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Menopausal syndrome limited to hot flushes and sweating a representative survey study

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ABSTRACT

Objective: The menopausal syndrome is described as a series of various physical and nonphysical symptoms attributed to perimenopausal changes in hormone levels. However, evidence is biased by focusing research on the target group of middle aged women only. To overcome this bias, we examined the occurrence of menopausal symptoms during the entire life span in both women and men.

Methods: Therefore, we studied the occurrence of menopausal symptoms with the widely used Menopause Rating Scale (MRS) across the entire life span in both women and men. To this end, we performed a nationwide cross-sectional survey study in Germany in which we examined a representative sample of 2527 persons aged from 14 to 95 years. Additionally, sociodemographic factors and self-efficacy were surveyed.

Results: Although the overall MRS score was generally higher for women compared to men, there was no specific peak for the time of menopause. Instead the score increased linearly with age for both sexes. Furthermore, it was stronger associated with sociodemographic variables and self-efficacy than with the sex of the participants. Among all assessed symptoms, only hot flushes and sweating, but none of the others, emerged as specific for the menopausal episode.

Conclusions: Our data indicate that among symptoms commonly classified as menopausal only hot flushes and sweating appear to be specific for the perimenopausal episode. Other symptoms may be caused by a multifactorial etiopathogenesis including physical, sociodemographic, cultural and psychological factors that, in turn, might benefit from multimodal treatment regimes.

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Climacteric; menopause; sociodemographic; hot flushes; women

Introduction

The perimenopausal episode or transition refers to the episode of hormonal change in women around the last occurrence of menstruation. Besides closely hormonal regulated changes such as bleeding disturbances and breast tenderness, this phase is commonly associated with occurrence of a variety of heterogeneous physical and psychological symptoms. These symptoms include autonomic cutaneous disturbances (e.g. hot flushes, sleep, sweating), urogenital symptoms (e.g. dysuria, vaginal dryness), cognitive symptoms (e.g. obliviousness, anxiety, irritability, concentration problems), and behavioral symptoms (e.g. decreased sexual appetite) and are commonly subsumed under the diagnosis menopausal or climacteric syndrome [1–6]. It is however critically discussed whether there is a clear syndrome complex. Research consequently

concentrates more on different symptom clusters occurring in the perimenopausal episode [7,8].

In the 1980s and 1990s, etiological conceptions focused on hormonal mechanisms. Consequently, prescription rates of hormonal substitution therapy increased during those years. However, after adverse effects including breast cancer had been detected and initially hypothesized beneficial effects of hormonal substitution on prevention of cardiovascular disease had not been confirmed, the indication for hormonal substitution has become more restrictive. Ever since, only severe hot flushes and vaginal dryness constitute widely accepted indications for hormonal substitution [3,9–11].

A systematic review of 16 cross-sectional and longitudinal studies in premenopausal and perimenopausal women aged 40–60 years linked sleep, sweating, hot flushes and vaginal dryness to the

menopausal period [2]. Results of further studies on the etiology of menopausal symptoms suggested sociodemographic [12,13], personality related [14,15] and cultural [13,16,17] factors as relevant contributors to perceived severity of menopausal symptoms. However, these studies exclusively investigated the occurrence of symptoms during the menopausal period of life (between 40 and 65 years) [4,18], thus leaving open the question whether detected symptoms might be specific for this age span. In addition, differences in design, measures and adjustment for confounders among these studies have made it difficult to aggregate findings [19]. It has been concluded that the hormonal transition is one among many factors affecting mental health of mid-age women, in addition to changes in family roles, increasing caregiving demands for ill partners or aging parents and incipient health problems [19].

Similarly to the menopause some men show in their second half of life several physical and psychological symptoms influenced by life style factors such as obesity and consumption of alcohol or nicotine as well as sociodemographic and personality related aspects [20]. Hence, studies on the link between testosterone levels and these symptoms inconclusive suggest a multifactorial etiology [21–23].

Taken together, the aforementioned studies indicate heterogeneity in etiology and clinical presentation of menopausal symptoms and do not provide evidence on the assumption that menopausal symptoms as a whole are age specific or even limited to women.

In this study, we sought to assess whether menopausal symptoms are specific for the perimenopausal episode, whether menopausal symptoms are specific for women and if there are potential sociodemographic and psychological moderators of menopausal symptoms.

