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Full length article

Associations between factors related to work and health and the experience of climacteric symptoms: A study among 52–56-year-old full-time working Finnish women before any treatment for the symptoms

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ABSTRACT

Objectives: To examine associations between factors related to work and health and the experience of climacteric symptoms among middle-aged full-time working Finnish women before receiving any treatment for the symptoms.

Methods: A cross-sectional study among Finnish women aged 52–56 years who were full-time employed and had never used any treatment for the studied symptoms ($n = 313$). The experience of symptoms was assessed as the occurrence and severity of menopause-related symptoms that have a negative impact on women's general wellbeing or wellbeing at work. These are hot flushes, sweats, sleeping problems, vaginal dryness and tenderness, loss of sexual desire, and depressive symptoms. The studied work- and health-related factors were the experience of the psychosocial work environment, health behaviors (body size, physical activity, and smoking habits), perceived stress and perceived social support.

Results: A high-strain job, smoking, increased levels of stress, and low levels of social support were associated with both the occurrence and severity of the studied symptoms. Women with these traits experienced symptoms more often and more severe than women without these traits.

Conclusions: Several factors may be in association with how a full-time working woman experience climacteric symptoms before receiving any treatment for them. Therefore, the health and wellbeing of middle-aged working women should be considered in all aspects including climacteric symptoms, both expressed and hidden, the work environment, health behaviors, perceived stress and perceived social support. Any healthcare professional should be aware of this. Furthermore, healthcare professionals and employers should work closely together to promote and improve women's health and wellbeing.

Introduction

Natural menopause is a physiological event in a woman's life that typically occurs between 45 and 55 years of age [1,2]. It is caused by hormonal changes, marks the cessation of the menstrual cycle and the end of the reproductive phase, and is often accompanied by symptoms known as menopausal or climacteric symptoms [2–5]. The most common symptoms, hot flushes and sweats, last an average of 2–7 years, but

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they may last for 15 years or longer [3,6,7]. Up to 80 % of women experience climacteric symptoms, and approximately 20 % experience severe ones [3–5]. In Finland, there are currently over 850,000 women who are 45–69 years old [8], at an age when women most typically experience climacteric symptoms. In many developed countries, a large number of women aged around 50 and older are employed outside the home [9]. In Finland, the female employment rate was approximately 78 % in 2023 [10]. Despite the high employment rate, full-time work was more common for women in Finland than it was in other Nordic countries, with approximately 77 % of women were working full-time. [11]. The retirement age in Finland varies from 63 to 70 years, depending on the year of birth [12].

Climacteric symptoms, especially severe climacteric symptoms, may have a negative impact on the quality of life in women, reducing their general wellbeing [13] and wellbeing at work [14,15]. Experiencing climacteric symptoms at work can be uncomfortable, embarrassing, and distressing for women, and might also impair their capacity, activity, and effectiveness at work [14–16]. Some women take sick leave because of climacteric symptoms, and some women would prefer not to tell their employer or manager a real reason for their absence [16]. Moreover, some women have left work because of the symptoms [16,17]. Climacteric symptoms are hidden, invisible and taboo in many workplaces [16,18]. Physical health factors, such as health behaviors, may affect how a woman experiences climacteric symptoms. For instance, health-related risk behaviors, such as overweight, physical inactivity, or smoking, seem to be associated with the experience of climacteric symptoms [3,19–21]. Furthermore, mental or social health factors, such as increased perceived stress or lower levels of social support, may be related to experiencing more severe climacteric symptoms [22,23].

The large proportion of women in the workforce, especially across developed countries, combined with the overall aging of the population and workforce, has led to an increasing interest in studying how women over 50 years cope with their work [17,24–26]. Labor shortages, especially across Europe [27], have made the topic even more important. The interest in studying associations between work and climacteric symptoms has also increased [28–31]. However, many of the studies have primarily focused on determining the impact of climacteric symptoms on the working life, rather than examining how women in different work environments experience climacteric symptoms. Moreover, many of the studies have been conducted in limited groups of participants, such as only nurses [28,30], or preschool [25], secondary [32] or university teachers [29]. Furthermore, it appears that this type of study would not have been conducted among women who only work full-time, and before the women received any treatment, whether hormonal or non-hormonal, for their symptoms.

The purpose of the present study was to learn more about how the work environment and health-related factors are associated with the experience of climacteric symptoms among full-time working women before any treatment for symptoms.

