Linköping University Post Print

Knowledge of reproductive physiology and hormone therapy in 53- to 54-year-old Swedish women: a population-based study.

Lotta Lindh-Åstrand, Jan Brynhildsen, Mikael Hoffmann, Karin I Kjellgren and Mats Hammar

N.B.: When citing this work, cite the original article.

This is a non-final version of an article published in final form in:

Lotta Lindh-Åstrand, Jan Brynhildsen, Mikael Hoffmann, Karin I Kjellgren and Mats Hammar, Knowledge of reproductive physiology and hormone therapy in 53- to 54-year-old Swedish women: a population-based study., 2007, Menopause, (14), 6, 1039-1046. <u>http://dx.doi.org/10.1097/gme.0b013e31803816ca</u> Copyright: Raven Press, Ltd.

Postprint available at: Linköping University Electronic Press http://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-20096

Knowledge of reproductive physiology and hormone therapy in 53

to 54 year-old Swedish women – a population-based study

Lotta Lindh-Åstrand, RN, Jan Brynhildsen, MD, PhD, Mikael Hoffmann¹ MD, PhD, Karin I Kjellgren², RN, PhD, Mats Hammar, MD, PhD.

From the Division of Obstetrics and Gynecology, Department of Molecular and Clinical Medicine, the ¹Division of Clinical Pharmacology, Department of Medicine and Care, Faculty of Health Sciences, Linköping, ²Institute of Health and Care Sciences, The Sahlgrenska Academy, Göteborg University, Sweden.

Correspondence: Lotta Lindh-Åstrand, Division of Obstetrics and Gynecology, Faculty of Health Sciences, University Hospital, S-581 85 Linköping, Sweden Tel +46-13-22 31 72, Fax +46-13-22 31 94 e-mail. Lotta.lind-astrand@lio.se

Key words: Menopause, knowledge, hormone therapy, reproduction physiology Short title: Knowledge of menopause and hormone therapy

Abstract

Objectives: To investigate knowledge of hormone therapy (HT), reproductive physiology and menopause in a population of 53 to 54 year-old women. Further aims were to determine if the knowledge differed between users and non-users of HT and between groups with different levels of education.

Design: In 2003, all 53 and 54 year-old women (n = 1733) in Linköping, Sweden were sent a questionnaire containing questions about reproductive physiology related to menopause and about HT. Answers from 73% of the women were analyzed.

Results: Swedish women had limited knowledge of HT, reproductive physiology and menopause irrespective of HT use or educational level. Most of the women knew that hot flashes are common around menopause and decreasing estrogen production causes the menopause. They knew little about the effects of progestagens and of effects of HT on fertility. Women with low educational level were more likely to answer the questions by stating that they were unsure than did women with high educational level. Ever users of HT knew more than never-users about risks and benefits of HT in relation to breast cancer and osteoporosis, and ever-users thought that the risks of thrombosis and myocardial infarction were lower than did never-users.

Conclusions: Women need improved knowledge of the risks and benefits of HT as well as education about the reproductive system around menopause. This would probably better support and empower menopausal women to manage an important period of their lives.

Introduction

The cessation of menstrual bleeding signals a transition from the reproductive to the nonreproductive stage of a woman's life. In the western world, about 75% of the women experience vasomotor symptoms such as hot flashes, sweating and local vaginal discomfort during menopause 1,2 . The use of hormone therapy (HT) – the administration of estrogen combined with progestagens - increased rapidly during the last decades of the 20th century. Only 7% of postmenopausal women from Linköping used HT in the early 1980s¹ compared to almost 50% in 1998³. This increase may have been related to confidence in results from several observational studies that reported benefits of long-term HT⁴⁻⁶. Other factors contributing to increased use of HT may have been improvements in the knowledge held both by women and doctors of the beneficial effects of HT use on vasomotor symptoms⁷, osteoporosis and fracture risk, colon cancer and Alzheimer's disease.⁸ Since a peak in 1999 there has been a dramatic decrease in the use of HT in Sweden^{12, 13} and in several other countries ¹⁴⁻¹⁷. This decrease may be related to findings in large, randomized, clinical trials that HT does not have either primary (WHI-study ⁹) or secondary (HERS-study ¹⁰) preventive effects on cardiovascular disease in the age groups studied. In addition, the Million Women Study ¹¹ confirmed and strengthened previous findings of an increased risk of breast cancer associated with long-term use of HT. Lately "window of opportunity" approach has been discussed, that suggests that the risk-benefit profile must take into account when, in a woman's reproductive life, HT is initiated. Thus, a reanalysis of the WHI-data with meta-analysis of observational and randomized controlled trial data by age of initiation of therapy suggests that when HT is started within 4-6 years of menopause there is cardio- and neuro-protection that is not seen when HT is initiated in older women¹⁸.

