Global perspectives on perimenopause: a digital survey of knowledge and symptoms using the Flo application

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Abstract

Objective: Perimenopause is the time leading up to a woman's last menstrual cycle and includes the 12 months afterward. Studies that systematically compare perimenopause symptoms across diverse cultural and geographic settings are lacking. This study, utilizing data from Flo, an international mobile health application, aimed to assess global knowledge and symptom experiences related to perimenopause.

Methods: This cross-sectional survey was conducted via the Flo application, offered to users aged 18 years and above. The primary endpoints were knowledge of perimenopause symptoms from all survey participants, and self-reported perimenopause symptoms for survey participants aged 35 years and above.

Secondary analyses compared knowledge scores and symptoms across geographic regions.

Results: A total of 17,494 women from 158 countries were included. Commonly recognized perimenopause symptoms included hot flashes (71%), sleep problems (68%), and weight gain (65%). Of the participants, 12,681 were aged 35 years or above, with the most common self-reported symptoms being fatigue (83%), physical and mental exhaustion (83%), irritability (80%), depressive mood (77%), sleep problems (76%), digestive issues (76%), and anxiety (75%). This pattern of symptoms was similar among those who self-reported being in perimenopause, though higher than in those not in perimenopause. International variation in perimenopause symptom knowledge and symptoms experienced was noted ($P < 0.001$).

Conclusions: This survey highlights a discordance between perimenopause knowledge and actual symptoms experienced across diverse global populations. While hot flashes were the most widely recognized symptom, respondents aged 35 years or above most commonly reported experiencing fatigue, physical and mental exhaustion, and irritability.

Key Words: Digital, Global, International, Menopause, Perimenopause.

Perimenopause is the transition period leading up to a woman's last menstrual cycle and includes the 12 months afterward, after which menopause is established.[1] Typically occurring in the mid-40s and lasting on average 6 years, symptoms may begin as early as the 30s and persist for a decade.[2-5] Perimenopause is a reproductive stage marked by menstrual cycle irregularity and fluctuating hormone concentrations.[6,7] These changes can give rise to a wide range of symptoms, including hot flashes and night sweats (vasomotor symptoms-VMS), sleep disruption, mood disturbances, and cognitive complaints.[3,8] Despite its clinical significance, perimenopause remains underrecognized and is less extensively studied compared with menopause. As a result, women might not realize their symptoms may be attrib-

utable to perimenopause, which can lead to delays in care-seeking and timely management.[2,9,10] A recent study found that care-seeking for perimenopause or menopause symptoms was highest among women aged over 56 years old, with 52% in this group visiting a health care professional. In comparison, only 16% of women aged 41-45 and 36% of women aged 46-50 sought care, despite a significant self-reported symptom burden across all age groups.[2] Efforts have been made to better understand how patients perceive menopause, including their knowledge gaps and symptom experiences. However, less is known about patients' knowledge of and the symptoms they experience during perimenopause.

Three large surveys in the United States on perimenopause identified VMS and sleep problems as the most common symptoms.[11] Because symptoms may be shaped by cultural norms, societal attitudes, and access to health care, a global perspective provides an opportunity to identify key drivers of knowledge gaps and understand how perimenopause symptoms vary across regions. A recent review of 17 international studies found that women's experiences of perimenopause and menopause vary widely by country and are strongly influenced by sociocultural factors.[12] However, studies that systematically compare perimenopause symptoms across diverse cultural and geographic settings are lacking, which constrains a comprehensive understanding of how symptom presentation and reporting vary by region and sociocultural context.

Digital health platforms offer a powerful tool to reach diverse populations and collect large-scale, real-world data.[13-16] Widespread mobile phone ownership across the globe, including in underserved low-income and remote regions, presents novel opportunities to conduct research across diverse populations and settings.[17,18] This also extends to women's health, where data collected via mobile health applications (apps) has contributed to insights into menstrual cycle characteristics, fertility, reproductive health conditions, and sexual health.[13,19-28]

Flo is a globally used mobile health app designed to support menstrual and reproductive health and provides a platform to capture data across multiple countries. By leveraging a broad and diverse user base, this study aimed to assess global knowledge and symptom experiences among Flo users related to perimenopause.

METHODS

Study design and participants

This cross-sectional online survey was conducted via the Flo app and offered to app users aged 18 years and older who had set the app language to English, Spanish, Portuguese, or French, reflecting large user segments among app users. The study and materials were approved by the independent ethical review board: WIRB-Copernicus Group Institutional Review Board (IRB number: 20244604). Eligible participants were active Flo users who consented to participate and were not currently using hormonal contraception. The questionnaire incorporated branching logic based on age, not on reproductive stage:

users aged 18 to 34 years completed questions assessing knowledge about perimenopause, while those aged 35 years and older completed a more extensive survey, which included both questions assessing knowledge of perimenopause and questions related to symptoms they were experiencing. In our study, we collected data on symptoms reported by all women aged 35 years and older, as well as from the subset of women within this group who self-reported being in perimenopause.

