Psychological behavior patterns and coping with menopausal symptoms among users and non-users of hormone replacement therapy in Finnish cohorts of women aged 52–56 years

Jaana Jalava-Broman[a,*], Niina Junttila[b], Lauri Sillanmäki[a,c,d], Juha Mäkinen[e], Päivi Rautava[a,c]

[a] Department of Public Health, University of Turku, Turku, Finland
[b] Department of Teacher Education, Centre for Education and Research on Social Health Services, University of Turku, Turku, Finland
[c] Turku Clinical Research Centre, Turku University Hospital, Finland
[d] Department of Public Health, University of Helsinki, Helsinki, Finland
[e] Department of Obstetrics and Gynecology, University of Turku, Turku University Hospital, Turku, Finland

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ABSTRACT

Objective: To identify subgroups of women who differ with respect to self-evaluated stress, hostility, optimism and sense of coherence, and to identify differences, if any, in whether these subgroups use or do not use hormone replacement therapy (HT).

Study design and methods: This time-trend study is based on the Finnish national HeSSup study, in which nationwide cohorts of Finnish women aged 52–56 years randomly selected in 2000 (n = 1321) and in 2010 (n = 1389) responded to postal questionnaires related to four psychological behavior patterns.

Main outcome measures: Relationships between psychological behavior patterns (stress, hostility, optimism and sense of coherence) and how menopausal symptoms are experienced and how this relates to the use of HT.

Results: The proportion of HT users was higher among those with more stress and hostility and less optimism and sense of coherence than among those low in stress and hostility and high in optimism and sense of coherence.

Conclusions: Differences in psychological behavior patterns influence the perception of menopausal symptoms and the use of HT. When the treatment of women at menopause is planned, psychological behavior patterns should be considered, as these reflect the ability to cope with menopausal symptoms.

1. Introduction

Menopausal women often have vasomotor and psychological symptoms that impair significantly their quality of life [1,2]. It is well known that the hormonal and biological changes associated with menopause cause hot flushes, night sweats and urogenital symptoms [3]. On the other hand, consensus is lacking on the extent to which other symptoms, like mood changes, sleep problems, sexual complaints and problems with concentration and memory, are linked to the menopause. Interindividual differences in reporting menopausal symptoms may also depend on personality traits, i.e., how menopausal symptoms are perceived, interpreted and coped with [4].

The main aim of the present study was to describe the profiles of subgroups of women aged 52–56 years which would differ with regard to self-evaluated stress, hostility, optimism and sense of coherence. We also investigated how women in this age group would fit into these profiles by use or non-use of hormone replacement therapy (HT),

sociodemographic variables and health behavior.

2. Data and methods

2.1. Population and questionnaires

The data were derived from the Health and Social Support (HeSSup) study which started in 1998. The HeSSup study is a longitudinal, prospective follow-up study of the Finnish working-aged population. The HeSSup study based on questionnaires sent to four age groups of the Finnish population: 20–24, 30–34, 40–44 and 50–54 years starting in 1998 [5]. After one reminder the initial response rate in 1998 was 40 %. In 2012, the HeSSup-questionnaire was sent only to those who had answered in 1998.

Another questionnaire entitled the Quality of Life Among Middle-Aged Women Study (The QoL Study) was sent in 2000 and 2010 to the women who had answered the HeSSup questionnaire in 1998. In the
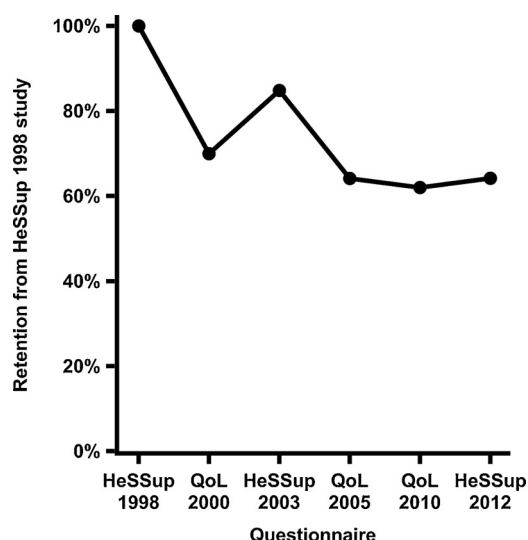
Fig. 1. Retention from HeSSup 1998 study and its sub study QoL.from 1998 to 2012.

current time-trend study we have focused on women born 1944–1948 and 1954–1958 and were 52–56 years at the time of the study.

