Women & Health

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/wwah20

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To cite this article: Esther Carter, Georgie Bruinvels, Kate Timmins, Charles Pedlar & Daniel Martin (23 Nov 2023): Menopausal symptoms, exercise practices, and advice received in active women: a multi-country survey of strava app users, Women & Health, DOI: 10.1080/03630242.2023.2284730

To link to this article: https://doi.org/10.1080/03630242.2023.2284730

WOMEN & HEALTH
https://doi.org/10.1080/03630242.2023.2284730

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Menopausal symptoms, exercise practices, and advice received in active women: a multi-country survey of strava app users

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ABSTRACT

The study aimed to identify the prevalence of symptoms, changes in exercise levels, and exercise advice received during the menopausal transition in a large multi-country sample. Using total population sampling, 2.5 percent of female Strava app users ($n = 970$) from 7 countries completed an online survey between 14 February 2019 and 11 March 2019. The survey discussed menopause status (perimenopausal or postmenopausal), menopausal symptoms, changes to exercise behaviors, and advice received concerning exercise during menopause. Frequencies, chi-square statistics, and linear regressions were used to analyze data. The most commonly reported menopausal symptoms were sexual (18–83 percent) and cognitive/psychological (77–78 percent). 41 percent of women reported no change in exercise behavior since menopause began (46 percent increased and 11 percent decreased behaviors). The majority (88 percent) of women did not receive advice regarding exercise during menopause. Women who received advice were more likely to report an increase in their exercise than those not receiving advice (60 percent vs 46 percent; X^2 (df 2, $n = 927$) = 7.1, $p = .03$). Exercise behaviors increased the longer it had been since the menopausal onset (X^2 (df 8, $n = 937$) = 77.42, $p < .001$). The results suggested high menopausal symptom prevalence in active women and a general lack of exercise advice. More women reported higher symptom prevalence and an increase in exercise participation, the longer it had been since menopause onset. Future research should determine whether these increased exercise behaviors are being used as a coping mechanism.

ARTICLE HISTORY
Received 28 April 2023
Revised 26 October 2023
Accepted 13 November 2023

KEYWORDS
Advice; exercise; menopause; symptom

Introduction

Menopause is characterized by the permanent absence of menstruation, determined after 12 months of amenorrhea from the final menstrual period (FMP; Santoro et al. 2021). Women progress through various stages during menopause, from "late reproductive" to "early and late menopausal transition" to "post-menopause," which are characterized by changes in menstrual cycle length, increasing follicle stimulating hormone levels (FSH), and depletion of estrogen levels (Harlow et al. 2012; Santoro et al. 2021). The menopausal transition stage is often referred to as "perimenopause," which is characterized

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/03630242.2023.2284730.

by changes or cessation of the menstrual cycle for less than 12 months after the FMP (Harlow et al. 2012).

The onset of menopause usually begins around the ages of 45 to 55 (NHS 2021), although BMI, smoking status, use of oral contraceptives, number of pregnancies, physical activity (PA), socio-economic status, and genetic factors can impact the age of menopause onset (Ceylan and Özerdoğan 2015). Along with the absence of a menstrual cycle, menopausal women can also experience a range of symptoms which exist in four broad categories (Monteleone et al. 2018): (i) vasomotor (e.g., hot flushes, night sweats); (ii) somatic (e.g., head and body aches, fatigue); (iii) psychological (e.g., anxiety, depression, memory and concentration problems) and; (iv) sexual (e.g., vaginal dryness and reduced libido).

Around 85 percent of menopausal women experience symptoms (Makara-Studzińska, Kryś-Noszczyk and Jakiel 2014). The most prevalent symptoms include sleep problems (50–76 percent), urogenital symptoms (38–71 percent), loss of libido (43–60 percent), muscle and joint pain (32–57 percent), psychological problems (57–60 percent), and hot flushes and night sweats (35–83 percent; Dąbrowska-Galas et al. 2019; Haimov-Kochman et al. 2013; Li et al. 2020; Setorglo et al. 2012; Sydora et al. 2018). The prevalence of menopause symptoms may vary between the stages of menopause, for example, increases in sexual (e.g., vulvovaginal atrophy, loss of interest in sex; Lan et al. 2017) and vasomotor symptoms (e.g., hot flushes; Yim et al. 2015) have been greater in postmenopausal women compared to premenopausal and perimenopausal women. Despite hormone therapy being the most common treatment of negative symptoms of menopause (Santoro et al. 2021), exercise is considered as an effective non-clinical alternative to reducing menopause symptoms (Dąbrowska-Galas et al. 2019). The World Health Organisation (WHO) recommend adults to undertake 150 min of moderate intensity exercise per week and strengthening exercises on at least 2 days per week; however, there is no specific guidance for menopausal women (WHO 2022). Evidence has shown that up to 30 percent of women believe they are less active "less active" since menopause began (Women in Sport 2018).

