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Increasing climacteric symptoms in untreated perimenopausal Finnish women: a 10-year cohort study

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Increasing climacteric symptoms in untreated perimenopausal Finnish women: a 10-year cohort study

Abstract

Purpose: This study aimed to examine changes over a 10-year period in experiencing climacteric symptoms and their associations with sociodemographic and health-related background factors in a birth cohort of Finnish women who have never used menopausal hormone therapy (MHT).

Materials and methods: This nationwide population-based follow-up study consists of 1491 women who during the follow-up period moved from the 42–46 age group to the 52–56 age group. The experience of climacteric symptoms was assessed by 12 symptoms commonly associated with the climacterium. The data were analyzed using statistical techniques.

Results: Both the intensity, expressed as a symptom score of four symptoms associated with a decrease in estrogen production (sweating, hot flushes, vaginal dryness, sleeping problems), and the prevalence of the five most common symptoms (sweating, hot flushes, sleeping problems, lack of sexual desire, depressive symptoms) increased clearly during the follow-up period. The examined sociodemographic and health-related variables did not explain the changes in experiencing the symptoms.

Conclusions: The results of this study can be considered in primary and occupational health care and in gynecological settings when working with symptomatic women or women with hidden climacteric problems and carrying out health promotion and counseling for them.

Keywords

Climacteric symptoms; Menopause; Middle aged; Health counselling; Follow-up study; Cohort study

INTRODUCTION

Climacteric symptoms and their impact on middle-aged women have been studied extensively [1–4]. Natural menopause, defined as 12 months of amenorrhoea resulting from the permanent cessation of ovarian function, typically occurs between the ages of 45 and 55 years, with the average being 51 years [5,6]. Hot flushes, sweating, and other frequent menopause-related symptoms, such as depressive symptoms, irritability, and sleeping problems, may exist at any of the phases of the climacterium [7–9]. In some women, climacteric symptoms last for 5–8 years or even more than ten years; furthermore, some women experience only mild symptoms and others have no symptoms [9,10]. Usually, climacteric symptoms are at their most severe within the first years after menopause [11,12].

Up to 80% of women suffer from climacteric symptoms with different degrees of severity and impact on the quality of life [13]. Additionally, altogether up to 60% of women assess their climacteric symptoms as ‘moderate’ to ‘severe’ [14]. Furthermore, approximately 50% of employed middle-aged women have problems at work because of their climacteric symptoms [15]. Depressive symptoms, sleeping problems, irritability, and hot flushes can particularly interfere with a woman’s well-being at work [16]. Having climacteric symptoms at work can be uncomfortable, embarrassing, and distressing for women and impair their capacity, activity, and effectiveness at work [17,18].

In Finland, at the time of this study, menopausal hormone therapy (MHT) was used by approximately 30–40% of menopausal women. MHT can be prescribed by any licensed medical doctor, for example, by a gynecologist, a general practitioner, or an occupational health doctor, but in practice mostly by a specialist, i.e., gynecologist. The physician decides on the MHT after a medical, especially gynecological examination of the woman (incl.

ultrasound etc.), counselling, a discussion with the woman, and hearing the woman's own insight into the subject. For instance, the type of MHT can often be selected based on the woman's wish. [19,20]

Although much research has been done on climacteric symptoms, there is still limited evidence available on how the experience of climacteric symptoms changes over time in a particular birth cohort of women who do not use menopausal hormone therapy (MHT) at all [10]. The present 10-year follow-up study in a birth cohort of Finnish middle-aged women who have never used menopausal hormone therapy aims to fill this gap. This study examined changes in the subjectively experienced climacteric symptoms over time and their associations with sociodemographic and health-related characteristics. The study provides new research-based information for health promotion practices on climacteric symptoms and their changes over time. These insights help health professionals improve women's knowledge about climacteric symptoms and their impact on everyday life, work, and relationships, and support their ability to adapt and cope with the climacterium.