Methods

The study was conducted among 52–56-year-old Finnish women who worked full-time. The studied symptoms were those that frequently impair women's general wellbeing or wellbeing at work, including hot flushes, sweats, sleeping problems, vaginal dryness and tenderness, loss of sexual desire, and depressive symptoms. The study provides research-based information to healthcare professionals both in primary and secondary care settings to support and counsel middle-aged women to improve their general wellbeing and wellbeing at work. Employers and managers can also benefit from this study.

The Health and Social Support Study (HeSSup Study) is a randomized four-cohort follow-up study of the Finnish working-age population – male and female – that examines psychosocial aspects of health, such as stress and social support. It also collects data regarding several aspects of physical wellbeing. The HeSSup Study was launched in 1998 with the following age cohorts: 20–24 years (n = 16,190), 30–34 years (n = 16,250), 40–44 years (n = 16,277), and 50–54 years (n = 16,080). The HeSSup survey was repeated in 2003 and 2012. For the present study, the HeSSup Study provided data on socio-demographic characteristics, working hours, experience of psychosocial work environment, health behaviors, perceived stress, and perceived social support.

The Quality of Life among Middle-aged Women Study (QoL Study) is a sub-study of the HeSSup Study. The QoL Study focuses on women's wellbeing, with a particular focus on climacteric symptoms and their treatment. The QoL Study was launched in 2000 by inviting all women of the two oldest HeSSup Study cohorts (52–56 years old and 42–46 years old in 2000) who had responded to the HeSSup survey in 1998 to participate. For the present study, the QoL Study provided data regarding menopausal status and the experience of climacteric symptoms. Participants of the present study were selected from the younger cohort of the QoL Study, and all of them had responded to both the 2000 QoL survey and the 2010 QoL survey.

The research data were obtained from the year 2010 QoL survey (as the participants were 52–56 years old) as well as from the year 2012 HeSSup survey, depending on the information we needed. The inclusion and exclusion criteria were as follows: Only women who 1) were in a full-time work and 2) had not used any treatment for climacteric symptoms, were included in the analyses (n = 313). Whereas the remaining women, i.e., those who were 1) in a part-time work, pensioners, or for any other reason not in the working life, and 2) had used some treatment for climacteric symptoms, were excluded (n = 855).

The outcome variable was the experience of climacteric symptoms according to the situation the respondents had not received any treatment for symptoms. The experience was expressed in terms of the occurrence and severity of symptoms that frequently impair women's general wellbeing or wellbeing at work. This included hot flushes, sweats, sleeping problems, vaginal dryness and tenderness, loss of sexual desire, and depressive symptoms. As regards the occurrence of symptoms, the following individual symptoms were studied: hot flushes, sweats, sleeping problems, loss of sexual desire, and depressive symptoms. Regarding the severity of symptoms, a symptom score was formed of the following symptoms: hot flushes, sweats, sleeping problems, and vaginal dryness and tenderness. These symptoms not only impair a woman's wellbeing but are also related to the decline in estrogen production (sleeping problems associated with night sweats). We have used these two sets of symptoms (including forming a symptom score) previously when studying the experience of climacteric symptoms; hence, for the purposes of continuity, we used this method in the present study as well. The explanatory variables were the experience of the psychosocial work environment, the Body Mass Index (BMI), the Metabolic Equivalent of Task-Hours per Day (MET-h/d), smoking status, perceived stress, and perceived social support. Menopausal status, age and professional education were used as covariates.

The QoL Study questionnaire provided data on the experience of climacteric symptoms. The symptoms presented in the QoL Study questionnaire were derived from studies by Stadberg et al. [33] and Kupperman et al. [34]. Besides the symptoms included in the present study, the following symptoms were presented in the QoL Study questionnaire: recurrent urinary tract infections, urinary incontinence, nervousness, dizziness, palpitations, and dyspareunia. A Numerical Rating Scale (NRS) was used to evaluate the intensity of each symptom. The scale ranged from 1 to 10 with 1 representing no symptoms and 10 severe symptoms. Respondents were asked to report the intensity of each symptom before any treatment for them was given. The question was as follows: "How severe were any of the following potentially menopause-related symptoms before you received any treatment for them?". When examining the occurrence of climacteric symptoms, the original rating scale (1–10) was categorized into no (1), mild (2–4), moderate (5–7), and severe (8–10) symptoms. To examine the severity of climacteric symptoms, we calculated a combined symptom score that ranged from 2 to 40 and categorized it into no (2–4), mild (5–16),

moderate (17–28), and severe (29–40) symptoms. All women received identical questionnaires, regardless of whether they had or had not received treatment for the symptoms. The women who had not received any treatment were assumed to report symptoms according to their current situation. The measure in question has been used in other studies among untreated Finnish women [4,5,7]. The English language version of the questionnaire used to assess the experience of climacteric symptoms in the present study is available as a supplementary file (Supplementary 1).

