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Beliefs regarding menopausal hot flushes among climacteric women as assessed with the Hot Flush Beliefs Scale

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ABSTRACT

Background: Hot flushes (HFs) and night sweats are frequent complaints among both peri- and postmenopausal women. Beliefs regarding these complaints may vary from one population to another.
Objective: To assess HF beliefs and factors related to negative beliefs in a climacteric Hispanic population using the Hot Flush Beliefs Scale (HFBS).
Methods: A total of 1154 healthy women (40–59 years) were assessed with the Menopause Rating Scale (MRS), those presenting HFs were requested to fill out the HFBS and a questionnaire containing socio-demographic data (female and partner).
Results: A total of 646 presented HFs (56%) graded according to the first item of the MRS as mild (28.6%), moderate (33.2%), severe (29.1%) and very severe (9.1%). Mean age of these women was 49.5 ± 5.2 years, with 51.9% having 12 or less years of education, 61.5% being postmenopausal and 47.2% living in high altitude. At the moment of the survey 13.9% were on HT, 12.8% on phytoestrogens and 7.1% on psychotropic drugs. Women strongly disagreed in more negatively oriented items of those contained in *subscale one* (beliefs about self in social context). Contrary to this, women strongly agreed in more negative oriented items contained in *subscale two* which assesses beliefs about coping with HFs. Women presenting with severe–very severe HFs displayed higher HFBS total and subscale scores indicating a more negative belief regarding HFs. Logistic regression analysis determined that HF severity was related to higher HFBS scores for the total and subscales one and two. Current smoking, higher parity, lower female education, female psychiatric consultation, time since menopause and partner unhealthiness and alcohol consumption were also related to higher HFBS scorings. Postmenopausal status and church attendance were related to lower scores.
Conclusion: In this mid-aged Ecuadorian female series negative beliefs regarding HFs were related to the severity of HFs and individual female or partner characteristics. Data provided from clinical research using this tool, alone or in combination with other tests, is warranted.

1. Introduction

The climacteric is a wide physiological period related to various risks and symptoms. Among the most frequent are hot flushes (HFs), night sweats and body weight increase which have been associated to certain risks such as sleep disorders, osteoporosis, cardiovascular disease, obesity and type 2 diabetes mellitus. HFs were among the most troublesome symptoms reported by women according to a recent Canadian survey performed after the Women's Health Initiative (WHI) publication [1]. Core body temperature elevation initiates endogenously and usually precedes the majority of HFs. However they may be exacerbated by stress, anxiety, alcohol and spiced foods [2,3]. They serve as a heat-loss system producing psychological discomfort, tachycardia, sleep interruption, daytime sleepiness and nervousness. During the last decades there have been attempts to objectively measure HFs under different conditions [4–7], and assess their psychological repercussions [8–12]. It has been postulated that emotional components and psychological distress seen during the menopausal transition express a personal vulnerability rather than a specific reaction to menopausal symptoms [13,14].

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Perceived personal control can affect the experience of symptoms. Women with lower perceived personal control of symptoms were associated to more negative experiences and more coping difficulties, especially in those who do not receive hormone treatment [15–17]. In many instances, the menopause is perceived as a time of poor emotional and physical health, especially due to the fact that research is based on those attending clinical consultations for health problems than those who do not. Despite this, and independent of the medical perspective, the menopausal transition has several interpretations, one is to consider it as normal stereotyped status and not a disease [18–24].

Beliefs, negative attitudes, low self-esteem, family dysfunction, social support, and stressful life events, can modify menopausal symptom severity [25]. Since HFs are among the most common symptoms seen during the menopause transition and may be increased by a negative psycho-social environment, it may seem plausible that the cited factors affect women's experience and beliefs regarding HFs [13,26]. The purpose of the present research was to assess HF beliefs in a climacteric Hispanic population using the Hot Flush Beliefs Scale (HFBS) originally described by Rendall et al. [11], in its Spanish version.