Exercise participation has been associated with lower psychological and physical symptoms in Israeli women (Haimov-Kochman et al. 2013) and less severe urogenital and somatic symptoms for Polish women with high and moderate PA levels (Dąbrowska-Galas et al. 2019). Similarly, Kim et al. (2014) highlighted the association between moderate PA levels and significantly lower physical and psychosocial symptoms in perimenopausal Korean women (Kim et al. 2014). However, there was no difference between high and low PA levels, suggesting a U-shaped curve for PA benefits on menopause symptoms (Kim et al. 2014), in contrast to other studies. These previous studies have usually only focused on one culture, despite the cross-cultural differences in menopause symptom prevalence (e.g., Makara-Studzińska, Kryś-Noszczyk, and Jakiel 2014) and a general population of menopausal women, rather than those with high levels of habitual exercise participation (e.g., Haimov-Kochman et al. 2013). Therefore, the current study aimed address this gap in the research by undertaking a large-scale questionnaire study with menopausal women from various countries and higher PA levels to examine the impact of PA on menopause symptoms across cultures in an active population.

The primary objective was to explore patterns of symptom prevalence and changes in exercise levels by self-reported menopausal status and recency of menopause onset. The secondary outcomes were to (i) describe the reported prevalence, types, and sources of menopause advice; (ii) compare reported changes in exercise according to receipt of advice; (iii) examine differences in reported exercise advice and changing exercise behaviors by country.

Methods

Research design

An online survey was created (SurveyMonkey, London) to evaluate menstrual characteristics, symptoms, and exercise habits in a cross-sectional sample of exercising females. The survey used a total population sampling approach and was designed to take approximately 10 min to complete. A group

of 20 internal testers were used to pilot the survey in order to evaluate face validity and question clarity. Following feedback from the pilot, the question order and grammar used were altered. The final questionnaire comprised 10 original questions derived using a combination of the authors' knowledge and experience in this area, alongside published peer-reviewed research tools (see Supplementary File 1).

The survey included questions about self-reported menopause status (perimenopausal or postmenopausal), whether respondents had a menstrual period in the last 12 months, and recency of onset of menopausal symptoms ("6–12 months," "1–2 years," "3–4 years" or "5+ years"). Participants were asked to rate how often they experienced 11 common menopausal symptoms on a rating scale with the option of including additional symptoms. Participants were asked to report changes to exercise behaviors since the onset of menopause on a rating scale and report whether they had received advice regarding exercise and the menopause. For participants who had received advice, they were asked who provided the advice and what they were advised. The survey was translated into French, Spanish, Brazilian Portuguese, German, and American English. It was then localized to seven countries (United Kingdom and Northern Ireland, Republic of Ireland, United States of America, France, Spain, Brazil, and Germany) by a native language speaker to ensure correct meaning and colloquialism. All questions were either multiple choice, checkboxes with or without a limit on the number of selections allowed, dropdown of answer choices, a matrix, and a slider. Free text answers were not requested except for instances where an "Other" was applicable. Mean time to complete the survey was 3:08 ± 0:39 minutes.

Ethical approval

The study protocol was approved by the St Mary's University Ethics Committee and participants provided informed consent upon commencing the survey.

Study population

The inclusion criteria were for participants to be female, aged 18 and older, and self-reported as currently menopausal or post-menopausal. Women who were pre-menopausal or pregnant were excluded from the survey.