Data collection

The survey was administered between December 6, 2024, and May 16, 2025. Informed consent was obtained at the beginning of the survey. Participants who consented to participate were presented with sociodemographic questions, including age, ethnicity, and a curated checklist of 26 potential perimenopause symptoms to assess knowledge. The list of potential perimenopause symptoms was based on symptoms from the Menopause Rating Scale (MRS) and additional symptoms curated from perimenopause literature.

All participants were presented with the following definitions of reproductive stages:
- Perimenopause is your transition through menopause. It covers the years leading up to menopause (your last ever period) and the 12 months after, at which point you can be sure you've reached menopause.
- Menopause is your last ever period. But you can only be sure you've reached menopause after you've gone 12 months without a period.
- Postmenopause is the time after your last ever period.

Subsequently, they were asked to describe themselves according to these options: I'm in perimenopause, I'm postmenopausal, I'm not in perimenopause or postmenopausal, I am unsure, or Prefer not to answer. Participants 35 years and older additionally received a perimenopause questionnaire asking them to report their symptom experiences.

International data

Data were sorted and analyzed by country-specific responses when there were at least 100 responses from a particular country. A respondent's country was determined from the country's location as set in the Flo app. Countries with fewer than 100 unique responses received were grouped together as "other" for analyses. The World Bank country income classifications were used to group countries as high income, upper middle income, lower middle income, or low income.[29]

Study endpoints

The primary endpoints included participants' knowledge of perimenopause symptoms from all survey participants, and the percentage of self-reported perimenopause symptoms experienced by survey participants aged 35 years and older. A perimenopause knowledge score was assessed by participants' ability to identify 26 symptoms (range: 0-26) as potential perimenopause symptoms. (Table 1)

TABLE 1. List of potential perimenopause symptoms

Symptoms

Bladder problems (difficulty in urinating, increased need to urinate, bladder incontinence)
Anxiety (inner restlessness, feeling panicky)
Brain fog (difficulty thinking clearly, slowed cognition)
Breast tenderness
Changes in body odor (stronger or different odor)
Depressive mood (feeling down, sad, on the verge of tears, lack of drive, mood swings)
Digestive issues (bloating, constipation)
Dizziness or lightheadedness
Dryness of the vagina (sensation of dryness or burning in the vagina, difficulty with sexual intercourse)
Physical and mental exhaustion (general decrease in performance, impaired memory, decrease in concentration, forgetfulness)
Fatigue (physical exhaustion)
Gum issues (increased sensitivity, swelling, bleeding)
Hair changes (thinning or loss of hair, changes in hair texture)
Headaches or migraines (especially if they've worsened or become more frequent)
Heart discomfort or palpitations (unusual awareness of heartbeat, heart skipping, heart racing, tightness)
Hot flashes, sweating (episodes of sweating)
Irritability (feeling nervous, inner tension, feeling aggressive)
Joint and muscular discomfort (pain in the joints, rheumatoid complaints)
Allergies or sensitivity to foods/smells (new or increased allergies)
Night sweats
Pain during or after sex (painful intercourse)
Sexual problems (change in sexual desire, sexual activity, and satisfaction)
Skin changes (dry or thinning skin)/skin rashes
Sleep problems (difficulty in falling asleep, difficulty in sleeping through the night, waking up early)
Tinnitus (ringing or other noises in one or both ears)
Weight gain or difficulty losing weight (unexplained changes in weight)

List of 26 potential perimenopause symptoms based on symptoms included in the Menopause Rating Scale (MRS) and additional items curated from perimenopause literature.

The percentages of respondents 35 years and older who reported currently experiencing each symptom from the list of 26 potential perimenopause symptoms were calculated. In addition, the percentages were analyzed by self-reported reproductive stage. Secondary analyses compared perimenopause knowledge scores and symptoms across geographic regions.