These conflicting, and sometimes contradictory findings on risks and benefits from use of HT make it difficult for many women to decide whether or not to use HT. Many women try alternative and less well documented therapies ^{19, 20} or they refrain from HT because of fear and possible misconceptions ²¹. Breslau et al ²² found in a study in 2003 that 74% of the women reported that they were confused about HT use and 79% said that they lacked information about HT. In line with this report, Ettinger ²³ et al found that only 23% of women answered correctly questions about the findings reported in the WHI study. To meet the needs and demands of menopausal women it is important that physicians and other health care providers are able to give the women correct information about the pros and cons of the therapy and about alternatives, including abstaining from therapy. Such information must be presented in a manner that takes into account a woman's knowledge of HT and the menopausal transition and about her own reproductive functions. We have found very few reports about the women's knowledge of female reproductive physiology related to menopause even though numerous studies have been published about women's knowledge of the risks and benefits associated with HT ²⁴⁻²⁷.

The aim of the present study was to investigate the knowledge of hormone therapy (HT), reproductive physiology and menopause in a population of Swedish women 53 to 54 years old. We then wanted to determine if the knowledge held by users of HT differed from that of nonusers of HT and/or in relation to level of education.

Methods

A questionnaire regarding women's knowledge of the reproductive physiology, menopause, and HT was mailed to all 53 to 54 year-old women (n = 1733) living in Linköping in the second quarter of 2003. Linköping is a university city with about 130,000 inhabitants, high technology industries and a mainly urban population. The local population authorities provided the names and addresses of these women. The women were asked to report their menstrual history, use of HT, educational level, occupation, parity, and smoking habits. An enclosed letter informed the women in a neutral way about the study and its aim to assess women's attitudes and knowledge of menopause and HT.

Ever users of hormone therapy were defined as women who were currently using or who had previously used oral or transdermal HT (oral contraceptives were not included). Never-users were women who had never used HT. Women who had been given local or oral estriol treatment for urogenital discomfort were classified as never-users of HT. Educational level was defined in three categories:

1) 9 years of compulsory schooling, 2) 12 years of schooling (graduation from high school), 3) university degree or other post-high school education resulting in at least 15 years of schooling.

The questions, including alternatives, regarding the reproductive functions related to menopause and questions about HT are presented in Table 1. After each question women were asked to tick one of a number of boxes, one of which always related to the alternative "I do not know".

This questionnaire was developed from a questionnaire originally validated in several steps and used in 1999 in a similar population ^{10, 25}. An almost identical version was used in 2003 with addition of a section with questions about knowledge of reproductive physiology. This 2003 questionnaire was validated separately. Ten women age 50-55 years completed the first version of the questionnaire and were interviewed afterwards. After clarifying some of the questions a new version was sent to 15 women, 50-59 years of age. Test-retest stability was checked by letting the same 15 women answer the questionnaire once 3. Why does menstrual bleeding cease?

6

A/Because the ovarian function decreases B/Because the uterus changes and may no longer bleed C/I do not know 4. Women usually experience hot flashes and sweating during the menopause. A/Yes B/No C/I do not know 5. What happens to the risk of having breast cancer when using HT compared to not using HT? C/ Decreased risk A/ Increased risk B/ Unchanged risk D/ I do not know 6. What happens to the risk of developing osteoporosis when using HT compared to not using HT? A/ Increased risk B/ Unchanged risk C /Decreased risk D/ I do not know 7. What happens to the risk of developing a thrombosis when using HT compared to not using HT? B/ Unchanged risk C /Decreased risk A/ Increased risk D/ I do not know 8. What happens to the risk of developing a myocardial infarction when using HT compared to without HT? A/ Increased risk B/ Unchanged risk C /Decreased risk D/ I do not know 9. Is a postmenopausal woman, who has regular bleeding due to HT, fertile? A/Yes B/No C/I do not know 10. Does HT work as an oral contraceptive and prevent pregnancy? A/Yes B/No C/I do not know 11. Progestagens are used in HT to increase the effect of estrogens on the hot flashes. A/Yes B/No C/I do not know 12. Progestagens are used in HT to counteract stimulating effects from estrogens on the endometrium (the mucosa lining the uterine cavity). A/Yes B/No C/I do not know 13. HT is recommended to all women above 50 years of age. A/Yes B/No C/I do not know 14. HT is mainly recommended to women with some kind of climacteric symptoms. A/ Yes B/No C/ I do not know

Table 1 The translated statements concerning knowledge of menopause, reproduction physiology and hormone therapy.