Methods

Participants and procedure

We performed a nationwide cross-sectional survey study in a representative German population of men and women in 2014 using a random-route procedure. Briefly, participants were randomly selected. Within a predefined region, a central street address (sample point) was defined. Participants were randomly selected within a predefined distance from each sample point.

Investigators then walked through the selected regions following a random-route protocol and identified every third household in the perimeter until 18

valid street addresses per sample point were collected. All identified households were then contacted. One contact person within each household was randomly selected using the Kish Selection Grid [24]. Questionnaires were explained to study participants in a standardized fashion by trained investigators. All questionnaires were presented in German language. Participants of the study were German-speaking and were at least 14 years of age. The study was conducted in accordance with the principles expressed in the Declaration of Helsinki and was approved by the institutional review board of Leipzig University (IRB number: 063–14-10032014).

In total, questionnaires were filled out by 2527 individuals (1350 females and 1177 males) aged 14–95 years. The study population is representative for the German general population with respect to age, gender and education level (Table 1). Mean age for

Table 1. Sociodemographic characteristics of the sample.

	Women (n = 1350)		Men (n = 1177)	
	mean	SD	mean	SD
Age (years)	49.84	17.77	48.98	17.88
	n	%	n	%
Marital status				
Married – live together	602	44.6	563	47.8
Married – live apart	23	1.7	30	2.5
Single	312	23.1	376	31.9
Divorced	202	15.0	150	12.7
Widowed	211	15.6	56	4.8
Not specified	0	0.0	2	0.2
Individuals per household				
1	429	31.8	354	30.1
2	509	37.7	499	42.4
≥3	412	30.5	327	27.5
Graduation				
No graduation	47	3.5	35	3.0
8th/9th grade	457	33.9	432	36.7
10th grade	543	40.2	386	32.8
Professional school	35	2.6	30	2.5
A level	120	8.9	118	10.0
University degree	122	9.0	133	11.3
Other	1	0.1	0	0.0
Still in school	25	1.9	43	3.7
Employment				
Full time (≥35 h/week)	388	28.7	605	51.4
Part time (15–34 h/week)	258	19.1	43	3.7
Part time (<15 hours/week)	58	4.3	8	0.7
Voluntary service/maternity leave	18	1.3	2	0.2
Unemployed	77	5.7	74	6.3
Pensioner	377	27.9	334	28.4
Homemaker	93	6.9	10	.8
In professional training	21	1.6	15	1.3
Still in school/college/university	56	4.1	80	6.8
Not specified	4	0.3	6	0.5
Household income				
<1250 Euro/month	293	21.7	168	14.3
1250–2499 Euro/month	569	42.1	508	43.2
≥2500 Euro/month	454	33.6	464	39.4
Not specified	34	2.5	37	3.1
Migration background				
No	1014	86.2	1176	87.1
Yes	163	13.8	174	12.9

women was 49.8 ± 17.8 years, mean age for men was 50 ± 17.9 years. About half of the participants were married (45% in women, 48% in men). Fifteen per cent of the women and 13% of the men were divorced. About 29% of female participants and 51% of men had a full-time job. The unemployment rate was 5.7% for women and 6.3% for men.

Questionnaires

Sociodemographic variables

Sociodemographic variables were assessed using structured questionnaires with categorical items. These items assessed marital status, number of persons living in the same household, level of education, financial income and cumulative monthly financial income of the household.

Menopause Rating Scale (MRS)

The MRS is a widely used self-evaluation tool to diagnose and quantify physical and psychological symptoms in the perimenopausal episode [25]. It includes 11 items allocated to three factorial groups (identified via factor analysis): physical, psychological and urogenital disturbances. Items are self-evaluated using a numeric scale from 0 (no symptoms) to 4 (severe symptoms). Item scores of one group are summed up to calculate the factorial group score. The MRS has sufficient reliability (Cronbach's Alpha ranges between 0.6 and 0.9 across countries for the total score as well the scores in the three domains; the test-retest coefficients of the total score range between 0.8 and 0.96) [26–28].

Brief general self-efficacy scale (ASKU, German).

The ASKU was designed for a time efficient assessment of general self-efficacy as a short version of the 10-item General Self-Efficacy Scale (GSE) [29]. The ASKU consists of three items and is one dimensional.

Item 1: "I can rely on my abilities in difficult situations."

Item 2: "I can manage to solve most problems using my own strengths."

Item 3: "I can usually handle even complicated and exhausting tasks."

Reliability of the ASKU is good (coefficient ω according to McDonald ranges between 0.81 and 0.86), convergent validity with the 10-items scale of Jerusalem and Schwarzer is high ($r = 0.75$) [29].