Survey dissemination

A research collaboration was formed between the Female Health Research Group at St Mary's University, Twickenham, FitrWoman (Orreco, Ireland), and STRAVA, an online exercise community (www.strava.com; Strava, San Francisco). The survey was disseminated via e-mail from the Strava database (including only women who opted in to receiving e-mails of this nature) and through the Strava application via a link. This took participants to an initial, broad female health questionnaire which included questions about menstrual health, menstrual characteristics, and menstrual history. On completion of this, they were then invited to complete follow-up questionnaires on "menopause" or "pregnancy" if these life stages were of relevance to them. A total of 425,697 women received an invitation to complete an online survey (180,000 via e-mail, 245,697 via the STRAVA mobile application). Of this sample 16,423 (3.9 percent) initiated the survey, and 10,674 (2.5 percent) completed the survey. Upon completion of the survey, participants were invited to complete the menopausal questionnaire if relevant to them. 1258 participants initiated and 970 (77 percent) completed the menopause survey. The survey was open for 25 days between 14 February 2019 and 11 March 2019.

Analysis

The distribution of responses for each survey item was described using counts and proportions. Participants indicated, for each symptom listed, whether they experienced it Never, "Occasionally," "Regularly" or "In the past." The number of symptoms experienced "Regularly" were summed; likewise, a sum of "Occasionally" experienced symptoms was calculated. Free text responses were assigned a newly generated category, by one author, based on key terms in the response. Where applicable, responses were translated to English using Google Translate. Frequency of free-text symptoms was not collected and these were not included in summed variables. Distributions of symptoms and exercise behavior changes were further summarized by time since menopause began (5 response categories). Self-reported exercise behavior change was also examined by country and receipt of advice. The chi-square statistic was used to analyze if observed differences in proportions were larger than expected. Two univariate regression models separately described the association between a) time since menopause began and number of regular symptoms and b) time since menopause began and number of occasional symptoms. Missing data were excluded from analyses. Analyses were computed using SPSS (v28, IBM, USA).

Results

Description of sample

The number of completed questionnaires from each country was: 120 from Brazil, 180 from France, 106 from Germany, 98 from Spain, 305 from the UK & Ireland, and 161 from the USA.

In total, 530 women reported they were perimenopausal, 97 women reported they were postmenopausal, and 308 women selected options for being both post- and perimenopausal. This may be in line with the STRAW + 10 + 1a early post-menopause +1a early post-menopause stage, which coincides with the end of perimenopause after 12 months of amenorrhea, and represents a transitional stage between perimenopause and early postmenopause (Harlow et al. 2012). In addition, 100 women did not know if they were postmenopausal, 37 did not know if they were perimenopausal, 11 women did not know if they were either. Finally, two women reported they were neither postmenopausal nor perimenopausal.

Menopause symptoms

The most commonly indicated symptoms that were occasionally or regularly experienced by the women were as follows: reduced sex drive (83 percent, 795 of 961), low mood or anxiety (78 percent, 751 of 960), problems with memory and concentration (77 percent, 738 of 958), night sweats (76 percent, 728 of 959), hot flushes (74 percent, 705 of 954), vaginal dryness (70 percent, 667 of 959), joint stiffness aches and pains (68 percent, 654 of 956), headaches (64 percent, 609 of 956), heart

Table 1. Experience of symptoms occasionally or regularly by menopausal status ($n = 627$).

Symptom	Perimenopausal ($n = 530$)	Postmenopausal ($n = 97$)
Hot flushes	405 (76 %)	59 (61 %)
Night sweats	432 (82 %)	59 (61 %)
Heart palpitations	270 (51 %)	43 (44 %)
Vaginal dryness	350 (66 %)	73 (75 %)
Reduced sex drive	425 (80 %)	90 (93 %)
Low mood or anxiety	430 (81 %)	62 (64 %)
Problems with memory and concentration	426 (80 %)	64 (66 %)
Joint stiffness, aches & pains	361 (68 %)	60 (62 %)
Reduced muscle mass	222 (42 %)	28 (29 %)
Headaches	345 (65 %)	58 (60 %)
Recurrent UTIs	98 (18 %)	14 (14 %)

Table 2. The association between length of time since menopause began and number of symptoms ($n = 961$).