METHODS

Study subjects

A population-based prospective etiological follow-up cohort study of the Finnish working-age population entitled the Health and Social Support Study (HeSSup Study) was launched in 1998 to examine the psychosocial health of the Finnish working-age population. The participants were randomly selected from the Finnish Population Register Centre and stratified according to gender and four age groups. The age-based study groups were as follows: 20–24 ($n = 16190$),

30–34 ($n = 16250$), 40–44 ($n = 16277$), and 50–54 years of age ($n = 16080$). In the initial part of the HeSSup Study, a postal questionnaire of 110 questions including psychosocial and behavioral aspects of health was used. The overall response rate was 40% with women responding more actively (48%) than men (32%). According to the careful analysis of the HeSSup Study data, the health status differences between responders and the general population were relatively small, which could have been definition-based and did not reveal a uniform health status-related pattern of non-response. [21] The Quality of Life among Middle-aged Women Study (QoL Study) is a sub-study of the HeSSup Study and consists of women from the two oldest age groups of the HeSSup Study.

The present study was carried out among women of the second oldest HeSSup Study age group. QoL Study questionnaires were mailed in 2000 and 2010 to women born between 1954 and 1958 who had responded to the HeSSup survey in 1998 ($n = 2322$), i.e., to women aged 42–46 years in 2000 and, respectively, 52–56 years in 2010; the total number of responses to the HeSSup survey in 1998 among women of this age group had been 3013 (45%).

A total of 1491 women who had returned their HeSSup questionnaire in 1998 and their QoL Study questionnaires in 2000 and 2010 were included in the present study. The response rate was 64%. A reminder letter was mailed to those who did not return their initial QoL Study questionnaires.

The experience of climacteric symptoms and their associations with sociodemographic and health-related characteristics was assessed both at baseline and the end of the follow-up period. The participants had not received any treatment for their symptoms.

Study variables

The QoL Study questionnaire focused on women's gynecological background, climacteric symptoms, treatment of climacteric symptoms, and sexuality. Regarding the climacteric symptoms, the questionnaire was modified from the studies of Stadberg et al. [22] and Kupperman et al. [23].

The following question was asked in order to elicit information on the experience of climacteric symptoms: 'How severe were any of the following potentially menopause-related symptoms before you received any treatment for them?' The response alternatives were on a scale from 1 to 10, where 1 represented 'not at all' and 10 represented 'very severe'. The symptom options were divided into 12 potentially menopause-related symptoms 'sweating', 'hot flushes', 'vaginal dryness and tenderness', 'recurrent urinary infections', 'urinary incontinence', 'sleeping problems', 'depressive symptoms', 'irritability', 'dizziness', 'palpitation', 'dyspareunia', and 'lack of sexual desire'. A numerical rating scale (NRS) was used for assessing the symptom intensity. The respondents were asked to circle the number between 1 and 10 that best describes the severity of each symptom for them. Also, the following instruction was given to the respondents: 'The higher the number you circle, the more severe you have experienced the symptom.'

To assess the change in the intensity of the climacteric symptoms a sum score was formed from four symptoms that are most often associated with estrogen deficiency (sweating, hot flushes, vaginal dryness and tenderness, and sleeping problems, the latter related to night sweats) [1,7]. To assess the change in the prevalence of the climacteric symptoms, the five most common climacteric symptoms were selected for analysis (sweating, hot flushes, vaginal

dryness and tenderness, sleeping problems and depressive symptoms) [1,14]. The same procedure was used in two previous QoL studies [1,2].

The sociodemographic background of the respondents included marital status, place of residence, basic education, professional education, and employment status. Body mass index (BMI), metabolic equivalent of task (MET), and smoking status were included in the health-related background. This data was collected from the HeSSup study data. BMI was calculated from self-reported weight and height as kg/m^2 , and MET was determined from the self-reported estimate of the amount of physical activity during leisure and commuting time as MET-hours/day.

Statistical analyses

Potential non-response bias was examined by comparing participants who participated in both QoL surveys, the baseline survey in 2000 and the follow-up survey in 2010, with those who participated only in the baseline survey for the following five sociodemographic variables: marital status, place of residence, basic education, professional education, and employment status. For the analysis, Pearson's χ^2 -test was used.

The participants were classified into three groups according to their climacteric status: 1) premenopausal phase, when the respondents still had natural and regular periods; 2) perimenopausal phase, when their periods were irregular; and 3) postmenopausal phase, when their periods had ceased spontaneously more than one year previously or after bilateral salpingo-oophorectomy with or without hysterectomy. The participants whose climacteric

status was uncertain were classified as 'not classified'. A generalized logit model was used to determine the effect of time on the climacteric status.