2. Methods

2.1. Participants

From February 15th to June 15th 2009 a cross-sectional study was carried out at healthcare centers of eight main cities of Ecuador with more than 100,000 inhabitants aimed to assess risk factors related to the presence and severity of HFs (The National Ecuadorian Study regarding HFs). For this, healthy women (40–59 years) accompanying those accessing the centers were requested to fill out a general questionnaire containing personal and partner data and assessed for the presence and severity of HFs with the first item of the Menopause Rating Scale (MRS). Women excluded from the study were those refusing participation or were incapable of understanding the items included in the questionnaire. Findings of the National Ecuadorian Study (Primary Research Branch) are presented elsewhere [27]; this document only provides information of women who presented HFs and additionally filled out the HFBS. Research protocol (primary and secondary branches) of the study was reviewed and approved by the Bioethics Committee of the Medical Faculty of the Universidad Católica, Guayaquil, Ecuador. All participants were informed about the research and its purposes and written consent obtained.

2.2. General questionnaire

2.2.1. Personal data

Female data included: age, parity, menopausal status (pre-, peri- or postmenopausal), marital status, educational level, accessed health system (free or paid), smoking status, partner status, church attendance, geographical altitude location, history of sexual abuse, psychiatric consultation, and the use of drugs (psychotropic, hormone therapy [HT] or phytoestrogens). High altitude was defined if women lived at or above 2000 m. Women were asked about how they perceived their health status and that of their partners. Those (men or women) capable of performing daily routine activities were defined as healthy. Sedentarism was defined if subjects carried out less than 15 min of physical activity twice a week [28].

2.2.2. Partner data

Partner data was explored in the present research based on our previous reports indicating significant correlations between male issues and mid-aged female sexual function [29] and menopausal symptom severity [30,31]. This information was provided by women and included: age, educational level, health status, faithfulness, presence of alcoholism and sexual dysfunction (erectile dysfunction or premature ejaculation). Criteria used to define male sexual dysfunction (erectile and ejaculatory) have been previously reported [30,31]. For surveyed women and their partners 12 or less years of schooling was defined as low [32].

2.3. The Menopause Rating Scale (MRS): Hot flush intensity assessment

This instrument was used to assess HF presence and severity. The MRS is a menopause specific health related quality of life instrument composed of 11 items divided into three subscales: somatic, psychological and urogenital. For this research item #1 of the somatic subscale was used, which was graded by the subject from 0 (not present) to 4 (1 = mild; 2 = moderate; 3 = severe; 4 = very severe) [33].

2.4. The Hot Flush Beliefs Scale: assessment of HF beliefs

Assessment of HF beliefs, among women presenting the symptom, was performed with the HFBS which consists of 27 items grouped as 3 subscales: Beliefs about self in social context (13 items); Beliefs about coping with HFs (10 items); and beliefs about coping with night sweats/sleep (4 items). Each item could be graded by the subject using a six-point response scale: strongly disagree, moderately disagree, mildly disagree, mildly agree, moderately agree, and strongly agree (coded as 0–5). Obtained scores for each item within a subscale were summed providing a total score for the subscale, and the sum of all three subscales provided a total.

For the purpose of this research a Spanish version of the original HFBS was used. Translation was performed by the authors (FRPL and PCH) using the forward/backward procedure and checked for cultural issues. Validation of this version was performed in a group of mid-aged Spanish women ($n = 57$), rendering a good internal consistency for the 27 items (alpha Cronbach 0.86) [34].

2.5. Menopausal status definition

Women having regular menses were defined as premenopausal, those presenting irregularities >7 days from their normal cycle perimenopausal, and postmenopausal if no more menses in the last 12 months [35]. Those with bilateral oophorectomy were defined as postmenopausal. For statistical purposes hysterectomized women were considered as a separate group.

2.6. Statistical analysis

Statistical analysis was performed using EPI-INFO 2000 (Centers for Disease Control, Atlanta, GA, USA; World Health Organization, Geneva, Switzerland). Data are presented as means, standard deviations, medians, percentages, odds ratios (ORs) and confidence intervals. Group comparisons for means were assessed with ANOVA or the Mann–Whitney test, according to homogeneity of the measured variance with the Bartlett test.