Data analysis

Data were analyzed with the SPSS statistical package, Version 22, (SPSS Inc., Chicago, IL).

The MRS sum was calculated as sum over all items for women. For men, data were adjusted after exclusion of the "dryness of vagina" item (sum = mean of all items, except "dryness of vagina" * 11). The effects of age and sex on the MRS sum score were analyzed with general linear model (GLM) approach, with sex (2) and age group (9) and the interaction as fixed effects and MRS sum score as target. In order to adjust for the left-skewed distribution of the MRS sum score, gamma probability distribution was used. *Post hoc* tests were performed as *t*-tests for independent samples. Linear and quadratic regression was analyzed, separately for women and men, with age group as independent and MRS sum score as dependent variable. Estimation of robust covariances was used in order to adjust for potential violations of model assumptions.

MRS severity for women was calculated according to the categorization of Heinemann et al. [27] who performed a large, multinational survey across nine countries and cultures using existing and for the respective countries representative panels in women aged 40–70 years: Europe (Germany, France, Spain, Sweden), North America (USA), Latin America (Mexico, Argentina, Brazil) and as example for Asia – Indonesia. The sample size in each of the countries was about 1000 females, with exception of USA ($n = 1500$). Heinemann et al. divided the MRS sum score into no/little (0–4 points) – mild (5–8 points) – moderate (9–16 points) or severe (>16 + points) symptomatology. For men, this categorization was adapted the same way reported before. The effects of age and sex on MRS severity were analyzed with a generalized estimation model (ordinal logistic type), which was used in a similar way as the GLM. MRS severity served as target and sex (2) and age group (9) were included for calculation of main and interaction effects.

Single items of the questionnaire were analyzed with a generalized estimation model (binomial type). The 10 single items (all except "dryness of vagina") served as target and sex and age group were included for calculation of main and interaction effects. *p* values were adjusted for multiple measurement and are reported with Bonferroni correction, by factor 10.

Predictors of MRS severity were analyzed in two steps using logistic regression models. The outcome variable MRS sum was therefore divided into low ("no/little" or "mild" symptoms according to Heinemann et al. [27]) versus high symptomatology ("moderate" or

“severe” symptoms according to Heinemann et al. [27]).

In the first step, individual regression models included age and gender and were computed for each potential sociodemographic or psychological predictor, respectively. In the second step, a logistic regression model was computed, in which we included all significant predictors of model 1.

Higher nonresponse rates in men and younger individuals as well as, underrepresentation of smaller households slightly skewed our data. Therefore, all analyses were performed without weighting adjustment and after weighting adjustment for gender, age, household size and state. Weighted analyses can be requested from the authors.

Results

MRS sum score

Analysis of the MRS sum score showed a significant main effect of age ($F[8,2507] = 39.0, p < 0.001$) and sex ($F[1,2507] = 16.8, p < 0.001$, compare Figure 1). Older people reported more symptomatology than younger ones and women reported more symptomatology than men. In addition, there was a significant interaction effect ($F[8,2507] = 2.1, p = 0.03$), indicating that there are sex differences in how MRS symptomatology develops over the course of life. Weighted data give similar results.

For women, there was a significant linear increase of symptomatology in the course of life ($F[8,1339] = 26.9, p < 0.001$). Interestingly, the symptomatology worsens significantly from age group 45–49 to age group 50–54 years ($t = 2.8, p = 0.005$). However, symptomatology did not decrease significantly after the age of 54. There were no significant

pairwise differences for any other age groups in a row (Figure 1).

For men as well, there was a significant linear increase of symptomatology with age ($F[8,1168] = 15.1, p < 0.001$) and symptomatology increased significantly from age group 35–44 years to age group 45–49 years ($t = 2.4, p = 0.02$), and from age group 60–69 years to age group 70–79 years ($t = 3.7, p < 0.001$).

MRS severity

In the same line, MRS severity showed a significant increase with age (Wald $\chi^2 = 269.2, p < 0.001$) and women exhibited significantly more pronounced severity throughout all age groups (Wald $\chi^2 = 7.2, p = 0.007$). There was no significant age*sex interaction effect (Wald $\chi^2 = 13.7, p = 0.09$), that is, men and women did not show significant differences of the distribution of symptom severity in different age groups. Data are shown in Table 2 and Figure 2. Weighted data give similar results.