(Fig. 1).

In 1998, the respondents to the HeSSup questionnaire with a high education replied more often to the questionnaire than other education groups. The ones who responded only after a reminder smoked and used more psychopharmaceutic drugs than the ones who responded without a reminder. This implies that late respondents and non-respondents had similar features. On the other hand, smokers consented more often than non-smokers to participating in the study [5]. Basic education, professional education, use of psychopharmaceutic drugs and employment status were examined in the drop-out analysis of the QoL Study in 2000 [6]. Here, the women with high level of basic and professional education responded more often than the rest.

2.2. Psychological variables

2.2.1. Stress

The Reeder Stress Inventory, a four-item questionnaire with a five-point Likert format [7] was used to measure the general perception of stressfulness in daily life. The questionnaire consisted of four statements: (1) "I am, in general, usually tense and nervous.";(2)" There is great amount of nervous strain connected with my daily activities."; (3) "At the end of the day, I am mentally and physically completely exhausted." ; and (4) "My daily activities are extremely trying and stressful." Each statement could get a score from 1 to 5 and thus the total score varied from 4 to 20, where a low score implies disagreement with the statement and a high score agreement. Thus, a high score indicated a high degree of stressfulness.

2.2.2. Hostility

Hostility was measured with three questions: "Do you get angry easily?" (score 1–7/easily-not easily); "How easily do you become irritated?" (score 1–7/easily-not easily); and "How often do you quarrel?" (score 1–7/very often-very seldom or never). Thus, the total hostility score varied from 3 to 21, a high score indicating a low degree of hostility [8].

2.2.3. Optimism

Optimism was measured with a 6-item version of the Life Orientation Test – Revised. Each item was scored from 1 to 5. Thus, the total score varied from 6 to 30, a high score indicating a high degree of optimism [9].

2.2.4. Sense of coherence (SOC)

The Sense of coherence (SOC) was measured using Antonovsky's 13-item scale [10]. This questionnaire covers three components of SOC: comprehensibility, manageability and meaningfulness. Each item was scored from 1 to 7 and thus the total score varied from 13 to 91, where lower scores represented a weaker SOC.

2.3. Explanatory factors

2.3.1. Sociodemographic factors

We included the following sociodemographic variables in the analysis: living alone or with a partner, number of children (none/one or more), educational status (none/vocational vs. college/university) and working status (unemployed/laid off /retired /housewife vs full-time/part-time worker/student).

2.3.2. Health behavior

Physical activity was assessed by asking how the respondent moved during her leisure time or way to work and how intense the activity was. Physical activity was measured with the Metabolic Equivalent Task (MET) index and the respondents were classified as sedentary when the day-MET was < 2 and as active when the day-MET was ≥ 2 [11]. Alcohol consumption was divided into two classes: reported weekly consumption of alcohol < 22 g or ≥ 22 g. Smoking status was classified as current smoker or never/previous smoker.

The body mass index (BMI) was divided into two categories: BMI < 25 g/m^2 and BMI ≥ 25 kg/m^2.

The self-rated health status was assessed by asking the question: "How is your health: good, rather good, moderate, rather bad or bad?" The answers were divided into two categories: 1) good or rather good and 2) moderate, rather bad or bad.

Information on the use of HT was received from the prescription registers in Finland (managed by the Social Insurance Institution of Finland). The drugs were classified by the ACT-system (Anatomical Therapeutic Chemical Classification). The sales figures for HT preparations were retrieved for estrogens (ATC G03C), progestogens (ATC G03D) and estrogens and progestogens in combination (ATC G03 F). The use of HT at the time of the survey by the individual participants in 2000 and 2010 was divided into two categories: yes and no.

2.3.3. Physiological and mental symptoms

A sum score was formed from four vasomotor symptom scores known to be related to estrogen deficiency: sweating, hot flushes, vaginal dryness and tenderness. Sleeping problems were also considered. The method used to evaluate climacteric symptoms was modified by Stadberg et al. and Kupperman et al. [12,13]. The intensity of vasomotor symptoms was recorded before any treatment. The sum score of these symptoms varied from 2 to 40; the higher the score, the more pronounced were the symptoms. All respondents who had answered at least two out of four questions were included in the statistical analysis.

Depressive symptoms were measured with the Beck Depression Inventory (BDI) score [14]. Depression was recorded as being present if the BDI was ≥ 18 (score 0–63).