2. Where are estrogens mainly produced in a woman of fertile age? A/ In the ovaries B/ In the uterus C/ I do not know

1. Menopause is caused by decreasing estrogen production. A/Yes B/No C/I do not know.

again two weeks later, without being informed beforehand that the questionnaire was to be answered twice. Fourteen of the 15 women completed the questionnaire the second time. There was total agreement between 82% of all pairs of answers (n = 210) between the two occasions. In 8% "yes" had been changed to "no" or vice versa and 10% of those originally "unsure" had changed to "yes" or "no". In three of the 15 questions there was total agreement between the first and second answers from all women. In the remaining 12 of the 15 questions the median (25th to 75th percentile) change from first to second answer was 0 (0-1) steps. We decided to delete one of the questions concerning weight change after menopause. Thereafter 14 questions remained for analysis. The questionnaires were coded, which enabled us to send a reminder to those women who had not answered after four weeks. After the codes had been eliminated from the questionnaires, data were optically scanned into the computer and analyzed using SPSS for Windows (release 14.0.0). The agreement between optical and manual reading was checked for the first 10 complete questionnaires and the optical reading was continued only after we confirmed that the manual and optical readings agreed totally.

Statistics: Pearson chi-square test was used to analyse differences between groups. Women were grouped according to educational level and HT use (ever users, never users) and cross tabulated with the answers to the questions concerning knowledge of reproductive function, menopause and HT. The p-value was set to <0.05 (two-tailed) to be considered significant. Binomial logistic regression with HT use (ever vs. never) as outcome variable was used in order to further analyse associations and to adjust for confounding factors. First, a logistic regression was carried out with all background variables (Table 2) in order to analyse associations. Those variables that showed the strongest association with HT use were then used as covariates in further logistic regression analyses in order to control for

				HT	ever use	HT nev	ver user		p-value
Hormone therapy									
User (current/previous)	561	(44.4)							
Never	702	(55.6)							
Education									
9-year compulsory school	399	(31.6)	185	(33.1)	214	(30.7)		0.57	
High school	384	(30.4)	172	(30.8)	212	(30.5)			
University degree	472	(37.4)	202	(36.1)	270	(38.8)			
Native language									
Swedish	1186	(93.9)	536	(95.7)	650	(92.7)		0.79	
Another Scandinavian language	24	(1.9)	7	(1.3)	17	(2.4)			
Another language outside Scandinavia	51	(4.0)	17	(3.0)	34	(4.9)			
Smoking habits									
Yes	252	(20.0)	121	(21.6)	131	(18.7)		0.21	
No	1009	(79.9)	440	(78.4)	569	(81.3)			
Resident									
City resident	1041	(82.4)	474	(84.6)	567	(81.0)		0.90	
Rural resident	219	(17.3)	86	(15.4)	133	(19.0)			
Marital status									
Married/cohabiting	984	(77.9)	420	(74.9)	564	(80.5)		0.01	
Singles	203	(16.1)	96	(17.1)	107	(15.3)			
Stable relation but living apart	75	(5.9)	45	(8.0)	30	(4.3)			
Occupation									
Full or part time	1019	(80.7)	446	(79.5)	573	(81.7)		0.02	
Housewife	15	(1.2)	3	(0.5)	12	(1.7)			
On sick leave/retired	184	(14.6)	96	(17.1)	88	(12.6)			
Student/unemployed	44	(3.5)		16	(2.9)	28	(4.0)		

Table 2. Characteristics of women answering the questionnaire and comparisons between ever and never users of HT. Percentages within brackets. Total number of answers varied between 1255-1263 in the different questions. P-values according to χ^2 .

confounding. These analyses included one knowledge variable at a time and all potential confounding factors.

Ethics: The local ethics committee at the Faculty of Health Sciences, Linköping University, approved the study design, including the questionnaire.

Results

After sending out one reminder, we received 1339 of the 1733 (77%) questionnaires. In the local population 9% of women 53-54 years old were immigrants, whereas among women answering the questionnaire 6% had another native language than Swedish, showing that immigrants were over represented among the drop-outs. No further drop-out analysis was performed. Several questions were posed from different perspectives, dealing with current or previous use of HT that made it possible for us to exclude women who answered inconsistently to these questions. A number of women (n = 76) were excluded because they had either answered inconsistently or not answered at all the questions concerning their use of HT. The excluded women were less educated (P = 0.034) and lived to a higher degree in rural areas (P = 0.018) than the included women. There were no differences in native language, marital status, smoking habits and occupation.