2.6.1. Internal consistency of the HFBS and its subscales

Internal consistency of the HFBS was assessed computing Cronbach coefficient alphas for the total 27-item scale and for each separate subscale.

2.6.2. Logistic regression analysis: factors related to higher HFBS scores

Logistic regression was used to analyze factors related to higher HFBS scores (indicating a more negative belief toward HFs). For this, HFBS scores (total and subscales) were transformed into a binary variable using medians as cut-off values. Regression model was constructed from significant variables provided from univariate analysis. Independent variables to be considered in the logistic regression model related to surveyed women were: older age (≥49, median), higher parity (≥3, median), marital status (married or not), low schooling (≤12 years), postmenopausal status, high altitude residency (≥2000 m over sea level), HF severity, smoking habit, sedentary lifestyle, health status, access to free health care, drug use (HT, phytoestrogen and/or psychotropic), partner status and if currently on psychiatric consultation. Those related to the partner were: age, low schooling, alcoholism, healthiness, faithfulness and sexual dysfunction (premature ejaculation or erectile dysfunction). Entry of variables (female and partner) into the model was considered with a 20% significance level and the back stepwise procedure performed. A p value of <0.05 was considered as statistically significant.

2.6.3. Sample size

Sample size calculation was focused on the aim of the Primary Branch of the study: assessing risk factors for the presence and severity of HFs. Hence, using EPI-INFO 6.04 statistical software a minimal sample of 94 women per center was calculated, considering that each one covers an estimated population of 5000 women between 40 and 59 years and assuming that, as previously reported [30,36] at least 50% would present HFs with a 10% desired precision and a 95% confidence interval.

3. Results

During the study period 1154 women were surveyed at a total of 11 centers from the Ecuadorian coast and highlands. Of the whole cohort, 56% (n = 646) presented HFs, which were graded according to the first item of the MRS as mild (28.6%), moderate (33.2%), severe (29.1%) and very severe (9.1%). Mean age of women presenting HFs was 49.5 ± 5.2 years (median 49), with an average parity of 3.4 (median 3). General characteristics of women and their partners are outlined in Table 1. Among the main findings related to women presenting HFs were: 51.9% had 12 years or less of education, 61.5% were postmenopausal, 47.2% lived in high altitude, 55.3% were married and 83.1% currently had a partner. A 13.9% were on HT, 12.8% on phytoestrogens and 7.1% on psychotropic drugs. In addition, a 68.1% of them accessed a free healthcare system, 10.1% were smokers, 43.2% were sedentary and 73.5% reported a positive perception of their health status. As for the partner (n = 537), average age was 52.1 ± 7.2 years (median 52), 43.9% had low schooling, 19.6% abused alcohol and 45.4% had sexual dysfunction (erectile dysfunction: 21.8% and premature ejaculation: 23.6%). According to surveyed women 68.5% considered their partners as healthy and 51.4% as faithful.

Response to each item contained in the HFBS, presented as percentages, is depicted in Table 2. Women strongly disagreed in more negatively oriented items of those contained in *subscale one* (beliefs about self in social context). Contrary to this, women strongly agreed in more negative oriented items contained in *subscale two* which assesses beliefs about coping with HFs. Coping to night sweats are assessed in *subscale three*. Although a higher percentage of women strongly agreed with the fact that night sweats affect their sleep (Item 3), a similar rate strongly agreed being able to manage the next day. A 19.7% of women strongly agreed with the fact that night sweats do not affect their general health.

Table 1
Characteristics of surveyed women and their partners.