Differential analysis of specific MRS symptoms

Age-dependent percentage of persons affected by symptomatology in each single item is shown in Figure 3. The following specific symptoms showed a highly significant increase in symptomatology with age: hot flushes and sweating (Wald $\chi^2 = 31.5, p_{\text{corr}} < 0.01$), heart discomfort (Wald $\chi^2 = 151.3, p_{\text{corr}} < 0.01$), sleep problems (Wald $\chi^2 = 81.9, p_{\text{corr}} < 0.01$), joint and muscular discomfort (Wald $\chi^2 = 304.2, p_{\text{corr}} < 0.01$), physical and mental exhaustion (Wald $\chi^2 = 71.2, p_{\text{corr}} < 0.01$), sexual problems (Wald $\chi^2 = 79.0, p_{\text{corr}} < 0.01$), bladder problems (Wald $\chi^2 = 116.9, p_{\text{corr}} < 0.01$) and dryness of vagina (women, only: Wald $\chi^2 = 51.2, p_{\text{corr}} < 0.01$). In contrast, depressive mood, irritability and anxiety were

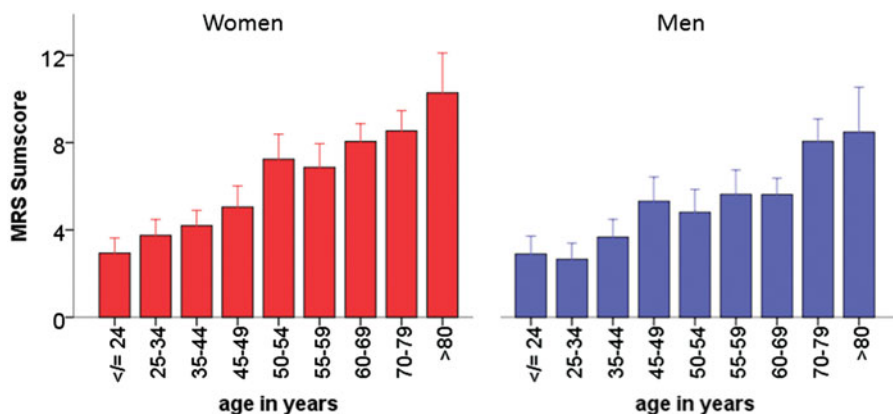


Figure 1. Development of MRS symptomatology across the course of life. Data are presented for women (left, red) and men (right, blue). A highly significant linear increase was found for both sexes. MRS sumscore for men is adjusted after exclusion of the “vaginal dryness” item. Error bars represent the 95% confidence interval.

Table 2. Frequency of MRS severity in women and men across the span of life.

MRS severity		Age groups (in years)									Total
		≤24	25–34	35–44	45–49	50–54	55–59	60–69	70–79	≥80	
Men	No. little	<i>n</i> 98	117	129	57	63	62	101	28	11	666
		% 72.6	78.0	70.5	53.3	55.3	53.0	47.4	23.1	29.7	56.6
	Mild	<i>n</i> 27	16	25	23	27	25	61	45	11	260
		% 20.0	10.7	13.7	21.5	23.7	21.4	28.6	37.2	29.7	22.1
Moderate	<i>n</i> 7	12	20	21	19	21	39	37	9	185	
	% 5.2	8.0	10.9	19.6	16.7	17.9	18.3	30.6	24.3	15.7	
Severe	<i>n</i> 3	5	9	6	5	9	12	11	6	66	
	% 2.2	3.3	4.9	5.6	4.4	7.7	5.6	9.1	16.2	5.6	
Women	No. little	<i>n</i> 92	132	142	71	58	63	70	41	11	680
		% 74.8	70.2	65.4	56.8	42.0	47.4	33.3	27.0	17.7	50.4
	Mild	<i>n</i> 18	30	42	29	39	32	54	49	21	314
	% 14.6	16.0	19.4	23.2	28.3	24.1	25.7	32.2	33.9	23.3	
Moderate	<i>n</i> 11	17	23	18	27	24	63	49	20	252	
	% 8.9	9.0	10.6	14.4	19.6	18.0	30.0	32.2	32.3	18.7	
Severe	<i>n</i> 2	9	10	7	14	14	23	13	10	102	
	% 1.6	4.8	4.6	5.6	10.1	10.5	11.0	8.6	16.1	7.6	