This left us with responses from 1263 women and a final analyzable number of 1263 of the original 1733 mailed questionnaires, i.e. a 73% rate of analyzable questionnaires. Not all questionnaires were answered completely; between 0.5 and 2.7 percent of the answers to individual questions were missing.

A little more than half of the women (55.6%, n = 702) had never used HT, 25.3% (n = 319) were current users, and 19.1% (n = 242) had previously used HT but were no longer doing

so. Thus, 44.4% (n = 561) were ever users of HT. The percentages of ever users of HT were similar in the different educational groups (9-year compulsory school = 33.0%, high school = 30.8%, university degree = 36.2%, NS) Educational level and other demographic data are present in Table 2.

Knowledge in relation to educational level.

The results of the questions on women's knowledge in relation to educational level are summarized in Tables 3-4. Most of the women were aware that it is common for menopausal women to experience hot flashes (92%) and that the menopausal transition is caused by decreasing estrogen production (91%). In answering most of the questions, there was a tendency for a greater percentage of women with lower educational level to answer that they were unsure than for women with higher educational level to answer in this manner. For example a significantly greater proportion (39%) of the women with 9-year compulsory schooling were unsure about whether a postmenopausal woman is fertile if her menstrual bleeding returns due to HT compared with 28% with upper secondary school and 21% with university level education (P < 0.001). In the lowest educational level group, almost 50% of the women answered that they did not know whether HT works as an oral contraceptive or not compared to 30 and 36% in the two other groups (P < 0.001). About half of the women (59%) were unsure about the statement that progestagens are used to counteract the stimulating effects from estrogens on the endometrium, 35% answered correctly and 5% of the women gave the wrong answer.

Women's knowledge of risks and benefits with HT varied with the women showing the highest level of knowledge about breast cancer and osteoporosis and a lower level regarding the risk of thrombosis or myocardial infarction. More than half of the women

11

Table 3

The distribution of answers (in percent) to questions about knowledge of menopause and reproductive physiology in 53 to 54 year-old women in relation to educational level and HT use. P-values according to χ^2

	Education/HT use	Yes	No	I do not know p-value
Menopause is caused by	9 years	85.9	1.0	13.1 <0.001
decreasing estrogen production?	12 years	94.2	1.0	4.7
	\geq 15 years	93.6	1.5	4.9
	Ever HT use	95.7	0.9	3.4 <0.001
	Never HT use	87.8	1.4	10.8
	Education/HT use	In the ovaries	In the uterus	I don't know p-value
Where are estrogens mainly produced	9 years	61.7	7.6	30.7 <0.001
in a woman of fertile age?	12 years	74.5	9.2	16.3
	\geq 15 years	84.6	6.9	8.6
	Ever HT use	76.3	9.9	13.8 <0.001
	Never HT use	72.2	6.1	21.7

]	Education/HT use	Ovarian dysfunction		Uter	rine involution	I don't know	v p-value
Why does menstrual bleeding cease?	9 years 12 years	76.5 85.9	8.4 7.9	15.2 6.3	< 0.001		
2	\geq 15 years	89.8	5.5	4.7			
	Ever HT use	85.8	7.7	6.5	0.045		
	Never HT use	83.1	6.6	10.3			
	Education/HT use	Yes			No I	don't know	<u>p-value</u>
Women usually experience hot flashe	es 9 years	93.2			0.8 6.	0 0.054	
and sweating during the menopause?	12 years	93.5	1.8	4.7			
	\geq 15 years	90.8	3.6	5.5			
	Ever HT use	95.7	0.9	3.4	< 0.001		
	Never HT use	89.6	3.1	7.3			