Derived from the questionnaire's ten-point scale (from 'no at all' to 'very severe'), the following four categories were formed to assess the intensity of climacteric symptoms: 1 meaning 'no symptoms', 2–4, meaning 'mild symptoms', 5–7 meaning 'moderate symptoms', and 8–10 meaning 'severe symptoms'. To analyze and compare the intensity of the four typical symptoms associated with a decrease in estrogen production (sweating, hot flushes, vaginal dryness and sleeping problems) in women who have never used MHT, a sum score was formed from the four symptoms. The sum score ranged from 2 to 40, with 2–4 meaning 'no symptoms', 5–16 meaning 'mild symptoms', 17–28 meaning 'moderate symptoms', and 29–40 meaning 'severe symptoms'. The above-mentioned symptoms and categories were the same as in the two previous QoL studies [1,2]. A cumulative logistic regression model with GEE method was used to examine the effects of age on the intensity of these four typical symptoms, both combined and separately associated with a decrease in estrogen production.

A multinomial logistic regression analysis was used to examine the effects of age on the prevalence of the five most common climacteric symptoms (sweating, hot flushes, sleeping problems, lack of sexual desire and depressive symptoms). These five symptoms were the same as in the two previous QoL studies [1,2].

Cumulative logistic regression models were used to analyze the associations between the sociodemographic background information (marital status, place of residence, basic education, professional education, and employment status) and the experience of climacteric symptoms.

The same method was used to analyze the associations between the health-related variables (BMI, MET, and smoking status) and the experience of climacteric symptoms.

The statistical analyses were performed using SAS software (SAS 9.4 TS1M1 2012, SAS Institute Inc., Cary, NC, USA).

RESULTS

When comparing respondents who participated in the follow-up survey at the age of 52–56 years in 2010 with those who participated only in the baseline survey at the age of 42–46 years in 2000, we found that unemployed women ($P < 0.001$) and women who were not in a couple relationship ($P = 0.004$) were more likely to drop out of the study during the follow-up period (Table 1).

[Table 1 near here]

As for the climacteric status, between the baseline survey and the end of the 10-year follow-up period, the participants had moved from the premenopausal phase to the postmenopausal phase ($P < 0.001$) (Table 2).

[Table 2 near here]

Regarding the changes in the intensity of the symptom score of the four typical symptoms associated with a decrease in estrogen production (sweating, hot flushes, vaginal dryness and sleeping problems) over time, we found that there was an increase in the intensity of the symptom score among women who have never used menopausal hormone therapy (Figure 1).

We also found that the effect of time on the intensity of the symptom score was significant (P

< 0.001); in general, stronger symptoms were more common at 52–56 than at 42–46 years of age.

[Figure 1 near here]

When examining changes over time in the prevalence of five most common climacteric symptoms (sweating, hot flushes, sleeping problems, lack of sexual desire, and depressive symptoms) among women who have never used menopausal hormone therapy, we found that the prevalence of all examined symptoms increased over time ($P < 0.001$ for each symptom). Depending on the symptom, at the age of 42–46 years, 26–54% of women experienced symptoms, whereas, at the age of 52–56 years, 67–82% of them experienced symptoms. (Figure 2.).

[Figure 2 near here]

When examining associations between the sociodemographic background information (marital status, place of residence, basic education, professional education, and employment status) and the change in the experience of climacteric symptoms, and, on the other hand, associations between the health-related variables (BMI, MET, and smoking status) and the change in the experience of climacteric symptoms, none of these background variables explained the change in the experience of symptoms. However, we found some indications that being single or being overweight was associated with experiencing the symptoms more acutely, but the associations were not statistically significant.

In terms of changes in the experience of climacteric symptoms in a birth cohort of Finnish women who have never used menopausal hormone therapy as they moved from 42–46 to 52–56 age group, there was an increase in the intensity of the symptom score of the four typical

symptoms associated with a decrease in estrogen production (sweating, hot flushes, vaginal dryness, and sleeping problems). We also found that the prevalence of five most common climacteric symptoms (sweating, hot flushes, sleeping problems, lack of sexual desire, and depressive symptoms) increased over time. Concerning the changes in the experience of climacteric symptoms over time and their associations with sociodemographic and health-related characteristics, none of the background variables studied provided an explanation for the change in experiencing the symptoms.