Time since menopause began	Number of regular symptoms			Number of occasional symptoms		
	β	95 percent CI	*p*	β	95 percent CI	*p*
In the last 6 months	−0.70	−1.16, −0.23	.003	0.44	0.004, 0.88	.048
6–12 months ago	−0.17	−0.61, 0.28	.46	0.23	−0.19, 0.65	.28
1–2 years ago	0.27	−0.10, 0.65	.15	0.21	−0.15, 0.56	.25
2–3 years ago	0.24	−0.16, 0.63	.24	0.18	−0.20, 0.55	.35

Data analyzed using univariate regression model; Reference category: ≥5 years ago.

palpitations (51 percent, 482 of 953), reduced muscle mass (44 percent, 417 of 953), and recurrent UTIs (18 percent, 169 of 959). Only one woman (who described herself as perimenopausal) reported no current symptoms. See Supplementary Files 2 and 3 and Table 1.

Several other symptoms were reported as free text, including weight gain ($n = 3$), dry skin ($n = 3$), deterioration in hair quality ($n = 3$), depression ($n = 3$), tiredness ($n = 3$), reduced athletic performance ($n = 2$), reduced sleep ($n = 2$), violent mood swings ($n = 2$), insomnia ($n = 1$), pelvic prolapse ($n = 1$), osteoporosis ($n = 1$), increased sex drive ($n = 1$), difficulty losing weight ($n = 1$), day sweats ($n = 1$), constipation and diarrhea ($n = 1$), breast pain ($n = 1$), abdominal aches ($n = 1$).

Overall, 118 (9 percent) women reported starting the menopause within the 6 months prior to the survey, 133 (11 percent) 6–12 months ago, 243 (19 percent) 1–2 years ago, 197 (16 percent) 3–4 years ago and 270 (22 percent) 5+ years ago. In total, 327 women reported having a period in the last year, of which, 272 self-reported as perimenopausal, 31 reported being both perimenopausal and postmenopausal, 4 reported being postmenopausal and 20 did not know. Furthermore, 182 women who reported having a period in the last year described the peri-menopausal stage starting within the past 12 months, with 145 women reported to have started their menopause earlier than this. Only 17 women reported starting their menopause 5+ years ago.

Regardless of self-reported menopausal status, univariate (unadjusted) linear regression indicated that those who started the menopause more recently (in the 6 months prior) were more likely to report fewer regular symptoms but slightly more occasional symptoms than those whose menopause began five or more years ago (Table 2).

Exercise behaviour and advice

Overall, 392 of 961 women (41 percent) reported no change in exercise behavior since entering the menopausal period, whereas 101 (11 percent) reported a decrease, and 444 (46 percent) reported an increase. Only 24 (2 percent) women had not considered whether or not exercise had changed since menopause. After excluding the latter, changes to exercise behavior did not appear to differ by country (X^2 (df 10, $n = 937$) = 13.69, $p = .19$).

More women appeared to have increased their exercise behaviors the longer it had been since menopause began (X^2 (df 8, $n = 937$) = 77.42, $p < .001$; Supplementary File 4).

The majority of women said they did not receive advice regarding exercise and the menopause: 841 of 961 (89 percent; Table 3). More women identified a source of advice than responded ‘yes‘ yes to

Table 3. Advice received by country.

Country	Received advice	Did not receive advice	Total responded
Brazil	30 (26 %)	87 (74 %)	117
France	16 (9 %)	161 (91 %)	176
Germany	9 (9 %)	92 (91 %)	101
Spain	15 (16 %)	79 (84 %)	94
UK + Ireland	21 (7 %)	279 (93 %)	300
USA	15 (9 %)	143 (91 %)	158
All countries	106 (11 %)	841 (89 %)	947

whether they had advice or not; suggesting some women interpreted the question differently. Due to a technical fault, there was also a discrepancy in whether women were presented with the follow-up question about sources of advice depending on their response to the prior question. Therefore, only women who responded "yes" to receiving advice ($n = 106$) were included when analyzing the sources of advice. 14 of these identified themselves as the source of advice and were also excluded from further analyses. The main sources of advice were doctor/clinical practitioner ($n = 70$), friends/family ($n = 12$), and through sport ($n = 8$). Other sources of advice reported included a nutritionist or dietitian ($n = 2$), a women's wellness weekend ($n = 1$), and a "well-being doctor" ($n = 1$). Twenty-seven women reported two or more sources of advice.