The experience of the psychosocial work environment was assessed by the Job Demand-Control (JDC) questionnaire, first presented by Karasek and further developed and tested by Karasek and Theorell [35]. The Karasek and Theorell's JDC questionnaire focuses on two factors of the psychosocial work environment: 1) job demands, which are understood as the physical and mental load of the work, and 2) job control or decision latitude, which is defined as the combination between the workers' skill discretion and decision authority. The questionnaire included a total of 19 items on the psychological job demands, skill discretion, and task control. Participants gave their responses on a five-point Likert scale, from strongly agree to strongly disagree. The respondents were asked to respond according to their current situation. According to the JDC model, four categories were defined: 1) low-strain (i.e., a job low on demands and high on control), 2) active (i.e., a job high on demands and high on control), 3) passive (i.e., a job low on demands and low on control), and 4) high-strain (i.e., a job high on demands and low on control) job. The English language version of the questionnaire used to assess the experience of psychosocial work environment in the present study is available as a supplementary file (Supplementary 2).

Since overweight, physical inactivity, and smoking have been reported to be associated with the increase in the experience of climacteric symptoms [5,19,20], we used the following measures to represent health behaviors: BMI [36], MET-h/d [37], and smoking status. The BMI value was calculated from self-reported weight and height as kg/m^2. Participants were classified into two classes based on their BMI value: one with BMI < 25 (normal weight/underweight) and the other with BMI ≥ 25 (overweight/obesity). The MET-h/d value was determined from the self-reported estimates of the intensity of physical activity during leisure and commuting time. Participants were classified into two classes according to their MET-h/d value: one with < 2 (light physical activity) and the other with ≥ 2 (moderate/high physical activity). The smoking status was obtained directly from the survey responses. Participants were classified into two classes based on their survey responses: no (non-smokers and former smokers) and yes (current smokers).

To assess perceived stress, the Reeder Stress Inventory (RSI) [38], a widely used self-assessment measure for subjectively perceived psychological stress, was used. Participants were asked to rate their levels of tension or anxiety on a 5–point Likert scale, from completely disagree to completely agree. Given the purpose of the measure, the respondents were asked to indicate how well the statements described them in general. Participants were classified by the mean score of the four statements into two classes: 1) one with low (scores 4–13) and 2) the other with increased (scores 14–20) levels of stress. The English language version of the questionnaire used to assess perceived stress in the present study is available as a supplementary file (Supplementary 3).

For assessing perceived social support, one of the short-form versions of the original Social Support Questionnaire (SSQ) by Sarason et al. [39] was used (SSQ6). For each question, respondents indicated people available to provide support to them, based on the following options: spouse/partner, some other close one, close friend, close colleague, close neighbor, another close person, no one. The respondents were asked to respond according to their current situation. Four categories were formed: low (0–5 people providing social support), moderate (6–11 people providing social support), high (12–17 people providing social support), and highest (18 or more people providing social support) levels of social support. The English language version of the questionnaire used to assess perceived social support in the present study is available as a supplementary file (Supplementary 4).

The participants were divided into three categories based on their menopausal status. The classification was the following: 1) premenopausal, meaning that they still had natural and regular periods, 2) perimenopausal, meaning that their periods were irregular, 3) postmenopausal, meaning that their periods had ceased spontaneously more than 12 months previously, or after bilateral salpingo-oophorectomy with or without hysterectomy [1]. Those whose menopausal status was uncertain were classified as not classified. However, regardless of their menopausal status, all women from the year 2010 QoL survey in the cohort of 52–56 years old were included in the present study if they met the two inclusion criteria, since they were of menopausal age, given the average age of menopause being 51 years [2].

To examine potential sociodemographic differences between participants and excluded women, Pearson's χ^2 test was used. The associations between the psychosocial work environment, health behaviors, perceived stress, and perceived social support and the experience of climacteric symptoms were first examined in percentages. General linear models, covariate-adjusted for age, menopausal status and professional education, were used to further determine the associations. The statistical analyses were performed using SAS software (SAS 9.4, SAS Institute Inc., Cary, NC, USA, 2020).

Results

There were no statistically significant differences between the participants ($n = 313$) and excluded women ($n = 855$) in terms of couple relationship, place of residence, basic education and professional education (Table 1).

Of the participants ($n = 313$), 15 % were premenopausal, 14 % perimenopausal, and 51 % postmenopausal. In other respects, Table 2 shows the profile of the participants.