DISCUSSION

Even though much research has been done on climacteric symptoms and their impact on women's well-being and quality of life, little research has been done on how the experience of climacteric symptoms changes over time among women who have never used MHT. To comprehensively understand the experience of climacteric symptoms and the impact of climacteric symptoms on women's well-being and quality of life over a longer period, we examined changes in subjectively experienced climacteric symptoms and their associations with sociodemographic and health-related characteristics in a birth cohort of untreated Finnish women.

The intensity (%) of the symptom score of the four typical symptoms associated with reduced estrogen production (sweating, hot flushes, vaginal dryness, and sleeping problems) as well as the prevalence (%) of five most common climacteric symptoms (sweating, hot flushes, sleeping problems, lack of sexual desire, and depressive symptoms) increased as women who have never used menopausal hormone therapy moved from the 42–46 to the 52–56 age group; the symptoms selected for the analyses were the same as in our recent studies [1,2] in the

same birth cohort of women. This result is consistent with the previous findings [2,4,8,9].

However, the difference in the present study, compared to the previous studies, is that it followed one birth cohort of women who have not used any treatment for their symptoms for ten years. As a result, we got new information about the changes in the experience of untreated climacteric symptoms in the same women over a longer period of time.

We found that being single or overweight could be potential predictors for more severe climacteric symptoms, but these findings did not achieve statistical significance at α level of 5%. For example, smoking or being unemployed or a housewife has been suggested as predictors for more severe climacteric symptoms, as well as these two factors, being single or overweight, that we also noted [13,24]. All in all, conflicting evidence has been presented in the literature regarding the factors predicting the intensity of climacteric symptoms.

Even though the experience of climacteric symptoms follows a certain pattern, it varies individually and according to age. Therefore, each woman at any age must be met as an individual both in health care and, for example, at work. Health professionals should provide women with guidance on what they can expect as they begin to approach middle age and menopause [25,26]. Women's limited understanding of menopause and climacteric symptoms contributes to delays in recognizing menopause and engaging in symptom management [27]. It would also be appropriate to increase knowledge of natural menopause in workplaces [28].

Knowledge and understanding of menopause and climacteric symptoms improve women's well-being and quality of life [29,30]. Health professionals can help middle-aged women to cope with menopause and climacteric symptoms by influencing women's knowledge, attitudes, and behavior [31,32]. Giving more attention to the promotion of health of middle-aged women,

health professionals can increase women's understanding of menopause and climacteric symptoms: effective and accurate health promotion improves the quality of life, well-being, and holistic care of middle-aged women [29,33].

The results of this study can be used when carrying out health promotion and counselling of middle-aged women, particularly in primary and occupational health care and gynecological settings. Although each woman is an expert on her own life and her potential health issues, each health professional must have the knowledge, skills, and attitude to support middle-aged women and women with climacteric symptoms also in the case that women do not want to use MHT. Such professional expertise is crucial regardless of the medical specialty or whether one works in public or private healthcare.

The strengths of the present study consist of a nationwide population-based design with a relatively high number of respondents and a questionnaire designed to assess women's experience of several types of climacteric symptoms. To reduce bias, only the respondents that had returned their QoL Study questionnaires both at the baseline and at the end of the follow-up period were included in the present study. In addition, differences between completers and drop-outs were examined.

Measuring the intensity of physical exercise is challenging and inexact, unfortunately. Though, to assess the intensity of the respondents' physical exercise we used the MET-hours/day value that we calculated based on the respondents' self-reported estimates of weekly physical exercise (walking or running, measured on a 5-point scale from 'not at all' to '4 hours or more') during leisure and commuting time. Certainly, limiting physical exercise to concern leisure and commuting time, the values we derived do not indicate the respondents' absolute physical

exercise intensity. Nevertheless, by considering the matter like this, we were able to get by some means comparable estimates for all respondents in this complicated issue. The MET value, developed by Professor Ainsworth et al. [34], is a simple, practical, and easily understood measure for physical exercise, and it is widely used by researchers, clinicians, and practitioners to identify and prescribe physical activities [35,36].