Statistical analysis

Descriptive statistics were used to summarize the baseline characteristics, knowledge of perimenopause symptoms, and self-reported perimenopause symptoms that the participants experienced. Continuous variables were summarized using mean and SD. Categorical variables were summarized as frequencies and percentages of respondents. For the assessment of perimenopause symptom knowledge, the proportion of women correctly identifying each symptom was calculated as both frequency and percentage. Mean and SD of perimenopause knowledge scores were calculated for each country and compared using ANOVA between countries and between country income groups. For plotting, the 95% CI of the

perimenopause knowledge score was also calculated. The rate of self-reported symptoms currently experienced was calculated and presented as a percentage of respondents experiencing each symptom. The international variation in symptoms was examined by comparing the top 3 most commonly reported symptoms by respondents from each country. Variation in symptom reporting by reproductive stage was analyzed using χ^2 tests for the top 5 most commonly reported perimenopause symptoms. All analyses were carried out using R version 4.4.2.[30]

RESULTS

Baseline characteristics

A total of 17,494 women from 158 countries aged 18 years and above were included in this study (Table 2). The mean age of participants overall was 37 years (SD 8.2), in the women aged 18-34 years, it was 26 years (SD 4.9), and in the women aged 35 years and older, it was 41 years (SD 4.9). The majority of respondents were English-speaking (59%), and nearly half were White (48%). Of the 12,681 women aged 35 years and older, 21% self-identified as currently in perimenopause, 45% reported they were not in perimenopause or postmenopause, 33% were unsure of their reproductive stage,

TABLE 2. Baseline demographics

Variable	All cohort (N = 17,494)
Age, y (SD)	37.14 (8.23)
Language, n (%)	
English	10,392 (59)
Portuguese	2,972 (17)
Spanish	2,765 (16)
French	1,365 (7.8)
Ethnicity, n (%)	
White	8,473 (48)
Hispanic or Latino	3,192 (18)
Black or African or African American	1,896 (11)
Multiple	1,232 (7.0)
Other	800 (4.6)
Prefer not to answer	697 (4.0)
Asian	647 (3.7)
Middle Eastern/North African or Middle Eastern/North African American	226 (1.3)
Another indigenous background	214 (1.2)
American Indian or Alaskan Native	72 (0.4)
Native Hawaiian or other Pacific Islander	45 (0.3)
Country income group, n (%)	
Low income	97 (0.6)
Lower middle income	1,013 (6.3)
Upper middle income	4,900 (31)
High income	9,949 (62)
Perimenopause status, n (%)	
Not in perimenopause or postmenopause	9,833 (56)
Unsure	4,673 (27)
Perimenopause	2,808 (16)
Prefer not to answer	95 (0.5)
Postmenopausal	85 (0.5)

Continuous variables are reported as means and SD. Qualitative variables are shown as counts and percentages.
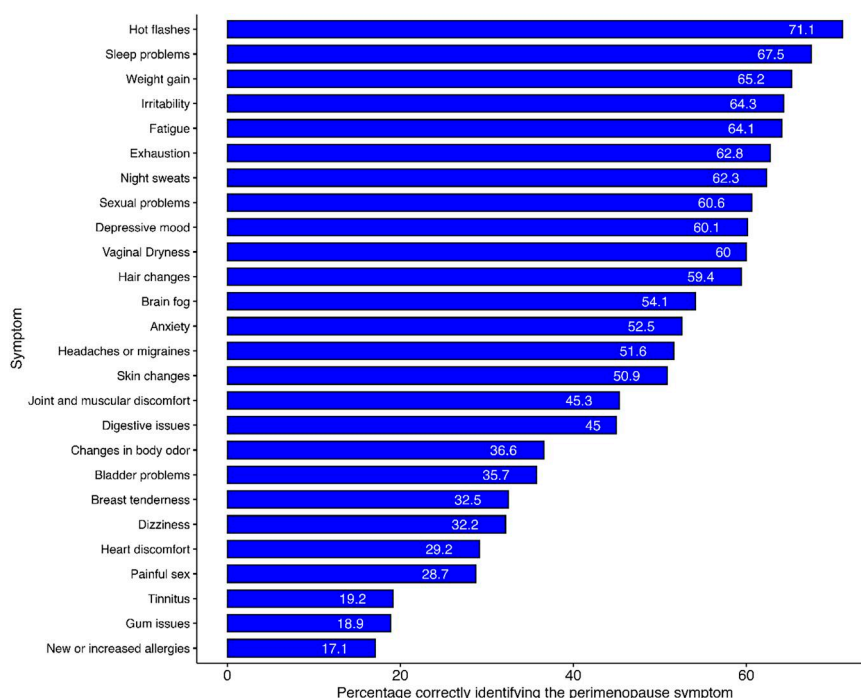
FIG. 1. Percentage of respondents identifying potential perimenopause symptoms. Percentage of all respondents who identified each symptom from a predefined list as a potential perimenopause symptom.

and 0.6% were in postmenopause (Supplementary S1, Supplemental Digital Content 1, http://links.lww.com/MENO/B472).