In terms of the advice given, 79 (75 percent) women said they were told they should maintain exercise levels. Four (4 percent) said they were told to reduce exercise, 16 (15 percent) were told they ought to alter the type of exercise they were doing, 53 (50 percent) said they were told to include more strength training. None of the women reported being told to reduce strength training.

Excluding those who had not considered exercise changes, women who received advice appeared more likely to increase their exercise than those who did not receive advice (60 percent vs 46 percent; X^2 (df 2, $n = 927$) = 7.1, $p = .03$).

Discussion

The current study aimed to assess the prevalence and frequency of menopausal symptoms, changes in exercise behaviors in relation to the onset of menopause, and the advice given to exercising menopausal women. The most prevalent symptoms appeared to be sexual (18–83 percent) and cognitive/psychological (77–78 percent), followed by vasomotor (74–76 percent) and somatic symptoms (44–68 percent). Both sexual and vasomotor symptoms were particularly prevalent in the current sample compared to other cross-continental research (Makara-Studzińska, Kryś-Noszczyk, and Jakiel 2014). Overall, symptom data indicated a high prevalence of various types of menopausal symptoms, even within an active portion of the population.

Additionally, the experience of symptoms seemed to vary depending on menopausal status, with night sweats (82 percent vs 61 percent), low mood or anxiety (81 percent vs 64 percent), and hot flushes (76 percent vs 61 percent) being higher for perimenopausal women compared to postmenopausal women. There is mixed evidence on the prevalence of vasomotor symptoms, with reports of higher occurrence in perimenopausal women (Li et al. 2020) and other research highlighting the continuity of vasomotor symptoms across peri- and post-menopause stages (Cengiz et al. 2019; Tepper et al. 2016). The only symptoms exhibiting higher prevalence rates for postmenopausal women compared to perimenopausal women were reduced sex drive (93 percent vs 80 percent) and vaginal dryness (75 percent vs 66 percent). The increased prevalence of sexual symptoms from the perimenopausal to the postmenopausal stage has been documented in previous literature (e.g., Lan et al. 2017).

The majority of the respondents reported similar (41 percent) or increased (46 percent) exercise since menopause began. Only 11 percent of the sample reported a decrease in exercise behavior. These figures appear higher than a previous multi-country study assessing changes in PA level (24–41 percent increase; Nappi et al. 2023). This also contrasts with previous research highlighting decreases in PA during the menopause transition (Women in Sport 2018) and only 24.7 percent of menopausal women over 50 meeting exercise guidelines for adults (Ottenbacher et al. 2015). However, the current samples were recruited from users of an exercise tracking application, suggesting a preexisting commitment to PA.

Furthermore, the longer it has been since menopause started, the more likely participants were to report more regular symptoms and increased exercise behaviors. Previous research has also indicated more severe symptoms in post-menopausal women compared to perimenopausal women (Yim et al. 2015) and troublesome symptoms, such as vasomotor symptoms, lasting 7–10 years (Avis et al. 2015). In addition, a higher proportion of late perimenopausal women were physically active compared to

early perimenopausal and premenopausal women (Bondarev et al. 2020). Therefore, it may be conceivable that women are using exercise as a coping strategy for the regular symptoms of menopause (Women in Sport 2018). However, the motivations for exercise were not explored in the current survey, which may be an avenue for future research to understand the reasons for exercise behavior change with menopause.

One of the most concerning outcomes of the current study was the reported lack of advice given to women regarding exercise and menopause, with 88 percent of the sample receiving no advice. For those who did receive advice, the primary recommendations were to maintain exercise levels (75 percent) or include more strength-based training (50 percent). The findings of this survey hint at a beneficial effect of advice on exercise behavior through the menopausal transition, with women receiving advice being more likely to increase exercise behaviors compared to those who did not receive advice ($p = .03$). This was demonstrated by the Brazilian sample who more likely to receive exercise advice (26 percent vs 7–16 percent) and increase their exercise behaviors (58 percent vs 43–49 percent). However, the majority of women in this sample reported receiving no advice about PA. Secondly, improved education on menopause in general seems necessary, as 100 women did not know if they were postmenopausal, 37 did not know if they were perimenopausal, and 11 did not know their current menopause status. This aligns with previous research suggesting a lack of knowledge regarding menopause symptoms, stages, and strategies for alleviating symptoms (Baquedano et al. 2022) with 41 percent of women reporting an insufficient provision of information and support (Currie and Moger 2019). The majority of the respondents in the current (74.5 percent) and previous studies indicated that doctors were the main source of advice (Nappi et al. 2023).