The study limitations consist of a low response rate at the beginning of the HeSSup Study (48%), drop-out bias, potential bias due to self-reported outcomes and the possibility of recall bias including under- or overestimation of the experience of symptoms due to the retrospective nature of the study. However, according to a comprehensive analysis of the HeSSup Study 1998 data, the differences between the respondents and the corresponding Finnish population were relatively minor when health-related characteristics are concerned [21].

Furthermore, the results of this study are limited to some extent by the fact that we used a non-validated questionnaire instead of a validated questionnaire to assess climacteric symptoms. Yet, we conducted a comprehensive review of the literature and discussed with several specialists in the field to increase the face and content validity of the questionnaire. Based on this, we assumed that, despite this limitation, this study and its results are important and sufficient. We consider that the results are well generalizable at least to the Finnish female population as the studied group of women was derived from the general population, and even though it had taken time since the research data were collected. Moreover, the year 2010 QoL survey was the most recent QoL survey. Besides, some of the women who participated in our study are still at an age at which they may suffer from climacteric symptoms, and, therefore, we also believe that the research data is still appropriate for studying our topic.

When reviewing the results, it is important to consider that the results of this study cannot necessarily be generalized to all populations, because, for example, there is regional genetic variation in the age of the menopause and the types of climacteric symptoms. Also, cultural differences can affect how a woman experiences climacteric symptoms.

This study shows that the intensity of climacteric symptoms, expressed as symptom score of the four symptoms included in the study, i.e., sweating, hot flushes, vaginal dryness and sleeping problems, increased clearly in untreated Finnish women during the 10-year follow-up period. Likewise, the prevalence of the studied symptoms, namely sweating, hot flushes, sleeping problems, lack of sexual and depressive symptoms, also increased during the follow-up period. The results can be considered in primary and occupational health care and in gynecological settings when working with symptomatic women or women with hidden climacteric problems and carrying out health promotion and counselling for them.

Climacterium itself is a multifaceted entity. Various attributes related to a woman's physical and mental health, as well as her psychological, genetic, environmental, and social characteristics, influence how she experiences climacterium and climacteric symptoms. Also, her attitudes, habits, and beliefs influence the experience of climacteric symptoms. Thus, we emphasize the importance of evidence-based counselling in this interesting field of medicine.

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Tables and Figures:

Table 1. Result of non-response analysis^a for a 10-year follow-up study in a birth cohort of women in the Finnish nationwide HeSSup and QoL studies.

	Participated only in the baseline survey (<i>n</i> = 2322)		Participated in both the baseline and the 10-year follow-up surveys (<i>n</i> = 1491)		<i>P</i> ^b
	<i>n</i>	%	<i>n</i>	%	
Marital status					0.004
No relationship	80	24	252	17	
Relationship	247	76	1190	83	
Place of residence					0.17
Town	197	59	909	61	
Local authority area	73	22	262	18	
Countryside	64	19	320	21	
Basic education					0.26
Less than 9 years	103	31	401	27	
9 years	100	30	440	29	
More than 9 years	131	39	649	44	
Professional education					0.34
No professional education	37	11	136	9	
Vocational course or school/Apprenticeship contract	113	34	453	31	
College	130	39	641	43	
University	59	16	252	17	
Employment status					<0.001
Full-time/Part-time worker or student	244	79	1217	87	
Unemployed/Laid off	36	12	127	9	
Retired	17	5	15	1	
Housewife	13	4	35	3	

^a Dropping out between the baseline (2000) and the follow-up (2010) surveys.

^b Pearson's χ^2 -test.

Table 2. The distribution of the climacteric status of participants at the age of 42-46 years (at the baseline) and the age of 52-56 years (at the end of the follow-up period) in the Finnish nationwide HeSSup and QoL studies.

	At the age of 42–46 years		At the age of 52–56 years		<i>P</i> ^a
	<i>n</i>	%	<i>n</i>	%	
Climacteric status					<0.001
Premenopausal	1087	73	123	8	
Perimenopausal	177	12	164	11	
Postmenopausal	46	3	733	51	
Not classified	172	12	462	30	

^a Generalized logit model.