Knowledge of perimenopause symptoms

Among the 17,290 respondents, the proportion recognizing potential perimenopause symptoms was variable depending on the symptom surveyed. The 10 most commonly recognized symptoms were hot flashes (71%), sleep problems (68%), weight gain (65%), irritability (64%), fatigue (64%), physical and mental exhaustion (63%), night sweats (62%), sexual problems (60%), depressive mood (60%), and vaginal dryness (60%). Other symptoms were less likely to be identified as being related to perimenopause (Fig. 1, Supplementary S2, Supplemental Digital Content 2, http://links.lww.com/MENO/B473).

International differences in average knowledge scores were observed ($F_{19, 1,800.5} = 71.79$, $P < 0.001$). Participants from the United Kingdom had the highest mean perimenopause knowledge score at 15.17 (SD 6.67), followed by Ireland 14.70 (SD 7.00), Australia 14.58 (SD 6.66), Canada 14.35 (SD 6.94), and the Netherlands 14.22 (SD 6.57). The lowest mean perimenopause knowledge scores were reported in Nigeria 8.17 (SD 6.14), France 9.17 (SD 5.52), Venezuela 9.77 (SD 5.83), Colombia 9.85 (SD 5.79), and Argentina 10.14 (SD 5.39) (Table 3, Fig. 2).

Average knowledge scores also differed by country income group ($F_{3, 444.6} = 259.38$, $P < 0.001$). High-income countries had the highest mean knowledge score (13.41, SD 6.78), followed by upper-middle-income countries

(10.88, SD 5.92), lower-middle-income countries (9.52, SD 6.51), and low-income countries (8.04, SD 6.12). Subsequent pairwise Tukey tests revealed significant

TABLE 3. Perimenopause knowledge score by country

Country	Perimenopause Knowledge Score, mean (SD)	N respondents
Argentina	10.14 (5.39)	266
Australia	14.58 (6.66)	502
Brazil	10.88 (5.88)	2,681
Canada	14.35 (6.94)	741
Chile	11.29 (5.69)	195
Colombia	9.85 (5.79)	193
France	9.17 (5.52)	743
Germany	12.75 (6.17)	138
India	10.44 (6.90)	201
Ireland	14.70 (7.00)	158
Mexico	11.43 (5.71)	859
Netherlands	14.22 (6.57)	112
Nigeria	8.17 (6.14)	161
Other	10.99 (6.64)	2,380
Portugal	10.80 (6.29)	166
South Africa	12.02 (6.21)	244
Spain	11.66 (6.08)	493
United Kingdom	15.17 (6.67)	1,822
United States	13.76 (6.77)	3,805
Venezuela	9.77 (5.83)	116
Missing	13.68 (6.77)	1,518

Perimenopause knowledge scores are reported as mean (SD) and number of respondents by country. Perimenopause knowledge score was assessed as participants' ability to identify symptoms (range: 0-26) from a predefined list as potential perimenopause symptoms. Countries with <100 respondents are grouped as "other." Respondents without an identifiable country are grouped as "missing."
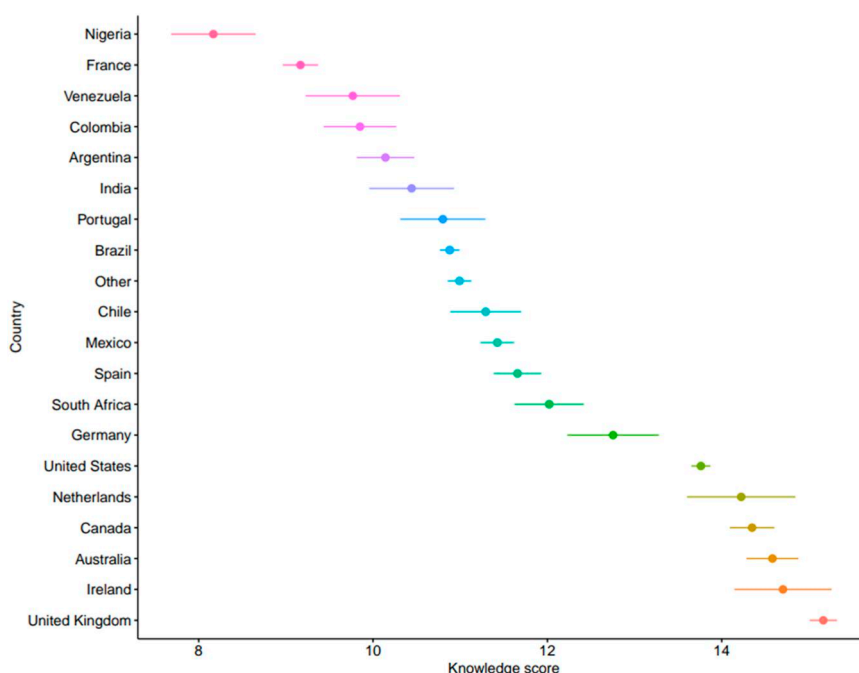
FIG. 2. Perimenopause Knowledge Score by country. Perimenopause knowledge score assessed as participants' ability to identify symptoms (range: 0-26) from a predefined list as potential perimenopause symptoms. Countries with <100 respondents are grouped as "other."

pairwise differences in mean knowledge score between all income group combinations (all $P < 0.001$) except between low-income and lower-middle-income countries.