The general lack of advice regarding menopause coupled with the high prevalence of menopause symptoms in the current study highlights a greater need for general education and specific advice on exercise as a method for symptom management. This is in line with the recommendations from the British Menopause Society (BMS), which call for holistic and individualized lifestyle advice regarding menopause, which includes PA (Hamoda et al. 2022). There is the potential that advice through healthcare systems could be a simple route to educate patients about the transition through menopause as well as PA guidelines, with the aim of improving women's experiences of the menopause (Currie and Moger 2019). This is supported by previous evidence suggesting that 90 percent of women would consider undertaking PA after the recommendation of a health professional (Women in Sport 2018). The use of the STRAW + 10 staging criteria has been recommended as a clinical tool to allow healthcare professionals and women to work together to better understand reproductive aging and associated symptoms through a consistent classification of 10 stages of menopause (Harlow et al. 2012).

In terms of study limitations, a cross-sectional survey from a self-selecting sample of active women. This limits our ability to infer the experiences of symptoms, advice, and behaviors across active women or the general population. The inclusion of a non-active comparison group in future research would be beneficial in understanding the differences in symptom prevalence and advice received. In addition, the majority of participants were peri-menopausal (530/970), with only 97 women in the study self-identifying as postmenopausal, and 308 women reporting they were both post- and perimenopausal. The small sample of postmenopausal women, and the high prevalence of women reporting to be in both perimenopausal and postmenopausal stages, suggests that caution should be taken when comparing the symptoms experienced between these two stages. In addition, the women reporting to be both perimenopausal and postmenopausal could be classified into the + 1a early post-menopause stage of the STRAW + 10 criteria (Harlow et al. 2012); however, this could not be concluded without the direct use of the criteria when asking participants to self-report their menopause status. In future, integrating the STRAW + 10 criteria to assist women in self-reporting their menopause status and using stratified sampling methods to ensure a more balanced and accurate representation of each menopause stage would be beneficial to aid in drawing comparisons.

In addition, data were not available on the prevalence of hormone therapy in the sample, which is likely to have influenced the experience of symptoms (Santoro et al. 2021). Future studies are

recommended to collect further health data from participants that may influence symptom prevalence. For example, participants with a higher BMI and waist circumference, poorer physical and mental health, and higher alcohol use have reported experiencing a high prevalence of vasomotor symptoms (Gold et al. 2017; Tepper et al. 2016). Furthermore, it is important to consider other co-morbidities associated with menopause, such as metabolic syndrome, which has shown significant correlations with menopause symptoms such as sleep and bladder problems and greater depressive symptoms (Cengiz et al. 2019), and obesity, which is significantly correlated with vasomotor and physical symptoms (Yim et al. 2015).

Additional details about the frequency, duration, or intensity of PA – perhaps using more objective methods, such as accelerometers (e.g., Rosa et al. 2015), or intervention studies – would be crucial to examine the direct relationship between exercise behaviors and symptoms. Qualitative insights into motivations to exercise, whether menopausal symptoms act as a barrier to regular PA, and the lived experiences of women exercising (or not) through the menopause would also be valuable. The study used data from seven countries to gain a broad perspective on symptoms, exercise behaviors, and advice given. However, no countries from Asia, Africa, or Australasia were sampled. Previous studies have indicated differences in symptom prevalence between countries, for example, the most common symptoms in Korean women were poor memory (85.8 percent) and vaginal dryness (78.9 percent; Yim et al. 2015), whereas night sweats (83.2 percent) and hot flushes (76.4 percent) appear to be prominent for Ghanaian women (Setorglo et al. 2012). Therefore, future studies assessing menopausal symptoms, exercise behaviors, and menopause advice across the continents could increase the generalizability of the results.

In conclusion, the current study provides a summary of the prevalence of menopause symptoms experienced in a sample of active women across seven countries. There was evidence for differing symptom experiences depending on menopausal status, and more women reported higher symptom prevalence and an increase in exercising the longer it had been since menopause onset. Although more research is needed to understand the frequency and content of advice given to women concerning exercise during menopause, the findings are suggestive of a positive impact of advice on exercise in active women.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

A small grant was received from Strava to conduct the study.