Female	n = 646 (%)
Living in high altitude (≥2000 m over sea level)	305 (47.2)
Married[a]	357 (55.3)
Premenopausal	100 (15.5)
Perimenopausal	149 (23.1)
Postmenopausal	397 (61.5)
Bilateral oophorectomy	73 (11.3)
Hysterectomized	134 (20.7)
Low schooling (≤12 years)	335 (51.9)
Current smoker	65 (10.1)
Sedentary	279 (43.2)
Access to free health care	440 (68.1)
HT use	90 (13.9)
Phytoestrogen use	83 (12.8)
Psychotropic use	46 (7.1)
Psychiatric consultation	79 (12.2)
History of sexual abuse	41 (6.3)
Currently has a partner	537 (83.1)
Healthiness (perceived health status)	475 (73.5)
Church assistance	377 (58.4)
Partner	n = 537
Low schooling (≤12 years)	236 (43.9)
Alcoholism	105 (19.6)
Healthy	368 (68.5)
Erectile dysfunction	117 (21.8)
Premature ejaculation	127 (23.6)
Faithful	276 (51.4)

[a] Those not married were either single (7.0%), divorced (10.2%), widowed (7.1%) or cohabited with partner (20.4%).

More than 70% of women agreed in some degree to the beliefs that HFs irritate them and seem everlasting (Items 26 and 27, respectively). Scores for the HFBS (total and subscales) are depicted in Table 3 and stratified according to HF intensity, menopausal status, years since the menopause onset and geographical location. No differences were observed for geographical location and years since menopause. However women displaying severe to very severe HFs significantly presented higher total and subscale HFBS scores, indicating a more negative belief regarding HFs. Postmenopausal women significantly displayed higher scores for the HFBS: total and for subscales one and two. Additionally, HFBS (total and subscales one and two) scores were found significantly higher among Ecuadorian women as compared to Spanish ones (Table 3).

Internal consistency was assessed for the total 27-item scale and for each subscale. Cronbach coefficient alphas computed for the individual HFBS subscales were as follows: beliefs about self in social context = 0.80; beliefs about coping with hot flushes = 0.73; beliefs about coping with night sweats/sleep = 0.65. The results for the total scale (0.85) reflected the general consistency of the measure.

Factors related to higher HFBS scores (total and subscale) are depicted in Table 4. Logistic regression analysis determined that HF severity was related to higher HFBS scores (total and subscales one and two). Current smoking was related to higher subscale three scores. Other factors related to higher HFBS scorings included: higher parity, lower female education, female psychiatric consultation, time since menopause onset (5 or more years) and partner unhealthiness and alcohol consumption. Postmenopausal status and church attendance were related to lower scores.

4. Discussion

The menopause includes biological, emotional, social and anthropological experiences [17–24]. HFs are among the most frequent menopausal symptoms which may be influenced by low socio-economic position, high body mass index, limiting illnesses, psycho-social factors and cultural beliefs [37,38]. To highlight this,

Table 2
Response to each item of the Hot Flush Beliefs Scale ($n = 646$) presented as percentages.