Experiences of perimenopause symptoms

Among the 12,681 participants age 35 years and older, the most commonly reported symptoms experienced regardless of reproductive stage, were fatigue (83%), physical and mental exhaustion (83%), and irritability (80%), followed by depressive mood (77%), sleep problems (76%), digestive issues (76%), and anxiety (75%) (Table 4, Fig. 3). While fatigue, physical and mental exhaustion, and irritability were the most commonly reported symptoms overall, this pattern was noted in six countries: Australia, Brazil, Canada, Portugal, United Kingdom, and United States. In contrast, digestive issues were among the top 3 symptoms in Argentina, Chile, Colombia, France, Mexico, South Africa, Nigeria, and Ireland and depressive mood featured among the top 3 in Germany, Spain, Venezuela, and the Netherlands. Anxiety was among the top 3 only in India, and sleep problems were only noted in Nigeria. There were also notable differences in the percentages of women reporting experiencing perimenopause symptoms. In most countries, over 80% of women reported experiencing the top three symptoms; however, in Nigeria, <60% reported experiencing symptoms, and in Germany, India, and Spain, the top 3 symptoms were reported by 69% to 76% of women.

When women aged 35 years and older were stratified by self-reported reproductive stage, the pattern of the most common symptoms was similar; however, the per-

centages of women reporting symptoms were different. The top five symptoms in the perimenopause group are physical and mental exhaustion, fatigue, irritability, depressive mood, and sleep problems. Notably, among those self-identifying as in perimenopause, 95% reported experiencing physical and mental exhaustion, and 93% reported experiencing fatigue. In contrast, 80% reported experiencing physical and mental exhaustion and fatigue in all other categories of self-reported reproductive stage, including being neither in perimenopause nor postmenopause, unsure of their reproductive stage, or preferred not to indicate their reproductive stage (grouped as other) (Fig. 4). χ^2 tests on the top 5 perimenopause symptoms revealed that the percentages of individuals reporting each of these symptoms differed between the reproductive stage groups (depressive mood, $\chi^2 = 216.6$, $P < 0.001$; exhaustion $\chi^2 = 328.82$, $P < 0.001$; fatigue, $\chi^2 = 257.21$, $P < 0.001$; irritability, $\chi^2 = 290.93$, $P < 0.001$; sleep problems, $\chi^2 = 340.25$, $P < 0.001$).

DISCUSSION

This large global study evaluated perimenopause symptom knowledge and experiences across a diverse sample of women from over 150 countries. Notable gaps in perimenopause knowledge and substantial variability in symptom experiences were identified.

Knowledge of perimenopause symptoms

Participants most often recognized common perimenopause symptoms such as hot flashes, sleep problems,

TABLE 4. Top symptoms reported by respondents aged 35 and older by country

Country	Symptom	% respondents
Argentina	Fatigue	83.422
Argentina	Digestive issues	82.979
Argentina	Exhaustion	81.383
Australia	Exhaustion	88.235
Australia	Fatigue	88.235
Australia	Irritability	83.155
Brazil	Exhaustion	87.513
Brazil	Fatigue	83.878
Brazil	Irritability	82.71
Canada	Fatigue	85.502
Canada	Exhaustion	85.13
Canada	Irritability	80.819
Chile	Exhaustion	85.333
Chile	Digestive issues	81.333
Chile	Fatigue	80
Colombia	Exhaustion	80
Colombia	Digestive issues	72.5
Colombia	Fatigue	70.833
France	Fatigue	82.274
France	Exhaustion	76.923
France	Digestive issues	74.231
Germany	Exhaustion	76.136
Germany	Depressive mood	75
Germany	Fatigue	73.864
India	Anxiety	72.603
India	Exhaustion	72.603
India	Irritability	72.603
Ireland	Fatigue	82.645
Ireland	Irritability	81.818
Ireland	Digestive issues	80.992
Mexico	Exhaustion	86.311
Mexico	Fatigue	85.5
Mexico	Digestive issues	79.667
Netherlands	Irritability	81.429
Netherlands	Fatigue	81.159
Netherlands	Depressive mood	78.571
Nigeria	Fatigue	59.406
Nigeria	Digestive issues	55.446
Nigeria	Sleep problems	55.446
Other	Fatigue	78.644
Other	Exhaustion	75.619
Other	Depressive mood	72.028
Portugal	Exhaustion	84.733
Portugal	Irritability	83.206
Portugal	Fatigue	79.389
South Africa	Fatigue	87.075
South Africa	Digestive issues	80.272
South Africa	Exhaustion	80.272
Spain	Exhaustion	73.729
Spain	Fatigue	71.268
Spain	Depressive mood	68.75
United Kingdom	Exhaustion	85.116
United Kingdom	Fatigue	84.91
United Kingdom	Irritability	84.093
United States	Fatigue	85.699
United States	Exhaustion	84.359
United States	Irritability	82.54
Venezuela	Exhaustion	81.319
Venezuela	Fatigue	79.348
Venezuela	Depressive mood	78.022
Missing	Fatigue	86.026
Missing	Exhaustion	85.564
Missing	Irritability	83.609

