control. This reinforces the utility of assessing perceived control, which can be a relevant psychological characteristic in the context of hot flushes' perceived severity and management.

In view of the fact that these vasomotor symptoms can be influenced by socio-economic, cultural and ethnic factors (Chedraui et al., 2010), other studies are recommended, especially with heterogeneous samples regarding ethnicity, given the present study was done mainly with Caucasian participants.

In conclusion, the research about the impact of the perceived control over hot flushes is still scarce (Chedraui et al., 2010). Given that perceived control can be a strong and significant predictor of hot flushes and night sweats' severity (Pimenta et al., 2011), its assessment with women who manifest an exacerbated vasomotor symptomatology is pertinent, both in research and clinical settings. Therefore it is important to rely on measures that present good psychometric properties, which allow the assessment of this particular perceived control.

This research confirms the Portuguese version of the Perceived Control over Hot Flushes Index, developed by Reynolds (1997) and using a female middle-aged sample, as an instrument with acceptable psychometric properties.

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Appendix

Versão Portuguesa do Índice de Perceção de Controlo sobre os Afrontamento

Indique por favor o ser grau de concordância ou discordância com cada uma das seguintes afirmações da escala seguinte, assinalando o número apropriado para cada afirmação:

Itens	**Discordo fortemente**	**Discordo**	**Concordo**	**Concordo fortemente**
1 – Os afrontamentos estão a controlar a minha vida.	1	2	3	4
2 – É largamente da minha responsabilidade gerir os meus afrontamentos.	1	2	3	4
3 – Consigo reduzir o meu mal-estar durante os afrontamentos se permanecer calma e relaxada.	1	2	3	4
4 – Com muita frequência sinto um afrontamento que aparece de forma repentina.	1	2	3	4
5 – Se eu fizer todas as coisas certas, posso gerir com sucesso os afrontamentos.	1	2	3	4
6 – Consigo fazer muita coisa para lidar com os meus afrontamentos.	1	2	3	4
7 – No que toca à gestão dos meus afrontamentos, sinto que apenas consigo fazer o que o meu médico me diz.	1	2	3	4
8 – Quando consigo gerir bem a minha vida pessoal, os meus afrontamentos não são tão intensos.	1	2	3	4
9 – Tenho uma capacidade considerável para controlar os meus afrontamentos.	1	2	3	4
10 – Eu dependo da ajuda de outras pessoas para lidar com os afrontamentos.	1	2	3	4
11 – Normalmente consigo saber em que dias os meus afrontamentos vão ser intensos.	1	2	3	4
12 – Independentemente do que faça ou por muito que tente, não consigo aliviar os meus afrontamentos.	1	2	3	4

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Itens	Discordo fortemente	Discordo	Concordo	Concordo fortemente
13 – Consigo lidar de uma forma eficaz com os meus afrontamentos.	1	2	3	4
14 – Sinto que os meus afrontamentos são influenciados por fatores que ultrapassam o meu controlo.	1	2	3	4
*15 – Quero aprender o máximo possível sobre os afrontamentos e a menopausa.	1	3	3	4

* Item excluído na versão atual

Nota sobre cotação: os itens 1, 4, 7, 10, 12 e 14 são cotados de forma invertida.

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