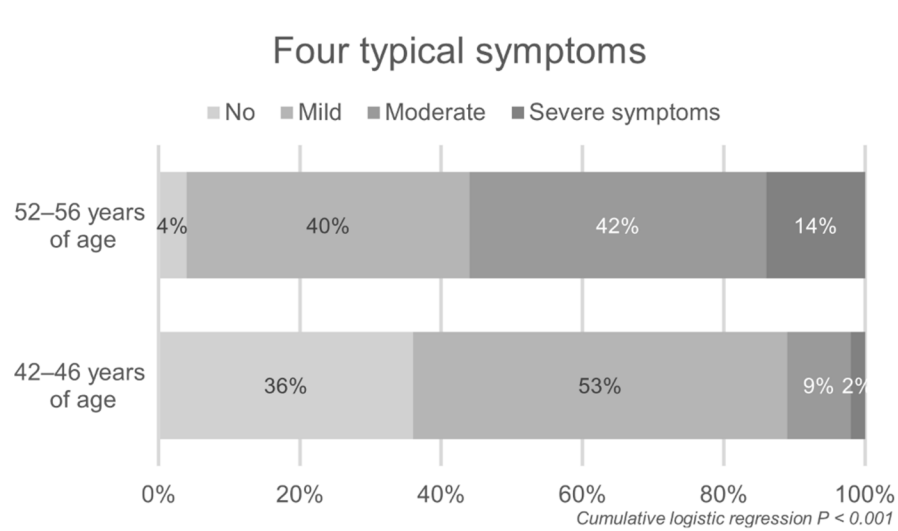


Figure 1. Intensity (%) of the symptom score of the four typical symptoms associated with a decrease of estrogen production (sweating, hot flushes, vaginal dryness and sleeping problems) among women who have never used MHT at the age of 42-46 years and the age of 52-56 years.