Percentage of respondents aged 35 years and older, by country, who reported currently experiencing or having experienced each symptom from a predefined list. Countries with <100 respondents are grouped as "other." Respondents without an identifiable country are grouped as "missing."

and weight gain. Perimenopause knowledge scores differed significantly by country, with higher scores in higher-income countries. The increased awareness of VMS as indicators of perimenopause, compared with many of the other symptoms surveyed, highlights the limited recognition of the broader symptom spectrum that could be attributed to the perimenopause transition.

The international differences in perimenopause knowledge scores observed may reflect global disparities in awareness and education about perimenopause. These are similar to previous smaller-scale studies in single countries and are likely influenced by sociocultural norms, social determinants of health, disparities in access to health care, and health literacy.[12,31] Studies have demonstrated global gaps in menopause knowledge; however, some have specifically noted a pronounced lag in low-income and middle-income countries, where barriers may extend to cultural stigma and misconceptions.[32] Our study adds to the evidence that perimenopause knowledge varies widely among women, highlighting the need for more education. While women in high-income countries recognized more possible perimenopause symptoms than those in low-income and middle-income countries, overall knowledge scores were low in all countries.
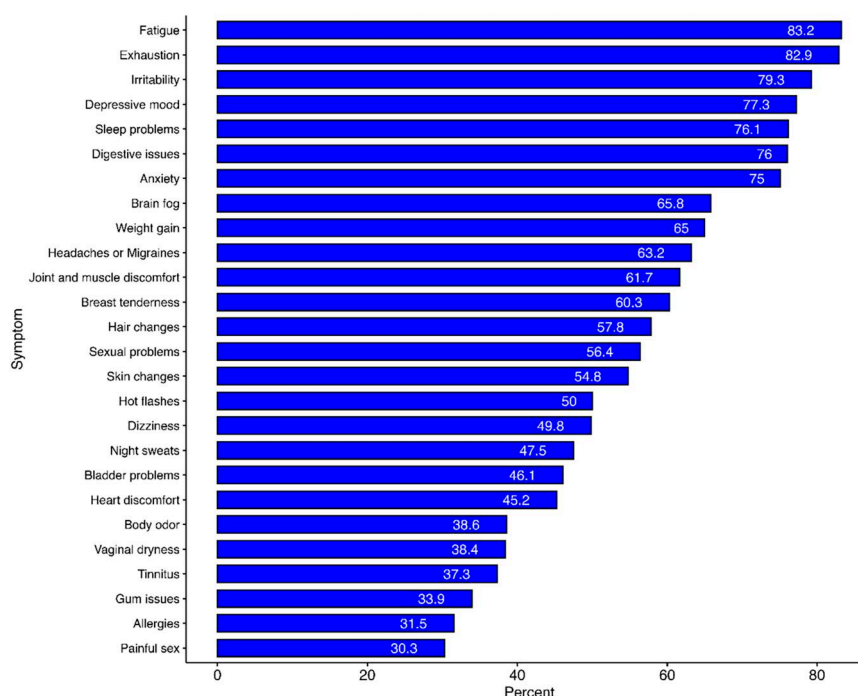
Experiences of perimenopause symptoms

Despite hot flashes being the most well-known symptom in our study, VMS were not the most commonly experienced symptoms by women in perimenopause or other reproductive stages. Previous smaller, single-country studies on perimenopause have shown varied patterns. For example, in the Netherlands (n = 743, mean age 49.3 y) tiredness/fatigue, low sex drive, and muscle/joint pain were most prevalent symptoms experienced.[33] In another study from Ethiopia (n = 151; mean age 38.9 y), the most commonly reported perimenopause symptoms were hot flashes, sleep problems, and depressive mood.[34] Differences in age and other population characteristics may partly explain these discrepancies.[33,34] A United Kingdom study of women in perimenopause aged 40 years and older found mood swings to be the most prevalent symptom, followed by brain fog and fatigue, a pattern that more closely matches our findings.[31]