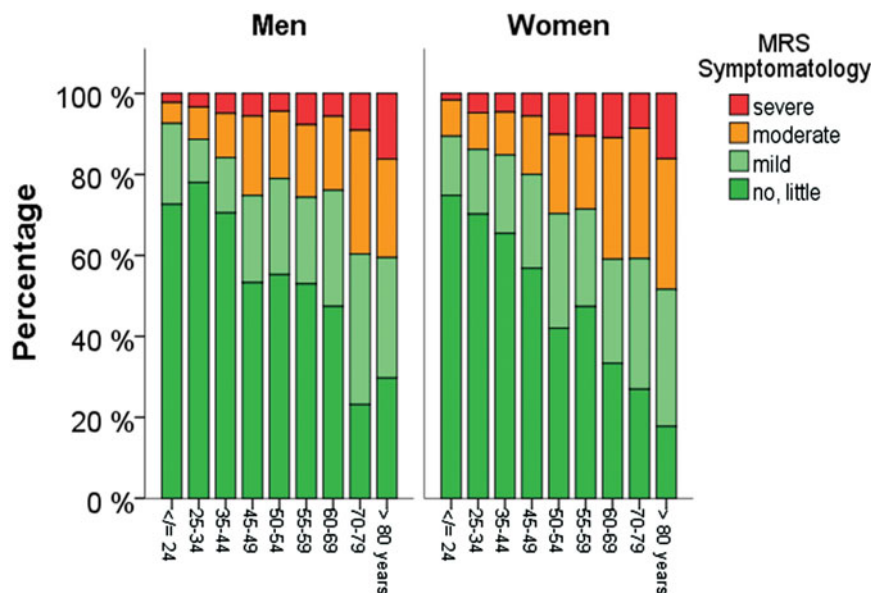


Figure 2. Frequency of MRS severity in women and men across the span of life.

not significantly related to age. Women reported significantly more symptomatology than men for the following items: hot flushes and sweating (Wald $\text{Chi}^2 = 40.8$, $p_{\text{corr}} < 0.01$), sleep problems (Wald $\text{Chi}^2 = 9.9$, $p_{\text{corr}} = 0.02$), irritability (Wald $\text{Chi}^2 = 7.9$, $p_{\text{corr}} = 0.05$), anxiety (Wald $\text{Chi}^2 = 14.9$, $p_{\text{corr}} < 0.01$). However, there were no significant age*sex interaction effects, except for the variable hot flushes and sweating (Wald $\text{Chi}^2 = 27.0$, $p_{\text{corr}} = 0.01$). Weighted data give similar results.

Sociodemographic and psychological predictors of MRS symptoms

The logistic regression model 1 revealed – besides the known effects of age and gender - that marital

status (single, divorced), low graduation level, unemployment status, low household income, high number of individuals per household, migration background and low self-efficacy were significantly associated with a high level of MRS symptomatology (Table 3). To focus on these effects, we performed a second logistic regression model in which we included all significant predictors of model 1. This model 2 revealed that marital status, employment status, household income, migration background and self-efficacy remained significant predictors of high MRS symptoms (Table 3). Interestingly, in this second multiple model, female gender was not significantly associated with high MRS symptoms (OR = 1.01 [0.8–1.28]).