2.4. Procedure and statistical analyses

A latent profile analysis (LPA) was used to identify women with similar patterns of stress, hostility, optimism and sense of coherence. The LPA is a model-based variant of traditional cluster analysis, and its purpose is to identify unobserved subpopulations (latent classes) within the data [15–17]. To compare the latent classes identified, we used the Akaike information criterion (AIC) and the Bayesian information criterion (BIC). The AIC and BIC estimates guide to choosing between competing statistical models: the smaller the value, the more parsimonious the model [18]. We also used the entropy value (which varies between 0 and 1), since a value close to 1 indicates a clearer

Table 1

Means, standard deviations and significances of differences between means by age group and between HT-non-users and HT-users. All effect sizes are small in magnitude.

	Born 1940–1944 (n = 1601)		Born 1950–1954 (n = 1794)		Difference between age groups		Systemic HT non-users (n = 2111)		Systemic HT users (n = 1284)		Difference between non-users and users	
	Mean	SD	Mean	SD	p	Cohen's d	Mean	SD	Mean	SD	p	Cohen's d
Stress	9.23	3.11	8.88	3.05	.003	.114	8.81	3.06	9.42	3.15	.001	−.196
Hostility	8.36	3.89	8.09	3.74	.065		8.02	3.71	8.52	3.95	.001	−.130
Optimism	22.78	3.72	22.75	4.17	.848		22.79	3.98	22.74	3.93	.750	
Sense of coherence	66.39	11.31	68.24	11.15	.001	−.165	67.82	11.23	66.58	11.28	.005	.110

Abbreviations: HT = Hormone therapy; SD = Standard deviation.

classification and the probability estimates of cases belonging to each class [16,17].

The data was run in the Mplus software, version 7 [19]. Once we had established the latent profiles, we tested whether other variables were evenly distributed within them by using the auxiliary options (DCAT and DCON) of the Mplus.

2.5. Data confidentiality and ethics

The study was performed according to the principles of the revised declaration of Helsinki, and approved by the Ethics Committee of the Hospital District of Southwest Finland.

3. Results

Table 1 presents the descriptive statistics and group differences for the psychological variables (stress, hostility, optimism and sense of coherence) between age groups (women born in the 1940's and in the 1950's) and between HT-users and non-users. Women aged 52–56 years born in the 1940's reported more stress and a lower sense of coherence than women at the same age born 10 years later. The differences were statistically significant (p < .010), yet small in magnitude (d < .20). HT-users reported more stress and hostility and a lower SOC than non-users. These differences were statistically significant (p < .010), albeit small in magnitude (d < .20). Of the women aged 52–56 years, 61.5 % used HT in 2000 and 38. 5% in 2010.

3.1. Latent profile analysis of self-evaluated stress, hostility, optimism and sense of coherence

The latent profiles were tested by using standardized total scores of stress, hostility, optimism and SOC. The resulted log likelihood, AIC, BIC, and entropy estimates and the class propositions and average latent class posterior probabilities for the consecutive number of classes (1, 2, 3, 4) are presented in Table 2. In order to choose the smallest possible number of classes, we used the criterion to be guided with 1) the fit of the model (based on log likelihood, AIC and BIC), 2) distinguishability of the latent classes (based on entropy and average latent class posterior probabilities), 3) latent class sizes (class propositions) and 4) the theoretical justification and interpretability of the latent classes [15].

The largest change in AIC and BIC occurred between the solutions of

classes 1 and 2. However, the changes in AIC, BIC and entropy were still notably higher between the solutions of classes 2 and 3 than 3 and 4. Based on the average latent class posterior probabilities the class 3 solution was still acceptable (all above .850). Based on these fit estimates, the statistically significant differences (p < .001) in all four study variables (stress, hostility, optimism, sense of coherence) between each class as well as the theoretical justification (having high, average and low instead of only high and low classes), we chose the class 3 solution. These classes were labelled according to their profiles as 1) high in stress and hostility, low in optimism and sense of coherence (23.8 %), 2) moderate in stress, hostility, optimism and SOC (52.2 %) and 3) low in stress and hostility, high in optimism and sense of coherence (24.0 %). The profiles are presented in Fig. 2.

3.2. Differences in the use of HT and menopausal symptoms among the psychological profile classes

Our main aim was to study if the use and non-use of HT is equally divided in the three psychosocial profile classes. The percentage distributions of HT users and non-users between the psychological profile classes are presented in Table 3. The distributions were statistically significantly different (p = 0.008) between class 1 (high stress and hostility, low optimism and sense of coherence) and class 3 (low stress and hostility, high optimism and sense of coherence): the proportion of women using HT was significantly higher in class 1 than in class 3. In line with this finding, vasomotor symptoms were more prevalent in class 1 (mean = 20.040, SD = 0.359) than in class 2 (mean = 17.360, SD = 0.240) or class 3 (mean = 15.306, SD = 0.337). The differences were statistically significant (p < .001) between all three classes.