References

Avis, N. E., S. L. Crawford, G. Greendale, J. T. Bromberger, S. A. Everson-Rose, E. B. Gold, R. Hess, H. Joffe, H. M. KFravitz, P. G. Tepper, et al. 2015. Duration of menopausal vasomotor symptoms over the menopause transition. *JAMA Internal Medicine* 175 (4): 531–9. doi:10.1001/jamainternmed.2014.8063.

Baquedano, L., M. Fasero, L. Gabasa, P. Coronado, J. Presa, N. Mendoza, and COMEM Study Spanish Investigators. 2022. What do Spanish women know about menopause? COMEM study. *Journal of Obstetrics and Gynaecology* 42 (5):1–7. doi:10.1080/01443615.2021.1998892.

Bondarev, D., S. Sipilä, T. Finni, U. M. Kujala, P. Aukee, E. K. Laakkonen, V. Kovanen, and K. Kokko. 2020. The role of physical activity in the link between menopausal status and mental well-being. *Menopause* 27 (4): 398–409. doi:10.1097/GME.0000000000001490.

Cengiz, H., C. Kaya, S. Suzen Caypina, and I. Alay. 2019. The relationship between menopausal symptoms and metabolic syndrome in postmenopausal women. *Journal of Obstetrics and Gynaecology* 39 (4): 529–33. doi:10.1080/01443615.2018.1534812.