	Education/HT use	Increases	Decrea	ises	Uncha	nged	I don't know	p-value	
What have an with hereast	0	65 7	1 0	11 /	21.2	-0.001			
what happens with breast-	9 years	05.7	1.8	11.4	21.2	<0.001			
cancer risk with HT compared	12 years	72.4	0.5	13.1	13.9				
to without HT?	\geq 15 years	77.2		0.9	12.3	9.6			
	Ever HT use	75.1	0.7	13.8	10.4	< 0.001			Never HT use
69.6	1.311.1 18.0								
What happens with osteoporosis	9 years	11.2	51.1	11.5	26.2	< 0.001			
risk with HT compared	12 years	12.6	55.5	14.5	17.4				
to without HT?	\geq 15 years	9.4	67.2	13.2	10.2				
	Ever HT use	9.8	72.1	9.8	8.2	< 0.001			
	Never HT use	12.0	47.2	15.8	25.0				
What happens with risk of	9 years	43.7	2.3	18.7	35.4	< 0.001			
thrombosis with HT compared	12 years	54.8	4.0	20.9	20.4				
to without HT?	\geq 15 years	53.5	3.4	24.9	18.1				
	Ever HT use	48.6	3.8	28.0	19.6	< 0.001			
	Never HT use	52.7	2.7	16.5	28.1				

<u>Table 4</u> The distribution of answers (in percent) to questions about knowledge of hormone therapy in 53 to 54 year-old women in relation to educational level and HT use. P-values according to χ^2

	Education/HT use	Increases	Decrea	ses	Uncha	nged	I don't know	p-value
What happens with the risk of	9 years	16.7	9.6	28.3	45.5	< 0.001		
myocardial infarction with HT	12 years	24.2	11.6	36.6	27.6			
compared to without HT?	\geq 15 years	18.8	15.6	40.4	25.2			
	Ever HT use	15.7	13.8	43.0	25.7	< 0.001		
	Never HT use	23.1	11.3	29.3	36.3			
	Education/HT use	Y	es	No	I don	't know	p-value	
Is a postmenopausal woman	9 years		7.6	53.3	39.1	< 0.001	l	
who has regular bleeding	12 years	1	0.3	61.6	28.0			
due to HT, fertile?	\geq 15 years	1	0.9	67.7	21.4			
	Ever HT use	ç	9.3	65.1	25.6	0.033		
	Never HT use	1	0.2	58.0	31.8			
Does HT work as an oral contra-	9 years	5	.8	45.7	48.5	< 0.001		
ceptive to prevent	12 years	8	.0	56.1	35.8			
pregnancy?	≥ 15 years	7	.8	62.3	29.9			
	Ever HT use	7	7.6	63.8	28.6	< 0.001		
	Never HT use	6	5.9	47.7	45.5			

	Education/HT use	Yes	No	I don't know	p-value
Progestagens are used in HT to	9 years	27.6	16.7	55.7 <0.00	1
increase the effect of estrogens	12 years	25.5	29.1	45.4	
on the hot flashes?	\geq 15 years	21.1	34.0	44.9	
	Ever HT use	27.4	41.3	31.3 <0.00	1
	Never HT use	22.1	15.6	62.2	
Progestagens are used in HT to	9 vears	24 3		4 1	71.6 <0.001
counteract stimulating effects	12 years	34.8	6.1	59.0	/110 (01001
from estrogens on the endometrium?	\geq 15 years	44.6	5.6	48.9	
	Ever HT use	49.6	8.3	42.1 <0.00	1
	Never HT use	23.3	3.7	73.1	-
HT is recommended to all	9 years	7.1		58.1	34.8 <0.001
women above 50 years of age?	12 years	4.2		71.7	24.1
	≥ 15 years	3.0		80.4 16.6	
	Ever HT use	5.9		69.8 24.3	0.258
	Never HT use	3.9		70.9	24.8

Ed	ucation/HT use	Yes	No	I don't know	p-value	
HT is mainly recommended to women	9 years	70.5		7.6	21.9	< 0.001
with some kind of climacteric symptom?	12 years	79.6	4.5	15.9		
	\geq 15 years	84.0	3.6	12.4		
	Ever HT use	83.1	4.5	12.4 <0.001		
	Never HT use	74.5	5.6	19.8		

knew that the risk of breast cancer and thrombosis increases during HT use and that osteoporosis risk decreases. About every third woman was unsure about the effect of HT on cardiovascular risk. Only 3-7% of the women in the different educational groups answered that HT is recommended to all women above 50 years of age. Between 70–84% of the women in the different educational groups were aware of the recommendation that HT should be used mainly for women with climacteric symptoms. Differences in knowledge between women with different educational levels are probably not confounded by HT use, since HT use was similar in the three educational groups.

Knowledge in relation to HT use.