When examining the occurrence of hot flushes, sweats, sleeping problems, loss of sexual desire, and depressive symptoms by the explanatory variables, i.e., the experience of the psychosocial work environment, BMI, MET-h/day, smoking, perceived stress, and perceived social support, we found that severe hot flushes occurred most often among women who smoked (21 %), with a high-strain job (20 %), and increased levels of stress (20 %). Severe sweats occurred most often among women with increased levels of stress (27 %), a high-strain job (23 %), and who smoked (23 %). Severe sleeping problems occurred

Table 1
Sociodemographic characteristics of the study participants ($n = 313$) and excluded women ($n = 855$).

	Participants	Excluded women	
Characteristic	*n* (%)	*n* (%)	*P*[a]
Couple relationship			0.335
No	48 (16)	155 (18)	
Yes	250 (84)	678 (81)	
Place of residence (type of municipality)			0.895
Urban (with $\geq$ 15,000 inhab.)	194 (62)	517 (60)	
Semi-urban (with 4,000–14,999 inhab.)	56 (18)	160 (19)	
Rural (with $<$ 4,000 inhab.)	63 (20)	178 (21)	
Basic education			0.336
Less than 9 years	73 (23)	231 (27)	
9 years	100 (32)	242 (28)	
More than 9 years	140 (45)	381 (45)	
Professional education			0.435
No professional education	23 (7)	77 (9)	
Vocational course or school/ Apprenticeship contract	96 (31)	252 (30)	
College	131 (42)	378 (44)	
University	63 (20)	142 (17)	

[a] Pearson's χ^2 test.

Table 2
Profile of the study participant ($n = 313$).

Characteristic	*n* (%)
Menopausal status	
Premenopausal	57 (15)
Perimenopausal	53 (14)
Postmenopausal	199 (51)
Not classified	78 (20)
Age (years, in 2010)	
52	86 (22)
53	82 (21)
54	83 (21)
55	79 (21)
56	57 (15)
Experience of the psychosocial work environment	
Low-strain	78 (23)
Active	94 (28)
Passive	87 (26)
High-strain	79 (23)
BMI	
<25	149 (41)
≥25	213 (59)
MET-h/day	
<2	92 (25)
≥2	270 (75)
Smoking	
No	286 (83)
Yes	57 (17)
Perceived stress	
Low	333 (93)
Increased	25 (7)
Perceived social support	
Low	26 (7)
Moderate	217 (57)
High	97 (25)
Highest	44 (11)

most often among women with a low-strain job (32 %), and low levels of social support (29 %). Severe loss of sexual desire occurred most often among women with light physical activity (22 %), and low levels of social support (21 %). Severe depressive symptoms occurred most often among women with low levels of social support (21 %). (Fig. 1.).

Upon further examination, we found that hot flushes occurred more often among smokers than non-smokers ($P = 0.001$), and with a high-strain job than a low-strain job ($P = 0.022$). Sweats occurred more often among women who were overweight or obese than normal weight or underweight ($P = 0.006$), smokers than non-smokers ($P = 0.007$), and with a high-strain job than a low-strain ($P = 0.019$) or a passive job ($P = 0.043$). Sleeping problems occurred more often among women with a high-strain job than a passive job ($P = 0.049$), smokers than non-smokers ($P = 0.05$), with increased levels of stress than with low levels of stress ($P = 0.016$), and low levels of social support than with highest ($P = 0.006$) or high ($P = 0.033$) levels of social support. Depressive symptoms occurred more often among women with increased levels of stress than with low levels of stress ($P < 0.001$), with low levels of social support than moderate, high or highest levels of social support ($P < 0.001$ each), and with a high-strain job than a low-strain job ($P = 0.041$). (Table 3.) In terms of statistical significance, covariate adjustment did not change the results notably.

When examining the severity of climacteric symptoms expressed as the combined symptom score of hot flushes, sweats, sleeping problems, and vaginal dryness and tenderness by the explanatory variables, i.e., the experience of the psychosocial work environment, BMI, MET-h/day, smoking, perceived stress, and perceived social support, we found that the most severe symptoms were experienced by women with low levels of social support (18 %) and increased levels of stress (12 %) (Fig. 2).

Upon further examination, we found that women with a high-strain job compared with women with a low-strain job ($P = 0.012$), smokers compared with non-smokers ($P = 0.01$), and with increased levels of stress compared with low levels of stress ($P = 0.026$) experienced more severe symptoms (Table 4). In terms of statistical significance, covariate adjustment did not change the results notably.