The Hot Flush Beliefs Scale	Strongly agreeing *n* (%)	Moderately agreeing *n* (%)	Mildly agreeing *n* (%)	Mildly disagreeing *n* (%)	Moderately disagreeing *n* (%)	Strongly disagreeing *n* (%)
Subscale one: beliefs about self in social context						
1. When I have hot flushes, other people will look at me	108 (16.7)	127 (19.7)	121 (18.7)	61 (9.4)	58 (9.0)	171 (26.5)
6. When I have a hot flush in front of people, I am anxious	119 (18.4)	127 (19.7)	148 (22.9)	80 (12.4)	66 (10.2)	106 (16.4)
7. When I have a hot flush, I am embarrassed	89 (13.8)	109 (16.9)	132 (20.4)	83 (12.8)	66 (10.2)	167 (25.9)
8. When I have a hot flush, I am anxious about how I look	119 (18.4)	129 (19.5)	142 (22.0)	75 (11.6)	63 (9.8)	121 (18.7)
9. Hot flushes make me feel unattractive	101 (15.6)	98 (15.2)	118 (18.3)	82 (12.7)	75 (11.6)	172 (26.6)
10. When I have a hot flush, other people will think I am incompetent	61 (9.4)	91 (14.1)	83 (12.8)	98 (15.2)	105 (16.3)	208 (32.2)
11. When I have a hot flush, I don't care what other people think	172 (26.6)	97 (15.0)	116 (18.0)	88 (13.6)	65 (10.1)	108 (16.7)
13. When I have a hot flush, other people will think there is something wrong with me	104 (16.1)	104 (16.0)	166 (25.7)	111 (17.2)	56 (8.7)	105 (16.3)
14. It is best to avoid social situations if I am having hot flushes	126 (19.5)	86 (13.3)	109 (16.9)	91 (14.1)	84 (13.0)	150 (23.2)
17. When I have hot flushes, I look stupid in front of others	63 (9.8)	73 (11.3)	92 (14.2)	87 (13.5)	86 (13.3)	245 (37.9)
20. When I have a hot flush, I feel useless	82 (12.7)	69 (10.7)	92 (14.2)	105 (16.3)	80 (12.4)	218 (33.7)
21. Having hot flushes makes me more concerned with what other people think about me	56 (8.7)	96 (14.9)	130 (20.1)	83 (12.8)	68 (10.5)	213 (33.0)
23. When I have hot flushes, I feel I am the center of attention	71 (11.0)	86 (13.3)	125 (19.3)	107 (16.6)	85 (13.2)	172 (26.6)
Subscale two: beliefs about coping with hot flushes						
2. I am able to cope with the physical discomfort of hot flushes	124 (19.2)	126 (19.5)	128 (19.8)	83 (12.8)	92 (14.3)	93 (14.4)
5. I don't let hot flushes get me down	219 (33.9)	118 (18.3)	126 (19.5)	74 (11.5)	40 (6.2)	69 (10.7)
12. I feel overwhelmed by my hot flushes	127 (19.7)	138 (21.4)	136 (21.1)	82 (12.7)	58 (9.0)	105 (16.3)
15. When I have a hot flush, I can ignore them	93 (14.4)	80 (12.4)	132 (20.4)	82 (12.7)	111 (17.2)	148 (22.9)
16. Other people seem to manage their hot flushes better than I do	78 (12.1)	112 (17.3)	156 (24.1)	105 (16.3)	71 (11.0)	124 (19.2)
18. I am coping effectively with my hot flushes	118 (18.3)	123 (19.0)	128 (19.8)	94 (14.6)	73 (11.3)	110 (17.0)
19. I feel resentful of my hot flushes	98 (15.2)	112 (17.3)	118 (18.3)	62 (9.6)	71 (11.0)	185 (28.6)
24. I worry about when I am going to have another hot flush	128 (19.8)	121 (18.7)	142 (22.0)	62 (9.6)	69 (10.7)	124 (19.2)
26. When I have hot flushes, I feel irritated	183 (28.3)	159 (24.6)	127 (19.7)	46 (7.1)	37 (5.7)	94 (14.6)
27. When I have a hot flush, I think when will they ever end	312 (48.3)	122 (18.9)	91 (14.1)	33 (5.1)	25 (3.9)	63 (9.8)
Subscale three: beliefs about coping with night sweats/sleep						
3. When I have night sweats, I won't be able to get back to sleep	158 (24.5)	137 (21.2)	119 (18.4)	67 (10.4)	52 (8.0)	113 (17.5)
4. If I'm woken up with sweats, I can manage the next day	137 (21.2)	100 (15.5)	110 (17.0)	97 (15.0)	97 (15.0)	105 (16.3)
22. When I have night sweats, it is harder to cope the next day	90 (13.9)	107 (16.6)	135 (20.9)	84 (13.0)	66 (10.2)	164 (25.4)
25. Hot flushes and night sweats don't affect my general health	127 (19.7)	107 (16.6)	128 (19.8)	82 (12.7)	83 (12.8)	119 (18.4)