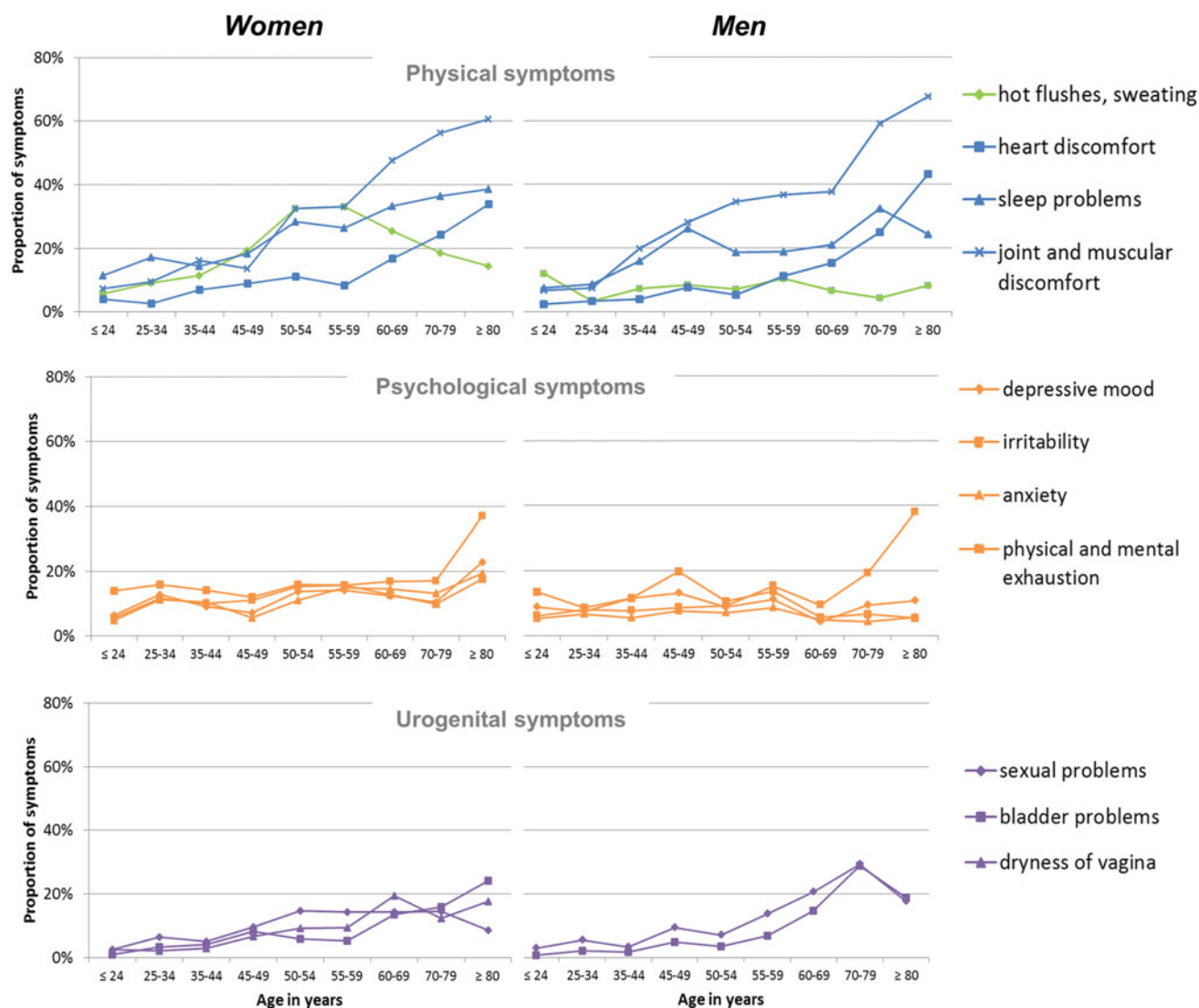


Figure 3. Frequency of at least moderate MRS symptoms in women ($n = 1350$) and men ($n = 1177$).

Discussion

The major findings of our representative survey are that physical and psychological symptoms assessed with the Menopause Rating Scale (MRS) (1) occur over the entire life span in both, women and men (2) increase with age and (3) are more frequent in women than in men. Taken together, our data suggest that symptoms commonly attributed to the perimenopausal episode might not be specific for this phase of life. In consideration of all physical and psychological symptoms assessed using the MRS, only hot flashes were gender-specific and showed age-specific maximum prevalence between ages 50 and the 59 and are therefore to be considered as a specific menopausal symptom.

Our data are in line with previous smaller surveys and studies using a limited age range of 40–65 years indicating that physical and psychological symptoms

might not be specific for the perimenopausal episode [2,7,12]. In two review articles, only vasomotor symptoms [7,8], vaginal dryness and sleep disturbance symptoms [7] were aligned with the menopausal status. Our finding of a maximum prevalence of hot flashes and sweating during menopausal ages is consistent with these previous studies. The observation of an increase of dryness of vagina after the age of 60 matches the increased vaginal atrophy in older women [30]. However, in a review article of Bastian et al., the onset of this symptom was already reported at the age of 40 years [2].

Previous research also argued against a single menopausal symptom complex [7,8]. Accordingly, a recent study identified three symptom clusters aligning with the perimenopausal episode: vasomotoric components, mood components and pain [31]. Matching this, our data have shown that symptoms of

Table 3. Predictors of low versus high MRS symptoms in women and men.

