



Symptom prevalence during menopause and factors associated with symptoms and menopausal age. Results from the Norwegian Hordaland Women's Cohort study

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ABSTRACT

Objectives: To describe symptoms during the menopausal transition and age at menopause in a representative Norwegian female cohort over a ten year period, to analyze factors associated with frequency and burden of symptoms and influence on self-rated health.

Study design: 2229 women aged 40–44 years at inclusion, randomly selected from a national health survey in Hordaland County, Norway, and followed with seven postal questionnaires from 1997 throughout 2009. Data for 2002 women (90%) were eligible for analyses.

Results: In a longitudinal analysis, 36% of the women reported daily hot flushes in one or more questionnaires, whereas 29% did not experience hot flushes at all. The prevalence of daily hot flushes increased from 2% at age 41–42 to 22% at age 53–54, decreasing to 20% at age 55–57. The odds ratio for reporting daily hot flushes vs. never/seldom for daily smokers was 1.6 (1.24–2.10). Women in the lowest education group had an OR = 1.8 (1.21–2.56) for reporting daily hot flushes compared to women with a university degree. There was no relation between the symptom burden and degree of physical exercise, overall feeling of health, BMI, family income, parity or menarche age as recorded at baseline. The mean age for final menstruation period (FMP) in the cohort was 51.1 (50.9–51.3) years. Smokers had a mean age of FMP 0.9 years earlier compared to the non-smokers.

Conclusions: Daily smoking and educational level were independent risk factors for experiencing daily menopausal symptoms. Degree of physical exercise, BMI, parity or menarche age did not have significant influence.

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1. Background

Symptoms most consistently connected to changes in hormonal status during the menopause are the vasomotor symptoms (hot flushes and sweats/nights sweats) and vaginal dryness, and to some extent sleep disturbances [1–4]. Studies published the last decade substantiating side effects of hormone therapy (HT) have profoundly changed the attitudes to HT during and after the menopause [5–7]. Since 2002 the Norwegian volume of purchased HT has been more than halved [8]. Because more women now prefer to pass this period without using HT, the interest in knowledge of the natural course of the menopausal transition is growing.

Menopausal symptoms have typically been studied in cross-sectional studies, many of which from menopause clinics, and

the external validity of these studies may be disputed [9]. From late 1980ies, longitudinal, population based studies were undertaken, contributing to more valid knowledge [10–16]. Results from these studies vary considerably on many parameters, e.g. menopausal age, degree of symptoms, duration of symptoms, and medication use [17–19]. Cultural and racial/ethnic differences may explain some of the differences found [18]. According to a recent meta-analysis, prevalence of symptoms peak 1–2 years after final menstrual period (FMP), when approximately 50% (95% CI 42–58%) experience bothersome symptoms [19].

Factors associated with symptom prevalence and symptom burden are analyzed in a number of studies. In some studies, smoking is associated with more menopausal symptoms [20,21] but this was not found in a Swedish cohort study of women aged 49–53 years [22]. A recent study from Finland did not reveal any association between smoking and bothersome hot flushes, but they found that physically active women reported fewer symptoms than women with a more sedentary life style [23]. A 2007 Cochrane review on effects of exercise on menopausal symptoms referred to a number of observational studies with inconclusive results [24]. Also the

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Box 1: Questions regarding menstrual periods and assessment of menopausal symptoms.

	YES	NO		
Do you have regular menstruation?.....	<input type="checkbox"/>	<input type="checkbox"/>		
When did you have your last period? Month:..... Year:.....				
The degree of symptoms and when it occurs during the menopausal transition vary a lot between the individual women. Do you have symptoms which can be attributed to the menopausal transition? And how much are you bothered? Reply by 1 tick for how often you have one or more of these symptoms, and 1 tick for how much bothered you are:				
SYMPTOM	How often do you experience this?			
	Never/almost never	Monthly	Weekly	Daily
Hot flushes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweats/night sweats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vaginal dryness/soreness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SYMPTOM	How bothered are you?			
	Not bothered	A little	Considerably	Very much
Hot flushes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweats/night sweats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vaginal dryness/soreness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

role of body mass index (BMI) in relation to vasomotor symptoms is unclear [25].

The large variations in reported symptom prevalences across nations and cultures, and the uncertainty regarding effects of life style factors and social determinants on menopausal symptoms call for more research in this field of medicine. Based on a longitudinal study in a representative population, we have explored these issues. The study reported here had two aims:

1. to describe symptom prevalences over time during the natural menopausal transition, and to investigate factors associated with frequency of symptoms as well as their possible influence on self-rated health and
2. to estimate age at menopause and possible factors associated with this age.

2. Materials and methods

2.1. Study population

The Hordaland County Health Survey (HUSK) was a joint epidemiological research project carried out by the National Health Screening System of Norway (now: Norwegian Institute of Public Health) and the University of Bergen. It consists of a baseline registration obtained in 1997–1999, including all inhabitants in the county born 1953–57. Baseline measurements from HUSK included body height and weight, and blood pressure. A non-fasting blood sample was also collected. The self-administrated baseline questionnaires in HUSK included open-ended questions on occupation, income, use of medicines, various health behaviors, and some self-reported diseases (among others diabetes, cardiovascular disease, asthma/allergy).

From the female participants in the HUSK study ($N = 14,349$), a random sample of 3453 was invited to participate in the Hordaland Women's Cohort (HWC) study. In all, 2230 (64.6%) women aged 40–44 years at the date of inclusion consented to participate in the Cohort. One woman died before the first questionnaire was registered, so the final number in the Cohort is 2229. A written consent form, including declaration of willingness to participate in follow-up questionnaires at regular intervals during the next

15 years, was signed by the participants. More details regarding the recruitment and the Cohort participants are described elsewhere [26].

2.2. Data collection

The data collection in HUSK (1997–99) for the HWC-participants formed the baseline data in the Cohort. Since 1999, a short questionnaire has been sent approximately every second year to the HWC-participants. The questionnaires have been almost identical each time, and consist of questions regarding self-rated overall health, life style and physical exercise, menstrual periods, menopausal symptoms, contraception, voiding (bladder function), and medication use [26]. The questions regarding menopause are shown in Box 1. In order to maintain the lowest possible attrition rate in the Cohort, non-responders received up to three postal reminders. In 2010, the Cohort had completed seven questionnaires (waves) and the age range of the participants had reached 53–57 years [27]. The response rates in the different waves have been between 87% and 93%.

2.3. Definitions. Dependent variables

The STRAW (Stages of Reproductive Ageing Workshop) definition introduced in 2001 defined three intervals of female life: reproductive phase, menopausal transition and postmenopause [28]. According to this definition, the menopausal transition ends with the final menstrual period (FMP) and the beginning of postmenopause. The menstrual data recorded in our study was regular cycles or not, and month and year for the last menstruation. Month and year for FMP and the menopausal status for the individual women was established after 12 months of amenorrhea, according to the STRAW definitions [28].

The dependent variables were frequencies and burden of the main vasomotor menopausal symptoms: hot flushes and night sweats/cold sweats. Self-reported vaginal dryness/soreness was also included in the questionnaire. Frequencies were reported as “daily”, “weekly”, “monthly” or “never/almost never”. Burden of symptoms was reported as “very much”, “considerably”, “a little” or “not bothered” (Box 1).

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