3.3. Other differences between psychological profile classes

The percentage distributions and differences between the classes are presented in Table 4. All distributions, except BMI, were statistically significantly different between class 1 and 3 at a p-level < .05: women in class 1 were less often in a relationship (72 % vs. 78 %), lacked a professional education (50 % vs. 35 %), had no children (16 % vs. 9 %), were unemployed (34 % vs. 16 %), used more alcohol (59 % vs. 52 %), smoked more regularly (17 % vs. 12 %), were less physically active (35 % vs. 19 %), had lower self-estimated health (60 % vs. 13 %) and had more often moderate or severe symptoms of depressiveness (33 % vs. 0 %) than women in class 3. Other statistically significant differences

Table 2

Model fit estimates, distinguishability estimates, and class proportions for the series of LPAs.

	AIC (diff.)	BIC (diff.)	Entropy	Class proportions	Average latent class posterior probabilities
1 class	30 591	30 638	1.000	1.000	1.000
2 classes	27 940 (-2 651)	28 040 (-2 597)	.735	.396 / .604	.919 / .926
3 classes	2 7154 (-786)	27 307 (-733)	.723	.225 / .537 / .237	.894 / .867 / .862
4 classes	2 6888 (-266)	27 094 (-213)	.706	.439 / .254 / .120 / .196	.835 / .776 / .808 / .883

AIC = Akaike information criterion.
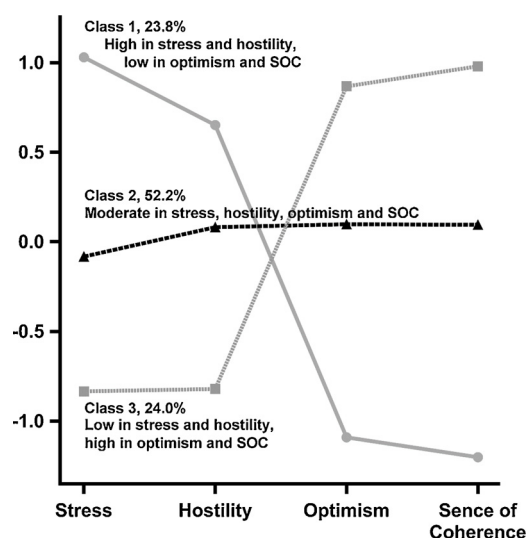BIC = Bayesian information criterion.

Fig. 2. Standardized mean values (y-axis) of LPA classes consisted of stress, hostility, optimism and sense of coherence (x-axis).

were also identified, as shown in Table 4.

4. Discussion

This study of two cohorts of Finnish women aged 52–56 years in 2000 and in 2010 focused on certain psychological behavior patterns and on the use/non-use of HT at the time of the surveys. We divided these women into three different groups by psychological behavior patterns. Our results indicate that the prevalence of HT use was greater among women aged 52–56 years who had been born in 1940–1944, they were more stressed and had a poorer sense of coherence than women of the same age one decade later. The HT-users reported more stress and hostility and a poorer sense of coherence than did non-users. The menopausal symptoms were also more prevalent in the group of women exhibiting more hostility and stress and less optimism and a poorer sense of coherence. Our results imply that these women may have experienced menopause differently and were more likely to be using HT at the time of the survey than their counterparts who did not exhibit these psychological behavior patterns.

We must also consider in this study that women born in Europe during or just after the Second World War are a very different cohort than the cohort of women born 10 years later. There are studies which show that adverse childhood experiences associate with a myriad of adverse health outcomes, including vasomotor symptoms. Childhood abuse is associated with increased vasomotor symptom reporting in adulthood [20,21]. The sense of coherence may not have had the opportunity to develop robustly for women born in the years 1944–1948, since that generation lived in the aftermath of a great war, in contrast to women born ten years later, from 1954 to 1958.

There has been a long-standing interest in examining which factors explain the differences in menopausal symptoms experienced by

menopausal women. Caltabiano and Holzheimer found that optimism, health-related hardiness and sense of coherence influenced symptom experiences of perimenopausal and postmenopausal women and how women adapt to midlife transition [22].