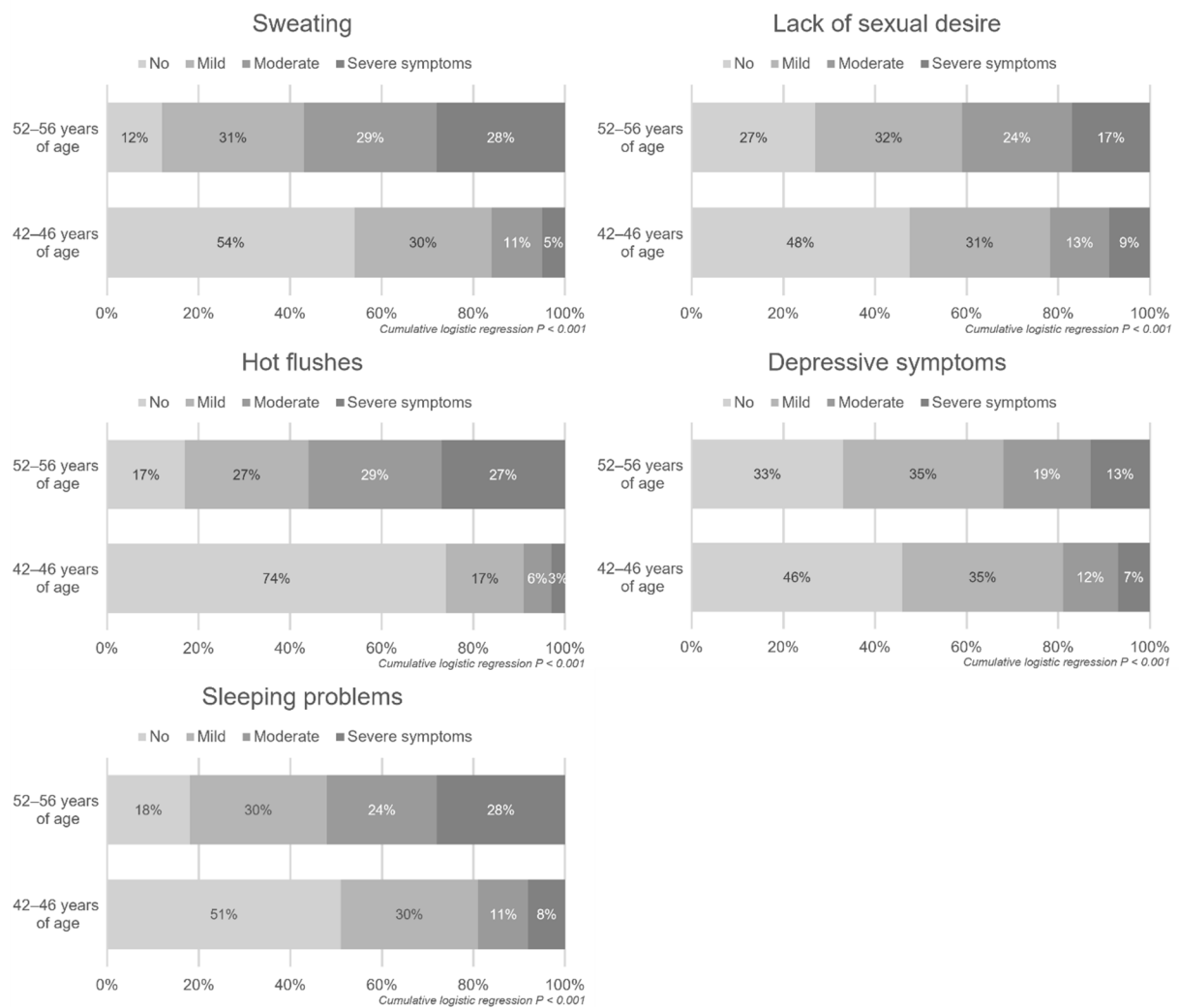


Figure 2. Prevalence (%) of five most common climacteric symptoms (sweating, hot flushes, sleeping problems, lack of sexual desire, and depressive symptoms) among women who have never used MHT at the age of 42–46 years and at the age of 52–56 years.

Abbreviations:

MHT: Menopausal hormone therapy

HeSSup: The Health and Social Support Study

QoL: The Quality of Life among Middle-aged Women Study

BMI: Body mass index

MET: Metabolic equivalent of task

Declarations:

Potential conflicts of interest: The authors report there are no competing interests to declare.

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Ethics approval and consent to participate: The concurrent joint Ethical Committee of the University of Turku and the Turku University Central Hospital approved the Health and Social Support Study (HeSSup Study). The study was carried out according to the Declaration of Helsinki. Participants signed a written consent agreeing to a prospective follow-up, including the registry data. The use of the data from the HeSSup study in our research did not require separate ethics approval but was granted by the study group led by the Principal Investigator, Professor Markku Koskenvuo. All study members had to sign a written commitment to data protection, and all shared and analyzed data was pseudonymized before delivery.

Supplementary Table 1. ANOVA results for the symptom score difference of 2000 and 2010 by specific factors. Least squares means and ANOVA statistics. A positive estimate indicates a higher symptom score in 2010. Finnish nationwide HeSSup and QoL studies.

	Least Squares Means ^a	F _{Ndf, Ddf}	p
<i>Sociodemographic variables</i>			
Marital status		F _{1,825} = 3.69	0.055
Relationship	10.66		
No relationship	9.00		
Place of residence		F _{2,1131} = 1.81	0.164
Countryside	11.05		
Local authority area	9.56		
Town	9.93		
Basic education		F _{2,1131} = 0.92	0.399
9 years	10.17		
More than 9 years	9.74		
Less than 9 years	10.62		
Professional education		F _{3,912} = 0.18	0.912
College	10.11		
No professional education	10.95		
University	10.19		
Vocational course or school/Apprenticeship contract	10.17		
Employment status		F _{3,867} = 0.61	0.606
Full-time/Part-time worker/student	10.27		
Housewife	8.25		
Retired	10.06		
Unemployed/Laid off	11.95		
<i>Health-related variables</i>			
BMI		F _{1,906} = 3.39	0.066
< 25 kg/m ²	10.78		
≥ 25 kg/m ²	9.71		
MET		F _{1,916} = 0.34	0.558

< 2 MET-hours/day	9.96		
≥ 2 MET-hours/day	10.34		
Smoking		$F_{1,865} = 1.13$	0.288
Yes	9.42		
No	10.33		

^a Cumulative logistic regression models