Predictors	Menopause Rating Scale				OR ^a	95% CI	OR ^b	95% CI
	Low		High					
	n	%	n	%				
Sex								
Men	926	78.7	251	21.3	ref.		ref.	
Women	994	73.7	354	26.3	1.31^d	1.07–1.56	1.01	0.8–1.28
Age groups(in years)								
≤24	235	91.1	23	8.9	ref.		ref.	
25–34	295	87.3	43	12.7	1.46	0.85–2.5	1.05	0.54–2.0
35–44	338	84.5	62	15.5	1.84^c	1.11–3.07	1.38	0.71–2.68
45–49	180	77.6	52	22.4	2.91^e	1.71–4.94	1.87	0.93–3.76
50–54	187	74.2	65	25.8	3.5^e	2.09–5.85	2.36^c	1.17–4.73
55–59	182	72.8	68	27.2	3.77^e	2.26–6.3	2.4^c	1.18–4.86
60–69	286	67.6	137	32.4	4.89^e	3.04–7.86	2.55^c	1.22–5.32
70–79	163	59.7	110	40.3	6.79^e	4.14–11.11	2.68^c	1.2–5.93
≥80	54	54.5	45	45.5	8.24^e	4.6–14.77	2.39	0.99–5.78
Marital status								
Married - live together	907	77.9	258	22.1	ref.		ref.	
Married - live apart	41	77.4	12	22.6	0.98	0.49–1.93	0.92	0.43–1.97
Single	570	83.0	117	17.0	1.62^d	1.2–2.2	1.7^d	1.14–2.53
Divorced	241	68.7	110	31.3	1.53^d	1.16–2.02	1.58^c	1.09–2.27
Widowed	159	59.6	108	40.4	1.29	0.93–1.78	1.04	0.66–1.64
Graduation								
No graduation	44	53.7	38	46.3	ref.		ref.	
8th/9th grade	612	68.8	277	31.2	0.49^d	0.3–0.79	0.71	0.41–1.22
10th grade	744	80.3	183	19.7	0.35^e	0.21–0.57	0.68	0.39–1.17
Professional school	52	80.0	13	20.0	0.32^d	0.14–0.7	0.73	0.31–1.72
Abitur (German university entrance qualification)	201	84.5	37	15.5	0.31^e	0.17–0.55	0.68	0.35–1.32
University degree	201	78.8	54	21.2	0.34^e	0.19–0.58	0.76	0.4–1.42
Other	0	0	1	100	-	-	-	-
Still in school	66	97.2	2	2.9	0.1^d	0.02–0.45	0.2	0.01–2.18
Employment								
Full time (≥35 h/week)	852	86.0	139	14.0	ref.		ref.	
Part time (15–34 h/week)	229	76.1	72	23.9	1.84^e	1.31–2.58	1.84^d	1.27–2.66
Part time (<15 h/week)	47	71.2	19	28.8	2.31^d	1.29–4.12	2.23^c	1.2–4.12
Voluntary service/maternity leave	18	90.0	2	10.0	0.9	0.2–4.01	1.02	0.22–4.68
Unemployed	101	66.9	50	33.1	2.87^e	1.94–4.24	1.34	0.84–2.14
Pensioner	432	60.8	279	39.2	3.01^e	2.03–4.46	2.22^e	1.44–3.41
Homemaker	70	68.0	33	32.0	2.88^e	1.79–4.61	2.44^d	1.42–4.18
In professional training	34	94.4	2	5.6	0.46	0.1–2.11	0.38	0.07–1.8
Still in school. college or university	131	96.3	5	3.7	0.31^c	0.11–0.86	0.35	0.09–1.25
Rural vs. urban								
Rural (<20.000 inhab.)	850	77.1	252	22.9	ref.			
Urban (≥20.000 inhab.)	1070	75.2	353	24.8	1.12	0.92–1.36	-	-
Religious beliefs								
No	536	76.9	161	23.1	ref.			
Yes	1379	75.9	437	24.1	1.0	0.8–1.24	-	-
Household income								
<1250 €/month	285	62.0	175	38.0	ref.		ref.	
1250–2499 €/month	805	74.7	272	25.3	0.54^e	0.42–0.69	0.73^c	0.54–0.99
≥2500 €/month	773	84.3	144	15.7	0.37^e	0.28–0.49	0.73	0.49–1.08
Number of individuals per household								
1	537	68.8	244	31.2	ref.		ref.	
2	746	74.0	262	26.0	0.77^c	0.62–0.96	1.16	0.81–1.63
≥3	637	86.5	99	13.5	0.57^e	0.42–0.78	0.91	0.58–1.43
Migration background								
No	1680	76.8	508	23.2	ref.			
Yes	240	71.2	97	28.8	1.53^d	1.16–2.0	1.39^c	1.02–1.89
	mean	SD	mean	SD				
Self-efficiency (ASKU score)	4.2	0.7	3.6	0.9	0.44^e	0.38–0.5	0.47^e	0.41–0.54

The results of two logistic regression models are displayed, whereby model two included all significant predictors of MRS symptoms from model 1. Annotations: significant results are highlighted in bold.