The role of psychological behavior patterns on menopausal symptomology and on the use of HT has been studied with respect to type-A personality, coping, resilience and stress, i.e., behavior patterns that are indirectly connected to the psychological behavior patterns examined in the present study.

Lemonge and coworkers examined a cohort of French menopausal women and showed that the type A personality is an independent predictor of HT use in the menopause [23]. There was no association between HT use and hostility. We made the same observation about hostility in a previous study [24]. As shown in Table 1, HT-users were significantly more hostile than non-users especially when hostility is one part of the psychological profile.

Bosworth and coworkers reported that the stress response to the transition in life caused by the menopause is multifactorial and depends on the woman's personality and coping styles. [25]. In our study, the latent profile analyses (LPA) implied that stress may indeed be a factor favoring the use of HT (Table 1). Class 1 psychological behavior patterns (high hostility and stress, low optimism and sense of coherence) suit this hypothesis quite well.

Igarashi and coworkers found that worsening of climacteric symptoms caused by stress are aggravated by the person's vulnerability to stress [26], while Bariola et al. showed that work-related stressors are significantly associated with the degree of menopausal symptoms. Symptoms were milder among women who received much supervisor support and who were employed full-time [27]. In conformity with this observation, Hamman et al. reported that interpersonal problems at the workplace aggravates menopausal symptoms [28]. There may also be differences in stress-coping mechanisms and personality when women with and without vasomotor symptoms are compared. Stress-coping in women with moderate to severe vasomotor symptoms is unaffected by estrogens [29]. Vasomotor symptoms are effectively treated with estrogens, but stress-coping may be associated with the sense of coherence as it develops during childhood. This basic human quality cannot be modulated with estrogen use.

Thus, women with a strong SOC are able to manage stressful situations, like climacteric symptoms, more efficiently without HT than women with a weak SOC. We also found that women with more stress and a lower SOC perceive climacteric symptoms as being more severe than women with a high SOC and may start taking HT partly because of that.

A study on the relationships between SOC and stressful events, coping strategies, health status and quality of life in women with breast cancer showed that women with a strong SOC reported fewer stressful events and more days without stressful events than women with a weak SOC [30]. Further, a recent study shows that a high degree of resilience is associated with fewer menopausal symptoms than a low degree of resilience [31]. Maybe high resilience is implicitly related to a strong SOC and to positive coping strategies. Sood et al. have recently shown that higher mindfulness and lower stress among midlife women are associated with milder menopausal symptoms [32]. Perhaps the

Table 3

Percentual distributions of HT users and non-users between psychological profile classes.

| | Class 1[a] | Class 2[b] | Class 3[c] | Comparison between classes | | | | | | | | Overall | |
| | | | | 1 vs. 2 | | 2 vs. 3 | | 1 vs. 3 | | | | | |
				χ^2(df = 1)	p	χ^2(df = 1)	p	χ^2(df = 1)	p			χ^2(df = 2)	p
Use of HT				2.25	.134	1.64	.200	7.08	.008			7.09	.029
Non-users	57 %	61 %	65 %										
Users	43 %	39 %	35 %										

Table 4

Percentual distributions of background variables between psychological profile classes. Statistically significant differences are highlighted in boldface and italics.

| | Class 1[a] | Class 2[b] | Class 3[c] | Comparison between classes | | | | | | Overall | |
| | | | | 1 vs. 2 | | 2 vs. 3 | | 1 vs. 3 | | | |
				χ^2(df = 1)	p	χ^2(df = 1)	p	χ^2(df = 1)	p	χ^2(df = 2)	p
Relationship status				6.22	*.013*	.02	.90	5.05	*.025*	7.32	*.026*
Not in relationship	28 %	22 %	22 %								
In relationship	72 %	78 %	78 %								
Professional education				4.88	*.027*	7.82	*.005*	23.60	*< .001*	23.75	*.001*
No professional education	50 %	43 %	35 %								
College/University	50 %	57 %	65 %								
Number of children				3.50	*.061*	2.81	.093	11.34	*.001*	11.35	*.003*
No children	16 %	12 %	9 %								
One child or more	84 %	88 %	91 %								
Working status				15.29	*0.001*	6.30	*.012*	38.22	*< .001*	38.33	*.001*
Full time/Part time/Studying	66 %	77 %	84 %								
Unemployed/Laid off person/Housewife	34 %	23 %	16 %								
Alcohol use				.02	.877	6.05	*.014*	5.00	*.026*	7.48	*.024*
Never/Mild	41 %	40 %	48 %								
Moderate/Heavy	59 %	60 %	52 %								
Smoking				1.82	.177	.71	.40	3.98	*.046*	4.08	.130
No/Previous	83 %	86 %	88 %								
Regular smoking	17 %	14 %	12 %								
Physical activity				18.33	*.001*	2.62	.105	31.18	*< .001*	32.30	*.001*
MET < 2	35 %	23 %	19 %								
MET > 2	65 %	77 %	81 %								
BMI				.10	.747	2.99	.084	3.63	.057	4.25	.119
Underweight/Normal	45 %	46 %	51 %								
Overweight/Obese	55 %	54 %	49 %								
Self-estimated health				131.03	*.001*	27.13	*< .001*	240.12	*< .001*	249.60	*.001*
Good	40 %	73 %	87 %								
Bad	60 %	27 %	13 %								
Depressiveness (BDI)				33.70	*.001*	32.75	*< .001*	1.91	.167	36.61	*.001*
None/Mild	67 %	100 %	100 %								
Moderate/Severe	33 %	0 %	0 %								