The results of the answers to questions on women's knowledge of the effects of HT are summarized in Tables 3-4. Most of the women irrespectively if they were using HT or not were aware that hot flashes are common in the menopausal transition and that the menopausal transition is caused by decreasing estrogen production. About 75% of the women knew that estrogens are produced in the ovaries. Of the women who never had used HT, 22% were unsure about the answer to this question compared to 14% of HT users (P < 0.001). Of the women who were currently using HT, 70% knew that a woman does not become fertile if menstrual bleeding returns due to HT compared to about 58% of the women who had either never used HT or had previously used HT (data not shown). A slightly higher percentage of those who were ever-users of HT could answer questions about HT correctly than those who had never used HT (Table 4). However, only 50% of the ever users of HT knew that progestagens are used to counteract the stimulating effects on the endometrium resulting from estrogens, and among never users only 23% knew this. Usually HT ever users had better knowledge of risks and benefits of HT than never users (Table 4). About 50% of all women knew that HT increased the risk of thrombosis.

Women who were ever users of HT were more disposed to agree that the risk of thrombosis was unchanged by HT use compared with never-users (28% vs. 16.5%, P < 0.001). A greater proportion of women who were previous users of HT saw more disadvantages and risks with HT compared with current users. Thus 55% of previous users thought that HT increases the risk of thrombosis compared to 44% of current users (P=0.042). The corresponding figures for myocardial infarction was 22% and 11% respectively

(P = 0.001). On the other hand knowledge of risks for breast cancer and benefits regarding osteoporosis did not differ between previous and current users of HT.

A logistic regression, with all background factors included (Table 2), showed no significant association between HT use and educational level but a significant association with marital status (P=0.025) as well as occupation (P =0.031). Women living on their own but having a partner used HT more frequently than married or single women, and HT use was less common in housewives than in employed women. Logistic regression analyses were also carried out in order to check for potential confounding from the background factors. Marital status and occupation were included in the analyses together with the questions regarding knowledge. The inclusion of potential confounding factors did neither affect women's knowledge of fertility after recurrence of bleeding during HT nor their knowledge of the contraceptive effects of HT.

Discussion

The present population-based questionnaire study performed in 2003 showed that 53 to 54 year-old women in Linköping, Sweden had rather limited, and in our opinion insufficient, knowledge of certain aspects of the menopause and HT. This evaluation applies independent of their use or non-use of HT and of their educational level. HT use in our area is probably representative for Swedish HT use¹². Furthermore HT use was evenly distributed between women with different educational levels, suggesting that Swedish women have rather equal access to the health care system. Previous studies ^{28, 29} have shown that HT use was more common in women with higher education than women with lower education but this association seems to be declining ^{28, 30-31}.

Understanding of the effect of progestagens was very low, even among HT users. More than 40% of current or previous HT users were unsure about the effect of progestagens on the endometrium. Thus, knowledge of hormonal effects on the reproductive organs is low among women and the information given by health care providers about effects of estrogens and progestagens appears either to be insufficient or to have been presented in a manner that is not sufficiently clear. Progestagens are an important component in the HT treatment intended to avoid endometrial stimulation, but are also associated with side effects. The Million Women study showed, for example, that the risk of developing breast cancer increased among women using HT, especially in regimes including progestagens ¹¹. Sequential addition of progestagens induces cyclic negative mood symptoms in certain women including depression, anxiety and irritability ³². In a Swedish study, 30% of the women stated that they experienced a negative mood effect during HT and 35% stated side effects as a reason for discontinuing HT ³³. Therefore providing information about

progestagens in a manner adapted to women's knowledge is of utmost importance to ensure adherence to treatment.

It is notable that almost half of the women in the lower educational group and a third of the women with highest level of education did not know that recurrence of bleeding during HT in a postmenopausal woman does not mean that there is a risk of pregnancy. This may lead them to think that contraception should be used if bleeding returns when using HT and this may hamper their sex life or even cause them to abstain. Unfortunately, we did not ask whether women who were uncertain actually used contraception or not. Most of the women, irrespective of HT use or educational level, knew that the menopausal transition is caused by decreasing estrogen levels and that hot flashes are common in the menopausal transition. In a review, Buick et al ³⁴ reported a great variation in women's knowledge of the cause of menopause. Only 11% of UK women knew the cause compared to 79% in a Scottish study. More than 50% of HT users stated that more information about HT therapy was needed ³⁵. Nearly 65% of the women in a study performed in Chile in 2001 stated that they had insufficient knowledge of HT and menopause²⁴. A British study by Hunter and Liao³⁶ showed that 45 year-old women had little knowledge of menopause and its causes. Intervention, including information and group discussion, lead to significantly increased knowledge ³⁷. Decision aids could help women to take an active role in informed decision making, improve knowledge and reduce decisional conflicts^{38.}