Discussion

This study found that the experience of the psychosocial work environment and health-related factors, such as health behaviors, stress, and social support, were associated with the occurrence and severity of climacteric symptoms among full-time employed 52–56-year-old untreated Finnish women in many respects: Full-time working women with a high-strain job experienced climacteric symptoms more often and more severe before receiving treatment for their symptoms than women working in any other type of psychosocial work environment. Furthermore, smokers experienced climacteric symptoms more often and more severe compared with non-smokers. Also, women with increased levels of stress experienced climacteric symptoms more often and more severe compared with women with low levels of stress. Likewise, full-time working women with low levels of social support experienced climacteric symptoms more often and more severe before receiving treatment for their symptoms than women with higher levels of social support.

Many of the findings in this study are consistent with previously reported findings regarding association between factors related to work [29] and health [22,23,40] and the experience of climacteric symptoms, though conflicting evidence has also been presented in the literature [21,41]. However, the difference in the present study compared with previously published studies is that this study was conducted among women who were in a full-time work, and without any treatment for climacteric symptoms.

Despite the large proportion of women in the workforce, there are only a few studies about how the work environment and health-related factors are associated with the experience of climacteric symptoms among full-time employees. Furthermore, especially limited studies have been conducted among women of menopausal age before receiving any treatment for their climacteric symptoms. These observations encouraged us to examine this important topic further.

All women should be treated with respect and support, both in healthcare and at work. As women approach middle-age, healthcare professionals should provide support and counselling on what to expect and how to deal with it. Women may have different expectations, beliefs, and attitudes about menopause and climacteric symptoms; furthermore, their limited understanding of menopause and climacteric symptoms can contribute to delays in recognizing menopause and engaging in symptom management [42,43]. It would also be advisable to enhance awareness of the natural menopause in workplaces [18,26,44]. For example, the present Finnish government has taken a proactive approach to promoting women's health and wellbeing, as part of maintaining work ability and coping at work; it has stated that the identification of climacteric symptoms and good treatment in occupational healthcare will be promoted to strengthen wellbeing and to reduce diagnostic errors and the number of sick leaves [45].

Healthcare professionals can help middle-aged women to understand climacteric symptoms and what is happening in their lives as a woman, spouse, and employee. The findings of this study can be applied when providing health promotion and counselling for middle-aged women. Successful health promotion can significantly improve the wellbeing and quality of life of middle-aged women. The findings can be applied in several healthcare settings, including primary and occupational healthcare, as well as gynecological settings, both in public and private health services. Healthcare professionals must have the skills, knowledge, and attitude to help and to counsel middle-aged women in all situations, such as, a woman has hidden climacteric symptoms, hesitates to initiate MHT or does not wish to take it. This study can also provide novel insights for employers and managers. Furthermore, the results of this study might inspire us to examine the topic further. For example, it would be interesting to conduct a study that covers all the symptoms presented in the QoL Study questionnaire.