we have previously reported that among mid-aged Ecuadorian women the presence of HFs was not related to age or hormonal status yet to other individual female/male characteristics and the demography of the studied population [27]. The prevalence of HFs may widely vary across populations and is strongly influenced by ethnics, culture, education, lifestyle and working status. In the United States, the Women's Health Across the Nation survey found that HF prevalence was highest among African Americans (46%), followed by Hispanics (34%), Caucasians (31%), Chinese (21%), and Japanese (18%) [39]. Mexican women report similar menopausal symptom rates with ethnical, socio-cultural and environmental factors influencing their appearance. In this series rate was similar even when urban and rural women were compared [40]. After controlling for age, education, health and economic status, Caucasian women usually report more psychosomatic symptoms around the menopause [41]. It should be noted that the Hispanic population encompasses a heterogeneous group of individuals with different customs, beliefs, ethnicities, taboos, prejudices, education level, and socio-economic status. Thus, Hispanic immigrants included in US studies represent a very specific and particular segment of non-migrant Spanish-speaking countries. Therefore, the vasomotor symptom process is neither unique nor universal. Current reports indicate that mid-aged Ecuadorian women report higher HF rates than the previously cited figures for other Hispanic popu-

Table 3
Scores for the HFBS (total and subscales) among women presenting hot flushes in relation to hot flush intensity, menopausal status, years since the menopause, and geographical location.

Parameter	Total HFBS score (mean)	Subscale one	Subscale two	Subscale three
All (n = 646)	66.7 ± 21.7 (69; 5–124)[a]	30.5 ± 12.6 (31; 5–60)	26.2 ± 9.3 (27; 0–50)	10.0 ± 4.4 (10; 0–20)
All (n = 57)[**]	52.5 ± 22.2[*] (50; 0–109)	20.2 ± 14.7[*] (18; 0–64)	23.5 ± 7.9[*] (24; 0–43)	8.9 ± 4.0 (10; 0–15)
Hot flush intensity				
Mild–moderate (n = 399)	61.9 ± 19.5	28.0 ± 11.7	24.4 ± 8.7	9.4 ± 4.2
Severe–very severe (n = 247)	74.6 ± 22.8[*]	34.5 ± 12.8[*]	29.1 ± 9.4[*]	10.9 ± 4.5[*]
Menopausal phase				
Premenopausal (n = 100)	61.0 ± 20.0	28.1 ± 12.0	23.5 ± 8.9	9.4 ± 4.2
Perimenopausal (n = 149)	67.3 ± 18.5	29.8 ± 11.2	27.2 ± 8.7	10.3 ± 3.9
Postmenopausal (n = 397)	67.9 ± 23.0[*]	31.3 ± 13.0[*]	26.6 ± 9.5[*]	10.0 ± 4.6
Postmenopausal stage				
Early (<5 years) (n = 215)	67.8 ± 20.8	31.1 ± 12.2	26.6 ± 9.0	10.1 ± 4.9
Late (≥5 years) (n = 182)	68.0 ± 25.6	31.7 ± 14.0	26.6 ± 1.0	9.9 ± 4.9
Geographical location				
Coast (n = 341)	67.8 ± 22.8	31.1 ± 13.3	26.5 ± 9.4	10.2 ± 5.0
Highland (n = 305)	65.5 ± 20.4	29.8 ± 11.7	26.0 ± 9.2	9.8 ± 3.7

[a] In parenthesis median, range.
[*] $p < 0.05$ for the whole trend as calculated with ANOVA or the Mann Whitney test according to homogeneity of the variance.
[**] Preliminary data from Spanish women.

lations. However cross-sectional design, the used HF assessing tool and the specific characteristics of a given Hispanic population make comparisons difficult.

The HFBS was developed by retrieving from 103 women aged 41–64 information of their individual personal experiences and clinical information related to flushes and sweats. This allowed creating a large pool of items covering the psychological expressions related to flushes and sweats [11]. A list of 71 positive and negatively worded items was initially obtained. The final HFBS included 27 items comprising three dimensions: beliefs about self in social context; beliefs about coping with HFs and beliefs about coping with night sweats/sleep. The tool uses a six-point response scale ranging from strongly disagrees to strongly agree (coded as 0–5). We have previously used and validated the original HFBS in its Spanish version in a small sample of Caucasian Spanish women [34], suggesting that the tool is applicable to Spanish-speaking populations. Although the HFBS has strengths as a tool, one limitation can be identified: that it is unable to predict variability of symptom experience, unless however it is combined with another specific symptom severity assessing tool such as the MRS. Combining both tools enhances HFBS's utility as it may allow establishing important correlations between HF intensity and the beliefs regarding them [34], as found in the present research. Interesting would have been applying the complete MRS to the cohort in order to correlate HFBS scores with other menopausal symptoms.