We have found few reports on women's knowledge of reproductive physiology. A recent study ³⁹ showed that knowledge of reproductive physiology and anatomy in teenagers and young adults in Sweden was insufficient in relation to the goals set by the national curriculum for the 7th to 9th grades of the school system. Apparently, the current Swedish

school system provides insufficient knowledge on reproductive physiology, a judgment in line with the findings of the present study on older women. The findings in this questionnaire study showed that women in general have good knowledge of the risks and benefits of HT concerning osteoporosis and breast cancer. For example more than 70% of the women knew that the risk of developing breast cancer increased when using HT. On the other hand, women were uncertain about the risk of developing myocardial infarction when using HT, with more than one third of the women unsure and one third answering that the risk was unchanged. This uncertainty may be a result of the exposure to contradictory findings during the last decade, which have affected the national treatment recommendations and have been frequently debated in the media. It may even be discussed what is the correct answer to this question, since the risk-benefit profile differs depending on when HT is initiated, doses used, pre-treatment cardiovascular health, design and duration of the study¹⁸. In a European study from 2003, the findings were similar with more than 50% of the women, who were ever users of HT being aware of the increased risk of breast cancer and one third of the women being uncertain about the risk of developing heart disease when using HT²⁵.

A Swedish study performed in 1992 as well as in 1998 ²⁶ showed that 32% and 45% of the women respectively thought that the risk of developing cardiovascular disease decreased with HT use. In our study, which was performed after the HERS and WHI studies were published, only 12.5% thought that HT decreased cardiovascular risk. This belief is probably a result of the extensive media reporting on risks and benefits of HT. In general a smaller percentage of those who were ever-users of HT believed there is an increased risk of thrombosis and myocardial infarction compared to never users. Those who were ever-users of HT also had higher factual knowledge of the benefits of HT on

bone density. Ever-users' better knowledge of the benefits of HT could be either a confounding-by-indication, i.e. that women with better knowledge opted for HT to a higher degree, or that users had received more or could recall more information about benefits. Ever-users also had more knowledge of the risks of breast cancer in relation to HT use. A high response rate is essential for a questionnaire study. Our response rate of 77%, of which we analyzed 73% after omitting answers with inconsistent results, is in accordance with other previous Swedish questionnaire studies^{1, 3, 21}. The method of asking about HT use in several different ways and then excluding women who answered inconsistently allowed us to strengthen the study by increasing its internal validity. Furthermore, we made a test-retest analysis on the questions of knowledge and found that for almost all questions women ticked the same box in the retest or just moved one step in any direction the second time. This suggests that women do not answer at random, but try to identify the box that suits best to their belief and knowledge.

Most of our respondents are women whose first language is Swedish so our sample does not fully reflect the current ethnic makeup of the female population of Linköping. Although Linköping has a substantial population of rather recent immigrants, the number of recent immigrant women in the 53 to 54 year old age group is certainly small. It is likely that many immigrant women in this age group did not answer the questionnaire because of linguistic problems. However, since we do not have any way to determine how many recent immigrant women answered the questionnaire, we must note simply that our sample may not be ethnically representative of the current female population of Linköping. This study showed that women seem to have insufficient knowledge of reproductive physiology and effects of HT on fertility and the endometrium. We believe that improving the knowledge among women entering menopause could increase the adherence among those who have elected HT and could also decrease the level of concern where concern seems unwarranted. Better understanding of HT and its risks and benefits is also a prerequisite for shared decision making in relation to counseling for menopausal problems. Providing better communication and discussions with healthcare providers could empower menopausal women to manage an important period of their lives but more studies about effects of different types of interventions ought to be performed.

Acknowledgement

We are indebted to the Swedish Medical Research Council; grant no K2002-72X-12651-05C; The research Council in the South East of Sweden and the County Council of Östergötland, for financial support, and also to Mats Fredriksson for statistical advice.

References

1. Hammar M, Berg G, Fåhraeus L, Larsson-Cohn U. Climacteric symptoms in an unselected sample of Swedish women. *Maturitas* 1984;6:345-350

2. McKinlay S, Brambilla D, Posner J. The normal menopause transition. *Maturitas* 1992;14:103-115.

3. Ekblad S, Bergendahl A, Enler P, Ledin T, Möller C, Hammar M. Disturbances in postural balance are common in postmenopausal women with vasomotor symptoms. *Climacteric* 2000;3:192-198.

4. Grodstein F, Stampfer MJ, Colditz GA, et al. Postmenopausal hormone therapy and mortality. *N Engl J Med* 1997;336:1769-1776.