Ceylan, B., and N. Özerdoğan. 2015. Factors affecting age of onset of menopause and determination of quality of life in menopause. *Turkish Journal of Obstetrics and Gynecology* 12 (1):43–9. doi:10.4274/tjod.79836.
Currie, H., and S. J. Moger. 2019. Menopause–understanding the impact on women and their partners. *Post Reproductive Health* 25 (4):183–90. doi:10.1177/2053369119895413.
Dąbrowska-Galas, M., J. Dąbrowska, K. Ptaszkowski, and R. Plinta. 2019. High physical activity level may reduce menopausal symptoms. *Medicina* 55 (8):466–75. doi:10.3390/medicina55080466.
Gold, E. B., S. L. Crawford, J. F. Shelton, P. G. Tepper, C. J. Crandall, G. A. Greendale, K. A. Matthews, R. C. Thurston, and N. E. Avis. 2017. Longitudinal analysis of changes in weight and waist circumference in relation to incident vasomotor symptoms: The study of women's Health across the nation (SWAN). *Menopause* 24 (1):9–26. doi:10.1097/GME.0000000000000723.
Haimov-Kochman, R., N. Constantini, A. Brzezinski, and D. Hochner-Celnikier. 2013. Regular exercise is the most significant lifestyle parameter associated with the severity of climacteric symptoms: A cross sectional study. *European Journal of Obstetrics & Gynecology and Reproductive Biology* 170 (1):229–34. doi:10.1016/j.ejogrb.2013.06.018.
Hamoda, H., S. Moger, E. Morris, S. Baldeweg, A. Kasliwal, F. Gabbay, and H. Wright. 2022. Menopause practice standards. *Post Reproductive Health* 28 (3):127–32. doi:10.1177/20533691221110001.
Harlow, S. D., M. Gass, J. E. Hall, R. Lobo, P. Maki, R. W. Rebar, S. Sherman, P. M. Sluss, T. J. de Villiers, and STRAW+ 10 Collaborative Group. 2012. Executive summary of the stages of reproductive aging workshop+ 10: Addressing the unfinished agenda of staging reproductive aging. *Climacteric* 15 (2):105–14. doi:10.3109/13697137.2011.650656.
Women in Sport. 2018. Menopause, me and physical activity: Exploring the impact of menopause on physical activity behaviour. Accessed September 24, 2023. https://womeninsport.org/wp-content/uploads/2018/05/Menopause-report-PDF-final-1-2.pdf
Kim, M. J., J. Cho, Y. Ahn, G. Yim, and H. Y. Park. 2014. Association between physical activity and menopausal symptoms in perimenopausal women. *BMC Women's Health* 14 (1):1–8. doi:10.1186/1472-6874-14-122.
Lan, Y., Y. Huang, Y. Song, L. Ma, P. Chen, Q. Ying, W. Li, Y. Cai, and J. Zhou. 2017. Prevalence, severity, and associated factors of menopausal symptoms in middle-aged Chinese women: A community-based cross-sectional study in Southeast China. *Menopause* 24 (10):1200–7. doi:10.1097/GME.0000000000000906.
Li, J., M. Luo, R. Tang, X. Sun, Y. Wang, B. Liu, J. Cui, G. Liu, and R. Chen. 2020. Vasomotor symptoms in aging Chinese women: Findings from a prospective cohort study. *Climacteric* 23 (1):46–52. doi:10.1080/13697137.2019.1628734.
Makara-Studzińska, M. T., K. M. Kryś-Noszczyk, and G. Jakiel. 2014. Epidemiology of the symptoms of menopause–an intercontinental review. *Menopause Review* 13 (3):203–11. doi:10.5114/pm.2014.43827.
Monteleone, P., G. Mascagni, A. Giannini, A. R. Genazzani, and T. Simoncini. 2018. Symptoms of menopause—global prevalence, physiology and implications. *Nature Reviews Endocrinology* 14 (4):199–215. doi:10.1038/nrendo.2017.180.
Nappi, R. E., E. Siddiqui, L. Todorova, C. Rea, E. Gemmen, and N. M. Schultz. 2023. Prevalence and quality-of-life burden of vasomotor symptoms associated with menopause: A European cross-sectional survey. *Maturitas* 167:66–74. doi:10.1016/j.maturitas.2022.09.006.
National Health Service (NHS). 2021. Menopause: A healthy lifestyle guide. Accessed September 24, 2023. https://www.cuh.nhs.uk/patient-information/menopause-a-healthy-lifestyle-guide/.
Ottenbacher, A., M. Yu, R. P. Moser, S. M. Phillips, C. Alfano, and F. M. Perna. 2015. Population estimates of meeting strength training and aerobic guidelines, by gender and cancer survivorship status: Findings from the health information national trends survey (HINTS). *Journal of Physical Activity and Health* 12 (5):675–9. doi:10.1123/jpah.2014-0003.
Rosa, C. S. C., F. E. Rossi, C. Buonani, R. A. Fernandes, H. L. Monteiro, and I. F. F. Junior. 2015. The agreement between physical activity time reported by the IPAQ and accelerometer in postmenopausal women. *Motricidade* 11 (3):106–13. doi:10.6063/motricidade.4100.
Santoro, N., C. Roeca, A. B. Peters, and G. Neal-Perry. 2021. The menopause transition: Signs, symptoms, and management options. *Journal of Clinical Endocrinology and Metabolism* 106 (1):1–15. doi:10.1210/clinem/dgaa764.
Setorglo, J., R. S. Keddey, I. Agbemafle, S. Kumordzie, and M. Steiner-Asiedu. 2012. Determinants of menopausal symptoms among Ghanaian women. *Current Research Journal of Biological Sciences* 4 (4):507–12.
Sydora, B. C., N. Yuksel, N. L. Veltri, J. Marillier, C. P. Sydora, M. Yaskina, L. Battochio, T. M. L. Tami, and S. Ross. 2018. Patient characteristics, menopause symptoms, and care provided at an interdisciplinary menopause clinic: Retrospective chart review. *Menopause* 25 (1):102–5. doi:10.1097/GME.0000000000000942.
Tepper, P. G., M. M. Brooks, J. F. Randolph, S. L. Crawford, S. R. El Khoudary, E. B. Gold, B. L. Lasley, B. Jones, H. Joffee, R. Hess, et al. 2016. Characterizing the trajectories of vasomotor symptoms across the menopausal transition. *Menopause* 23 (10):1067–74. doi:10.1097/GME.0000000000000676.
World Health Organisation 2022. Physical activity. Accessed September 24 , 2023. Last modified November 26, 2020. https://www.who.int/news-room/fact-sheets/detail/physical-activity.
Yim, G., Y. Ahn, Y. Chang, S. Ryu, J. Y. Lim, D. Kang, E. K. Choi, J. Ahn, Y. Choi, J. Cho et al. 2015. Prevalence and severity of menopause symptoms and associated factors across menopause status in Korean women. *Menopause* 22 (10):1108–16. doi:10.1097/GME.0000000000000438.