Digestive symptoms ranked among the top 3 in Nigeria, South Africa, India, several Latin American countries, France, and Ireland. In the Women Living Better survey, bloating was the most common digestive symptom (35%) among women in the late reproductive stage or the menopause transition, followed by constipation (16%) and diarrhea (12%).[3] However, the Seattle Midlife Women's Health Study found that neither estrone nor FSH levels were associated with constipation or diarrhea severity during the menopause transition.[35] Differences in oral and gut microbiomes between premenopause and postmenopause women have also been reported, though findings remain inconsistent, and the impact of these differences on gastrointestinal symptoms remains unclear.[36,37]

Mood symptoms, such as depressive mood and anxiety, ranked among the top 3 reported symptoms in
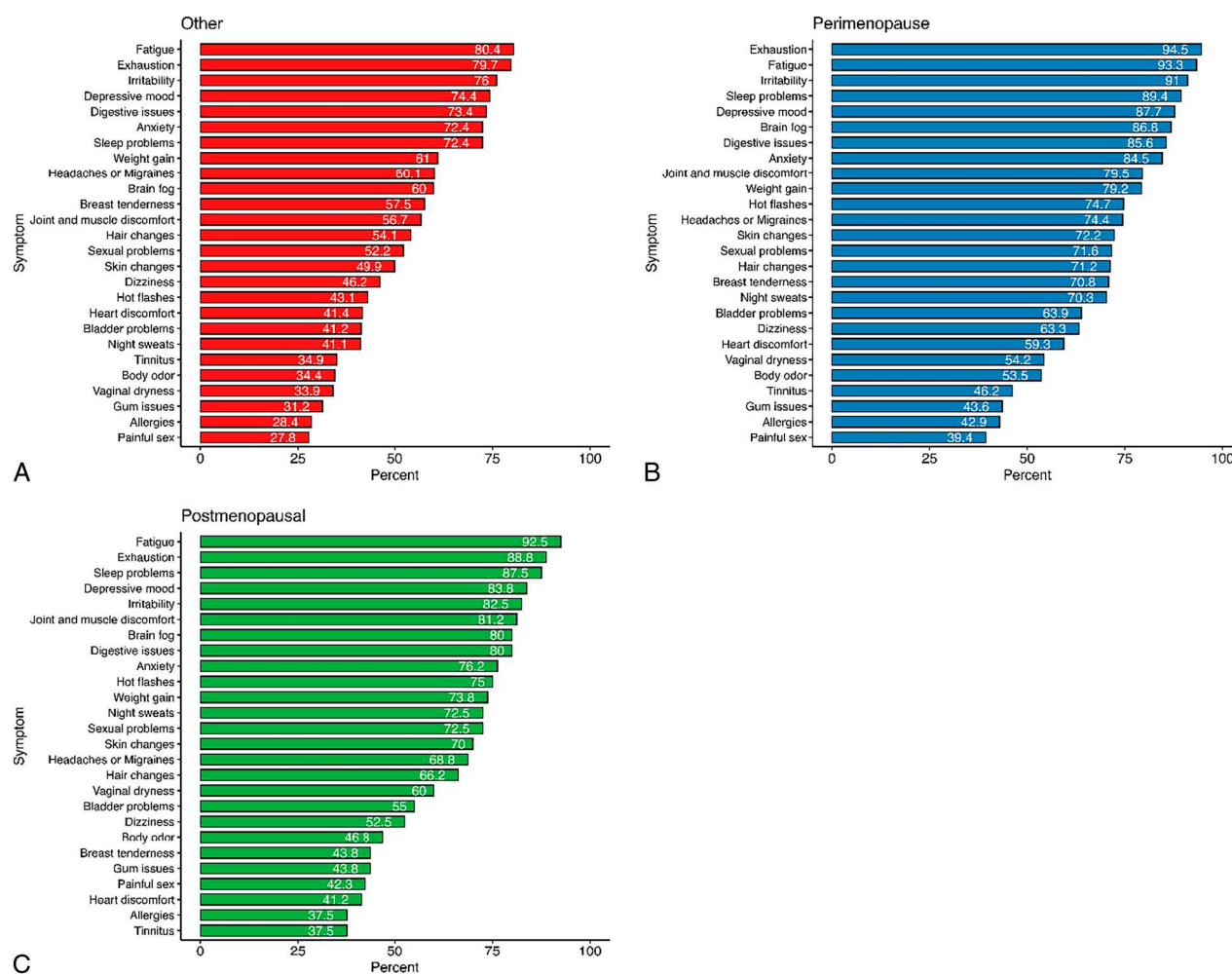
FIG. 3. Symptoms reported by respondents older than 35 years. Percentage of respondents aged 35 and older who reported currently experiencing each symptom from a predefined list of potential perimenopause symptoms.