Table 4
Factors related to higher HFBS scores (total and subscale): logistic regression analysis.

The HFBS	Odds ratio (CI 95%)	p value
Subscale one: beliefs about self in social context		
Severe–very severe hot flushes	2.70 (1.68–4.33)	0.0001
Higher parity	1.70 (1.11–2.60)	0.01
Subscale two: beliefs about coping with hot flushes		
Severe–very severe hot flushes	3.24 (1.94–5.42)	0.0001
Lower female education	2.67 (1.40–5.08)	0.003
Partner non-healthiness	2.37 (1.38–4.06)	0.002
Partner alcoholism	2.11 (1.11–4.02)	0.02
Postmenopausal status	0.45 (0.24–0.81)	0.009
Church attendance	0.50 (0.30–0.83)	0.007
Subscale three: beliefs about coping with night sweats/sleep		
Current smoking habit	2.44 (1.09–5.45)	0.02
Late postmenopausal (5 or more years)	1.81 (1.14–2.89)	0.01
Partner non-healthiness	1.66 (1.10–2.51)	0.01
Church attendance	0.49 (0.31–0.78)	0.003
Total HFBS		
Severe–very severe hot flushes	5.40 (3.12–9.35)	0.0001
Psychiatric consultation	2.59 (1.08–6.22)	0.03
Partner non-healthiness	1.79 (1.07–3.00)	0.02
Church attendance	0.30 (0.18–0.52)	0.0001

Computed alpha Cronbach values of the present series (n = 646) were found to be consistent (27 items = 0.85; subscale one = 0.80; subscale two = 0.73; subscale three = 0.65) and similar to our previous validation for the 27 items = 0.89 and subscale one = 0.89; although higher in subscales two and three (0.57 and 0.31) [34]. Our current data also correlates with those found by Rendall et al. [11] during their original validation: 0.94 (total scale) and 0.93, 0.89 and 0.78 for subscales one, two and three, respectively. These findings indicate that all subscales are consistently measuring one underlying factor, proportionately measure true score, and therefore have good reliability. Regarding obtained mean HFBS scores it is important to highlight that Ecuadorian women, as compared to Spanish ones, displayed higher total and subscale one and two scorings (Table 3). Although the Spanish group was small, this finding is in correlation with the fact that beliefs toward HFs, as reported by others [25,41], are related to cultural and geographical aspects.

Menopausal women concentrate at menopause clinics and hospitals to treat their symptoms and complaints, suggesting a high prevalence of different morbid conditions. In the present study we assessed women who were not visiting physicians for health related problems rendering a more natural and representative snapshot of the general population aside from the auto-bias caused by medicalization. The results of the present research indicate that HF severity was an important predictor for higher HFBS total and subscale one and two scores, being total scores significantly higher in postmenopausal women as compared to peri- and premenopausal ones (Table 3). Among postmenopausal women, total and subscale HFBS scores were similar independent of time since menopause onset, suggesting that other factors may be involved

which are independent from age and hormonal status. Women presenting with higher HFBS scores have stronger negative beliefs regarding HFs. These negative beliefs may indirectly reflect the fact that they are not being able to control their HFs, and in certain sense creating a scenario characterized as a social problem to the adaptation of vasomotor menopausal changes. Finding that HF severity is related to higher HFBS scores (hence more negative beliefs) well correlates with the fact that these same women displayed lower scores for the Perceived Hot Flush Control Index, in which HF severity was the main predictive factor [12]. A parallel correlation with anxiety and depressive symptoms indeed would have provided valuable insights in the present research; moreover if one considers: (a) the characteristics of our population (low schooling and higher parity), (b) the fact that depressive symptoms relate to menopausal symptom intensity and partner profile [42] and (c) that psychiatric consultation (most likely due to depressive and anxiety symptoms) was also a factor related to a higher total HFBS scores. These points some how link with our previous findings among Latin America women that point out psychiatric consultation as a factor related to more intense menopausal symptoms, most likely, as previously discussed, due to depressive symptoms. In Ecuador more than 70% of perimenopausal women present easy crying, irritability and symptoms of unhappiness [43], and more than 60% of postmenopausal ones suffer of anxiety, depression and loss of memory [44].