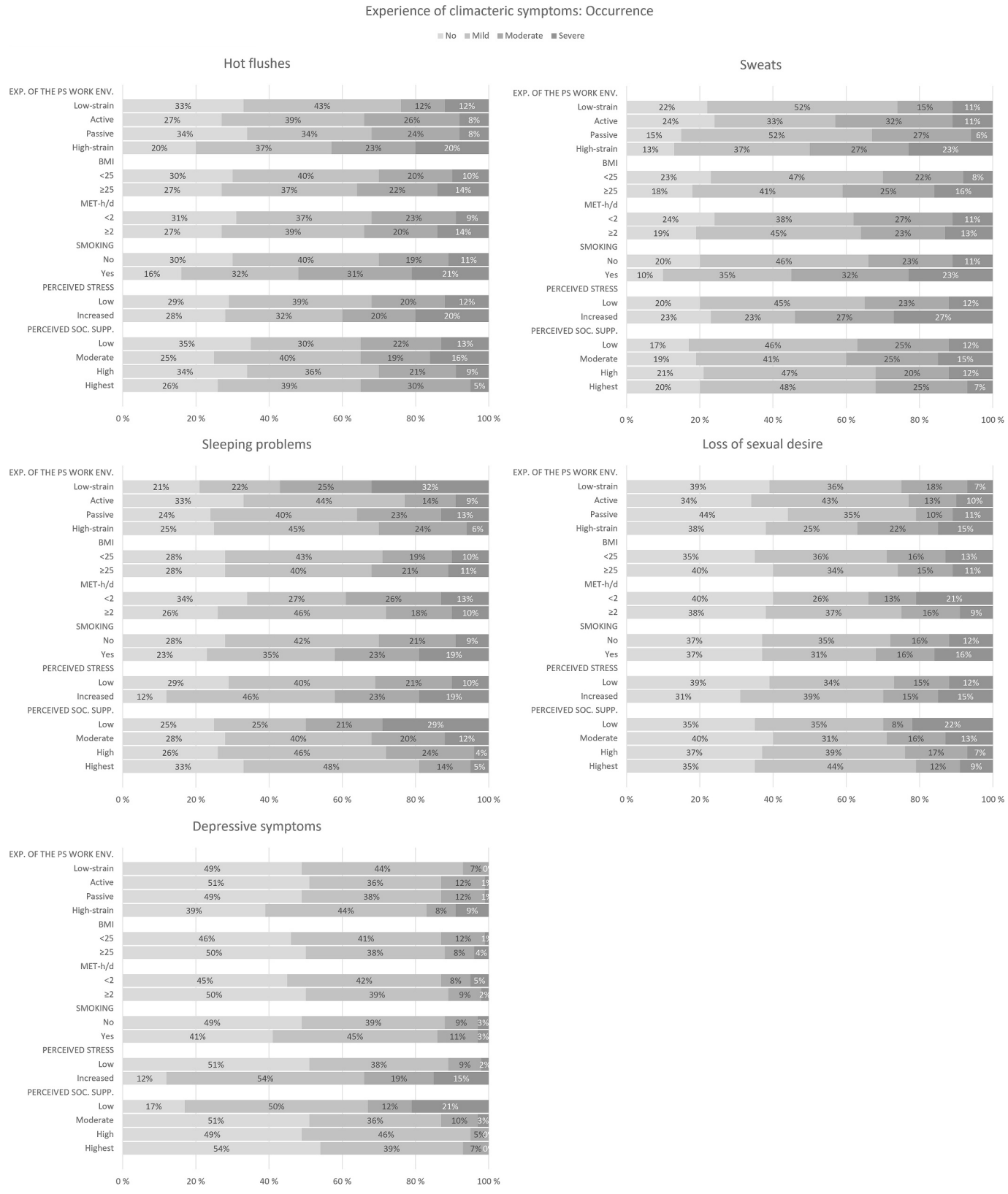

Fig. 1.

The strengths of the present study are a study design derived from a nationwide population-based study with a relatively high number of respondents, and the high-quality questionnaires: the HeSSup survey questionnaire comprehensively assessed physical, psychological, and social health and wellbeing and the QoL Study questionnaire covered various menopause-related symptoms. To mitigate any potential bias, the present study solely encompassed respondents who had returned their QoL Study questionnaires both in 2000 and 2010. Furthermore, we examined the differences between participants and excluded women.

The limitations of the study are a low response rate (48 %) at the

Table 3
Summary of several single predictor general linear models for the occurrence of the studied climacteric symptoms, i.e., hot flushes, sweats, sleeping problems, depressive symptoms, and loss of sexual desire. Only statistically significant predictors are included. Effect sizes are expressed as Cohen's *D* statistics.

Outcome variable	Explanatory variable	Differences of Least Squares Means				Cohen's *D*
		Estimate	SE	*t*	*P*	
Hot flushes						
	Experience of the psychosocial work environment[a]					
	Low-strain vs. High-strain	−1.140	0.428	−2.66	0.022	−0.43
	Passive vs. High-strain	−0.938	0.419	−2.24	0.067	−0.35
	Active vs. High-strain	−0.737	0.405	−1.82	0.169	−0.28
	Smoking					
	No vs. Yes	−1.230	0.381	3.23	0.001	−0.47
Sweats						
	Experience of the psychosocial work environment[a]					
	Low-strain vs. High-strain	−1.122	0.413	−2.72	0.019	−0.43
	Passive vs. High-strain	−0.974	0.403	−2.42	0.043	−0.40
	Active vs. High-strain	−0.647	0.388	−1.67	0.226	−0.25
	BMI					
	<25 vs. ≥ 25	−0.742	0.268	−2.77	0.006	−0.29
	Smoking					
	No vs. Yes	−0.999	0.367	2.72	0.007	−0.39
Sleeping problems						
	Experience of the psychosocial work environment[a]					
	Low-strain vs. High-strain	−0.555	0.409	−1.36	0.385	−0.22
	Passive vs. High-strain	−0.947	0.400	−2.36	0.049	−0.38
	Active vs. High-strain	−0.041	0.384	−0.11	0.999	−0.02
	Smoking					
	No vs. Yes	−0.716	0.363	1.97	0.050	−0.29
	Perceived stress					
	Low vs. Increased	−1.235	0.508	2.43	0.016	−0.50
	Perceived social support[a]					
	Moderate vs. Low	−0.968	0.534	−1.81	0.139	−0.36
	High vs. Low	−1.392	0.569	−2.45	0.033	−0.58
	Highest vs. Low	−1.935	0.634	−3.05	0.006	−0.77
Depressive symptoms						
	Experience of the psychosocial work environment[a]					
	Low-strain vs. High-strain	−0.743	0.305	−2.43	0.041	−0.38
	Passive vs. High-strain	−0.623	0.296	−2.10	0.092	−0.30
	Active vs. High-strain	−0.609	0.288	−2.11	0.090	−0.30
	Perceived stress					
	Low vs. Increased	−1.890	0.364	5.19	<0.001	−1.06
	Perceived social support[a]					
	Moderate vs. Low	−1.695	0.384	−4.42	<0.001	−0.84
	High vs. Low	−2.044	0.407	−5.02	<0.001	−1.18
	Highest vs. Low	−2.195	0.457	−4.81	<0.001	−1.10