OR^a: odds ratio adjusted for sex and age groups (or for sex was only adjusted for age groups; or for age groups was only adjusted for sex) (model 1).

OR^b: odds ratio adjusted for sex, age groups and all significant predictors of model 1 (model 2).

^cp < 0.05;

^dp < 0.01.

^ep < 0.001.

ref.: reference group.

hot flushes and sweating emerged around the age of the perimenopausal episode in women. Physical symptoms (heart discomfort, sleep problems and joint and muscular discomfort) and urogenital symptoms (sexual problems, bladder problems and dryness of vagina) steadily increased with age. Psychological symptoms (irritability, anxiety, physical and mental exhaustion), in contrast, did not show any direct association with age.

In our study, perceived severity and frequency of physical and psychological symptoms were associated with sociodemographic and cultural factors such as higher age, unemployment, low income and background of migration. This confirms previous results of a longitudinal study where marriage status and education level were also found to be associated with health symptoms in the menopausal transition [32]. Matching this, the general prevalence of psychological distress in midlife is related to sociodemographic factors such as income [33].

In contrast, increased self-efficacy was linked to decreased probability of physical and psychological symptoms. It is therefore conceivable that a positive appraisal of symptoms and the use of personal competencies in coping with symptoms might be protective factors. The cross-sectional design of our study does not allow for causal attribution and it would be also possible that a low symptom severity might enhance self-efficacy. Further studies using a prospective design are warranted in order to clarify this issue. Interestingly, the influence of sex on the probability of physical and psychological symptoms was neutralized when analyzes were controlled for sociodemographic and psychological factors, supporting the assumption of a multifactorial pathogenesis of physical and psychological symptoms.

Taken together our data suggest that the majority of symptoms occurring in the perimenopausal episode are rather caused by a multifactorial genesis than by a monocausal hormonal mechanism. Our results are in line with Avis et al. [7] who clearly stated that there is no universal “menopausal syndrome.”

For clinical praxis, hence an individual evaluation of the patient’s physical health and situation in life is required. In line with Yanikkerem et al., we conclude that individual factors such as self-efficacy and the sociodemographic background might be important to understand the dynamics of symptoms occurring in the perimenopausal episode and identify potential treatment targets [15], such as cognitive behavioral therapy [34,35]. In line, previous research demonstrated that satisfaction in life predicts decreased perception of symptoms during perimenopausal ages [36]. Concordantly, lower education levels were linked to

psychological, social and physical disturbances as well as to negative attitude toward the menopause [15,37]. A positive attitude toward aging on the other hand was identified as a predictor of successful aging in men and in women [17]. Women with more negative attitudes toward the menopause seem to report more symptoms during the menopausal transition [38].

We are aware of some limitations of the study: the usage of the MRS for the assessment of changes in physical and psychological well-being during the perimenopausal episode can be criticized. The MRS is a reliable, widely used questionnaire and its brevity of the makes it a good tool for epidemiological studies. However, frequent gynecological symptoms, such as bleeding disturbances or breast tenderness, are not asked by the MRS. Further, our study is limited by its cross-sectional survey based design and neither the hormonal status of participants, nor potential hormonal substitution therapy or contraceptive treatments were assessed. Strengths of our study are a large sample size and national representativeness of our study population.

Interpretation

Our data indicate that, symptoms usually defined menopausal appear not to be specific for this period of life and may be caused by a multifactorial etiopathogenesis including physical, sociodemographic, cultural and psychological factors that, in turn, might benefit from multimodal treatment regimes. Only hot flushes and sweating seem specific for the perimenopausal episode.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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► Current knowledge on the subject

- The menopausal syndrome is described as series of physical and nonphysical symptoms that accompany the perimenopausal changes in hormone levels.
- About one-third of women in the respective age range are reported to suffer from bothersome symptoms.
- However, previous literature is heavily biased by focusing on women aged between 40 and 60 years and neglecting other age spans.

► What this study adds

- Menopausal symptoms were assessed through the whole span of life (14–95 years) in men and women using the widespread MRS questionnaire.
- The overall MRS score increased linear with age – both for women and for men.
- intensity of MRS symptoms was stronger associated with marital status, employment situation, household income, migration background and self-efficacy than with sex.