For some time it has been speculated that geographical location and climate could influence HF intensity. Ecuador is a country with basically two geographical regions: the highlands and the sea coast. As previously reported, highland women present a higher HF prevalence than those from the coastal region, although HF intensity is more severe among those living in the coast with higher mean daily temperatures [27]. Although this was the same population, HFBS scores were found similar among geographical regions. It would seem that psychological response and coping attitudes were similar despite different HF characteristics, which would support the fact that psycho-social HF perception is beyond the biological phenomena.

Concerning subscale one of the HFBS, that assesses beliefs of self in the social context, the present research found that severe–very severe HFs and higher parity were factors related to higher scores and thus more negative beliefs. Since individual perceptions seem to alter life, effective treatment of HFs should ameliorate this endpoint. These aspects should be tested within the context of a prospective controlled study evaluating treatment (hormonal or non hormonal) and measuring changes with appropriate tools before and after.

Subscale two of the HFBS relates to beliefs about coping with HFs. In this sense one must mention that coping capacity is highly dependent on HF intensity. Again, in the light of our findings and giving a practical use to the HFBS, future studies should involve the tool in the clinical field (i.e. determine beliefs before and after treatment). Female lower education, partner bad health and alcoholism are factors related to more negative beliefs regarding the adaptation to HFs. This seems to correlate well with the fact that partner issues (alcoholism, sexual dysfunction) and lower female education have been previously reported as factors related to more intense menopausal symptoms in Ecuador [27,31,36] and Latin America [30]. Spirituality and attendance to religious services have been postulated to ameliorate coping to HFs and mental health in midlife women [45,46]. Church attendance has some kind of sedative effect as occurs with other spiritual or relaxation technique [47], improving both subjective and objective coping results. Church followers, especially among traditional cultures, are exposed to male-dominant values which are a negative influence on women's life. The present data supports the concept that religious commitment may help mitigate HF difficulties.

Finally regarding beliefs about coping with night sweats/sleep (subscale 3), smoking habit was related to more negative beliefs regarding HFs. Interesting to say is that smoking increases the risk of earlier menopause [48] and might interfere with neuroendocrine mechanisms in terms of increasing HF severity. Contrary to univariate analysis, our regression model found that the late postmenopausal stage (5 years or more since menopause onset) and partner non-healthiness were significant conditions that related to higher subscale 3 scores suggesting that coping with difficulties requires a global approach in order to achieve quality of life improvement as a goal.

Limitations to the study have previously been addressed and thoroughly discussed [27]; however one can mention its cross-sectional design and lacking the assessment of other female variables such as depressive symptoms, anthropometrics, HF frequency and race. We also recognize that due to the diversity of any studied population, our findings cannot be totally extrapolated to this or any other Latin American population or region with different socio-economical, ethnical or cultural background. Despite the mentioned limitations a strength can be recognized in our study that it is to the best of our knowledge perhaps the first to apply the HFBS in a important number of Hispanic mid-aged women and address factors related to higher scores and thus more negative beliefs toward HFs. HFs are discouraging symptoms which are not exempt of health repercussions [49–51] and social difficulties [21,52,53].

In conclusion, in this mid-aged Ecuadorian female series negative beliefs regarding HFs were related to the severity of HFs and individual female or partner characteristics. Data provided from clinical research using this tool, alone or in combination with other tests, is warranted.

Contributors

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Competing interest

The authors of the manuscript "Beliefs regarding menopausal hot flushes among climacteric women as assessed with the Hot Flush Beliefs Scale" declare no conflict of interests.

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