[a] Dunnett adjustment conducted for multiple comparison.

beginning of the HeSSup Study [46], a cross-sectional and retrospective study design, a relatively small sample size, and potential inaccuracies or bias that might have arisen from self-reported data and the outcome measures. By including more covariates or confounding factors or decomposing explanatory variables more detailed, we could have improved the reliability of the study, but unfortunately, our dataset did not provide this information. It should also be considered that the study by default did not include women who discontinued working because of severe symptoms. Nevertheless, a comprehensive examination of the data obtained from the HeSSup Study in 1998 has determined that the disparities between the respondents and the corresponding Finnish population were comparatively insignificant in terms of health-related characteristics [46]. The sample size reflected the frequent use of menopausal hormone therapy (MHT) among Finnish women, as well as the small population of the country. There was a possibility that the respondents had overestimated or underestimated their responses, or reported some outcomes inaccurately, which might have reduced the quality of the self-reported data. The outcome measures we used were well known, widely used, and validated, except the climacteric symptom measure; regarding the climacteric symptom measure, however, we had used it in a few previous studies among untreated women. The recall period for climacteric symptoms measure might have been defined imprecisely. On the other hand, since the women in the study were assumed to report symptoms according to the current situation, the possibility for misunderstanding the recall period, and the risk of recall bias, were considered relatively low. Still, the possibility of misunderstandings and recall bias could not be completely excluded. This study was conducted among Finnish women aged 52–56 years old. It is known that, for example, there is a regional genetic variation in the age of menopause and the types of climacteric symptoms women experience. Moreover, cultural differences can affect how women experience climacteric symptoms or the work environment.

To conclude, women with a high-strain job, smoking, increased levels of stress, and low levels of social support were the ones who had the most frequent and severe climacteric symptoms. These findings suggest that healthcare professionals should adopt a holistic approach to the health and wellbeing of middle-aged women. Furthermore, healthcare professionals should work closely with employers to promote and improve women's health and wellbeing.

Ethical statement

Ethical approval for the Health and Social Support Study (HeSSup Study), which is the main study of our study, the Quality of Life among Middle-aged Women Study (QoL Study), was provided by the concurrent joint Ethical Committee of the University of Turku and the Turku University Central Hospital. The use of the data from the HeSSup Study in our study did not require separate ethics approval but was granted by