[a] High in stress and hostility, low optimism and sense of coherence.

[b] Moderate in stress, hostility, optimism and sense of coherence.

[c] Low in stress and hostility, high in optimism and sense of coherence.

psychological factors (stress, hostility and lower SOC) were driving treatment-seeking behavior in our study. We have previously shown [24] that a low SOC predicts HT use, which is in line with previous reports and the findings of the present study (Table 1).

In the present study we found that women low in stress and hostility and high in optimism and SOC (class 3) seem to have healthier life styles, are more often in a relationship, employed and more educated than women high in stress and hostility and low in optimism and sense of coherence (Table 4). The prevalence of HT use among women aged 52–56 years in 2010 was lower than among women of the same age in 2000. This finding is in line with the results of a former study from Finland reporting decline in the use of systemic HT between 2003–2013 [33]. A major factor influencing HT prescribing practices and use between 2000 and 2010 was most likely the publication of the Women´s Health Initiative (WHI) trial results in 2002. WHI findings resulted in a decline in HT use worldwide [34].

A strength of the present study is that it is based on a large population-based sample of women aged 52–56 years studied in 2000 and in 2010. The response rates in the QoL-studies in 2000 (1986/ 2702 = 73.5 %) and 2010 (1988/2740 = 72.6 %) were high. The LPA method accommodates the simultaneous examination of several intermediate factors which may be directly or indirectly related to the result. Thus, the use of HT is examined in a multifaceted fashion and the personal behavior patterns associated with the user may be analyzed in detail. Considering the use of HT, the present study is apparently the first one to survey psychological variables associated with HT use by this method.

A limitation of the HeSSup study is that it had a rather low baseline questionnaire response rate in 1998, although the population sample

was shown to be representative of the target population [5]. HT use was assessed during one year in 2000 and 2010, not longitudinally, which also must be considered as a limitation in our study.

To date, it is not clear what makes some women more vulnerable to intense climacteric symptoms, others not. There is still a need for a better understanding of the differences menopausal women exhibit in perceiving and reporting symptoms. This is important also from the therapeutic point of view, since there is an obvious need to improve the management of women with menopausal symptoms. The better we understand the factors influencing menopausal symptoms, the better we can help to individualize treatment.

5. Conclusions

Psychological behavior patterns are one moderator affecting how women experience menopausal symptoms and cope with them. Women with low hostility, low stress and high optimism and a strong sense of coherence tend to manage with their menopausal symptoms without HT.

Contributors

Jaana Jalava-Broman was involved in the conception and design of the research, and data collection.

Niina Junttila was involved in the conception and design of the research and statistical analysis.

Lauri Sillanmäki was involved in the conception and design of the research, data collection, and statistical analysis.

Juha Mäkinen was involved in the conception and design of the

research, and data collection.

Päivi Rautava was involved in the conception and design of the research, and data collection.

All authors were involved in drafting and critically revising the manuscript for its intellectual content, and saw and approved the final version.

Conflict of interest

The authors declare that they have no conflict of interest.

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Ethical approval

The study was performed according to the principles of the revised declaration of Helsinki, and approved by the Ethics Committee of the Hospital District of Southwest Finland.

Research data (data sharing and collaboration)

There are no linked research data sets for this paper. Adhering to the EU General Data Protection Regulation (GDPR) and Finnish legislation concerning sensitive data such as health-related information, the authors are not authorized to share the data..

Provenance and peer review

This article has undergone peer review.

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