Germany, Spain, Venezuela, the Netherlands, and India, while sleep disturbance ranked among the top three in Nigeria. Together, mood symptoms, fatigue, and sleep-related issues appear central to many women's perimenopause experiences. Fatigue during the perimenopause transition may be influenced in part by estrogen fluctuations, which can disrupt central nervous system regulation, alter circadian rhythms, and reduce restorative sleep. Furthermore, perimenopause is associated with an increased risk of mood disturbances compared with premenopause or postmenopause. While largely attributed to hormonal fluctuations that disrupt neurotransmitters and hypothalamic-pituitary-adrenal axis regulation, mood changes during perimenopause have also been linked to inflammation, diet, brain structure, and function.[38] In the Healthy-Women study of 1,045 women (43% perimenopause, 57% postmenopause), mood symptoms were among the most commonly reported, with 69% experiencing anxiety or panic and 67% reporting depression, prompting many to seek care from health care professionals or to adopt lifestyle modifications. In contrast, only 54% of women experiencing hot flashes reported seeking relief.[11] This underscores the importance of addressing mood and sleep disturbances alongside physical symptoms in perimenopause.

In our study, the percentage of women who reported experiencing symptoms varied by country, ranging from <60% for each of the top 3 symptoms in Nigeria to over 80% in most other countries. A previous study in Nigeria with 1,189 women aged 40 to 60 years also found that fewer than 60% reported each symptom assessed. Others have proposed that social determinants of health and health care access are contributing factors to these differences and have called for large, multiethnic studies to improve understanding of perimenopause.[39] Although the specific top symptoms differed, the overall proportion of women reporting symptoms in our study was high across all reproductive stages, with the highest proportion among those in perimenopause. This indicates a significant symptom burden among midlife women, with an additional impact at the time of perimenopause. Possible contributing factors include caregiving burden, which has been associated with increased menopause symptom burden.[40] Coexisting health conditions may also result in symptoms that mimic perimenopause symptoms. In addition, a significant proportion of women indicated that they were unsure of their reproductive stage, and it is feasible that some of the symptom burden in this group may be attributed to perimenopause.

The impact of perimenopause symptoms on quality of life and work-related productivity can be substantial. In the United States, the economic burden associated with the loss of work productivity because of menopause symptoms has been estimated to be $1.8 billion annually among women aged 45-60 years.[41] While less is known about the impact of symptoms in perimenopause specifically on work productivity, one study from the Netherlands suggested that symptomatic perimenopause women reported lower work ability compared with women without symptoms.[33] This highlights the potential economic benefits of effective symptom management.

FIG. 4. Symptoms reported by the reproductive stage. Percentage of respondents by reproductive stage, who reported currently experiencing each symptom from a predefined list of potential perimenopause symptoms. Categorized as self-reporting as other **(A)**, perimenopause **(B)**, or postmenopause **(C)**. "Other" includes responses "I'm not in perimenopause or postmenopausal," "I am unsure," and "Prefer not to answer."

Our study has several strengths, such as the large sample size and broad international distribution, facilitating our investigation across diverse cultural and geographic settings. In addition, digital surveys can help reduce misreporting, particularly of sensitive topics.[42]

However, several limitations should be noted. Despite advertising the survey in three languages in addition to English to ensure a broad demographic reach, the majority of respondents were English-speaking (59%) and nearly half were White (48%). In addition, administering a survey in digital format via a mobile app requires that respondents have both access to mobile technology and sufficient digital literacy, presenting potential barriers to participation.[43] Due to the lack of validated symptom questionnaires tailored specifically to perimenopause, we employed a combination of symptoms from the Menopause Rating Scale (MRS) and additional items in our survey. However, the survey is not validated at present. The definitions of reproductive stages presented in the survey did not include changes in menstrual cycles, unlike those set out in the STRAW +10 criteria, which may have resulted in women misclassifying their reproductive stage.[7] Finally, our study relied on self-reported reproductive stage and symptoms, which introduces the possibility of reporting and selection bias, as women experiencing symptoms may have been more likely to participate, potentially affecting the findings.[44]

CONCLUSION

Our findings highlight significant knowledge gaps, with symptoms identified as common during perimenopause differing from those most frequently experienced. Notably, hot flashes were not the top-reported symptoms, while fatigue, physical and mental exhaustion,

mood changes, digestive issues, and sleep disturbances predominated. International variations in both knowledge and symptoms were also noted. Future research should explore how demographic and lifestyle factors, social determinants of health, attitudes toward perimenopause and menopause, and knowledge-seeking behaviors influence these differences. Understanding these drivers will facilitate the development of tailored educational initiatives for both patients and clinicians.

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