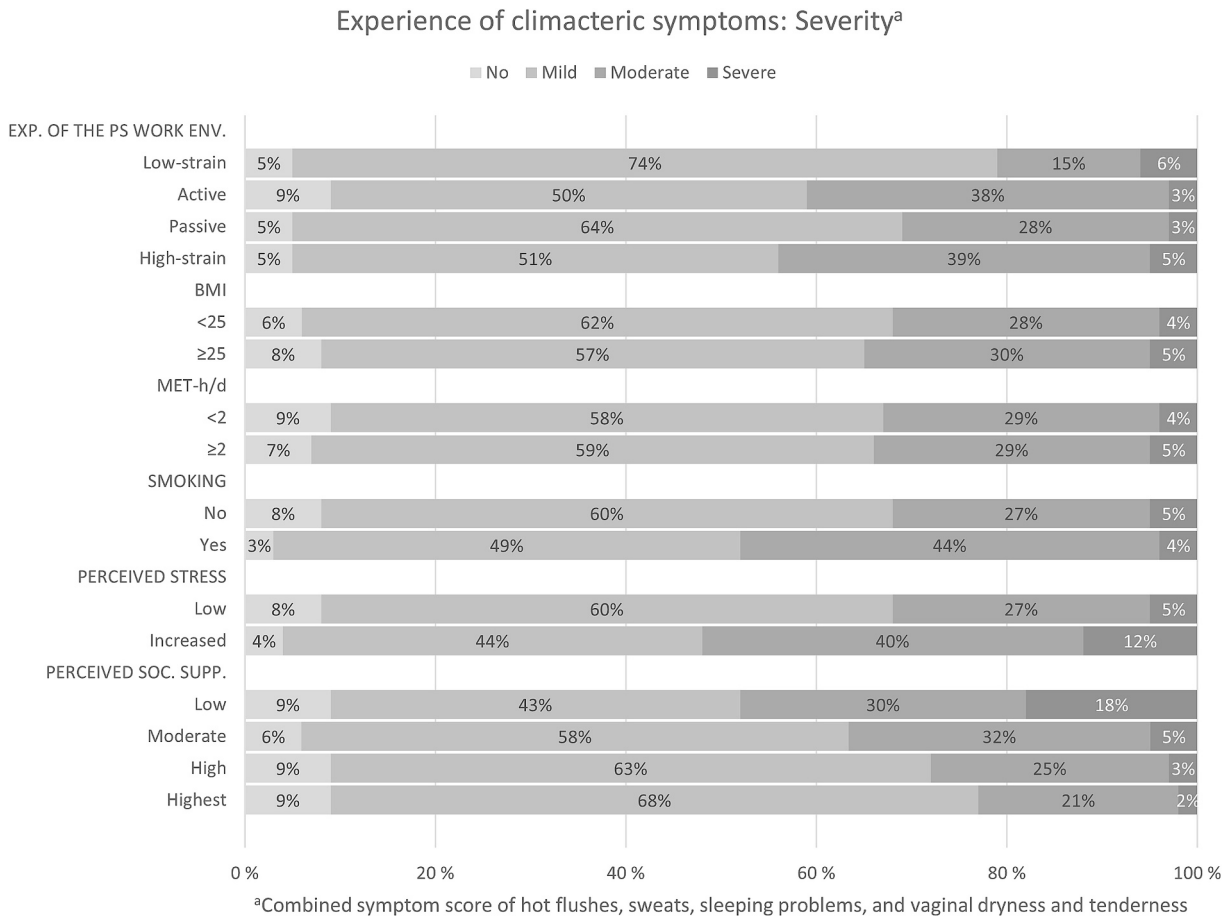

Fig. 2.

Table 4
Results of single predictor general linear model for the severity of climacteric symptoms expressed as the symptom score of hot flushes, sweats, vaginal dryness and tenderness, and sleeping problems. Effect sizes are expressed as Cohen's *D* statistics.

Explanatory variable	Differences of Least Squares Means				Cohen's
	Estimate	SE	*t*	*P*	*D*
Experience of the psychosocial work environment[a]					
Low-strain vs. High-strain	−3.562	1.243	−2.87	0.012	−0.46
Passive vs. High-strain	−2.815	1.218	−2.31	0.056	−0.36
Active vs. High-strain	−1.419	1.172	−1.21	0.476	−0.18
BMI					
<25 vs. ≥ 25	−0.773	0.821	−0.94	0.347	−0.10
MET-h/day					
<2 vs. ≥ 2	0.275	0.937	0.29	0.769	0.04
Smoking					
No vs. Yes	−2.893	1.113	2.60	0.010	−0.38
Perceived stress					
Low vs. Increased	−3.565	1.598	2.23	0.026	−0.46
Perceived social support[a]					
Moderate vs. Low	−1.445	1.696	−0.85	0.627	−0.18
High vs. Low	−3.174	1.797	−1.77	0.151	−0.41
Highest vs. Low	−3.192	1.991	−1.60	0.205	−0.39

[a] Dunnett adjustment conducted for multiple comparison.

the study group led by the Principal Investigator, Professor Markku Koskenvuo. The study was carried out according to the Declaration of Helsinki. A written consent was signed by participants to a prospective follow-up, including the registry data. Analyzed data were pseudonymized.

CRediT authorship contribution statement

Maija Lipasti: Writing – review & editing, Writing – original draft, Data curation, Conceptualization. **Jaana Jalava-Broman:** Writing – review & editing, Data curation, Conceptualization. **Lauri Sillanmäki:** Writing – review & editing, Formal analysis, Data curation, Conceptualization. **Juha Mäkinen:** Writing – review & editing, Supervision, Data curation, Conceptualization. **Päivi Rautava:** Writing – review & editing, Supervision, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ejogrb.2025.114031.

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