5. Criqui M, Squarez L, Barrett-Connor E, McPhillips J, Wingard D, Garland C. Postmenopausal estrogen use and mortality: results from a prospective study in a defined, homogeneous community. *Am J Epidemiol* 1988;128:606-614.

6. Cauley J, Seeley D, Browner W et al. Estrogen replacement therapy and mortality among older women: a study of osteporotic fractures. *Arch Intern Med* 1997;157:2181-2187.

7. McLennan A, Lester S, Moore V. Oral estrogen replacement therapy versus placebo for hot flushes (Cochrane Review). *The Cochrane Library*, Issue 2, 2001.

 Birkhäuser M. Menopause in the aging society. In Aso T, Yanaihara T, Fujimota S, eds. *The Menopause at the Millenium*. New York: The Parthenon Publishing Group, 2000;13:101-107.

9. Writing Group for the Women's Health Initiative Investigators. Risks and Benefits of Estrogen Plus Progestin in Healthy Postmenopausal Women: Principal Results From the Women's Health Initiative Randomized Controlled Trial. *JAMA* 2002;288:321-333.

10. Herrington DM, Vittinghoff E, Lin F et al for the HERS Study Group. Statin therapy, cardiovascular events and total mortality in the Heart and Estrogen/Progestin Replacement Study (HERS). *Circulation* 2002;105:2962-2967.

11. Writing Group for the Million Women Study Collaborators. Breast cancer and hormone-replacement therapy in the Million Women Study. *Lancet* 2003;362.419-427.

12. Hoffmann M, Hammar M, Kjellgren KI, Lindh-Åstrand L, Brynhildsen J. Changes in women's attitudes towards and use of hormone therapy after HERS and WHI. *Maturitas* 2005;52:130-154.

13. Ekström H. Trends in middle-aged women's reports of symptoms, use of hormone therapy and attitudes towards it. *Maturitas* 2005;52:154-164.

14. MacLennan AH, Taylor AW, Wilson DH. Hormone therapy use after the Women's Health Initiative. *Climacteric* 2004;7:138-142.

15. Lawton B, Rose S, Mc Leod D, Dowell A. Changes in use of hormone replacement therapy after the report from the Women's Health Initiative: cross sectional survey of users. *BMJ* 2003;327:845-846.

16. Haas JS, Kaplan CP, Gerstenberger EP, Kerlokowske K. Changes in the use of postmenopausal hormone therapy after the publication of clinical trial results. *Ann Intern Med* 2004;140:184-188.

17. Hersch AL, Stefanick ML, Stafford RS. National use of postmenopausal hormone therapy: annual trends and response to recent evidence. *JAMA* 2004;291:47-53.

18. Sturdee DW, MacLennan AH. The pendulum swing back; estrogen is now beneficial if started at right time. *Climacteric* 2006;9:73-74.

19. Kronenberg F, Fugh-Berman A. Complementary and alternative medicine for menopausal symptoms: a review of randomized, controlled trials. *Ann Intern Med* 2002;137:805-813.

20. Nelson H, Vesco K, Haney E, et al. Nonhormal therapies for menopausal hot flashes. *JAMA* 2006;295:2057-2071.

21. Stadberg E, Mattsson LÅ, Milsom I. The prevalence and severity of climacteric symptoms and the use of different treatment regimens in a Swedish population. *Acta Obstet Gynecol Scand* 1997;76:442-448.

22. Breslau ES, Davis WW, Doner L, et al. The hormone therapy dilemma: women respond. *J Am Med Women Assoc* 2003;58:33-43.

23. Ettinger B, Grady D, Tosteson AN, Pressman A, Macer JL. Effect of the women's health initiative on women's decisions to discontinue postmenopausal hormone therapy. *Obstet Gynecol* 2003;102:1225-1232.

24. Blümel J E, Castelo-Branco C, Kerrigan N, et al. Influences of hormone therapy on postmenopausal women's health perceptions. *Menopause* 2003;10:235-240.

25. Strothmann A, Schneider PG. Hormone therapy: the European women's perspective. *Climacteric* 2003;6:337-346.

26. Thunell L, Stadberg E, Milsom I, Mattsson L-Å. Changes in attitudes, knowledge and hormone replacement therapy use: a comparative study in two random samples with 6-year interval. *Acta Obstet Gynecol Scand* 2005;84:395-401.

27. Lindh-Åstrand L, Brynhildsen J, Hoffmann M, Hammar M. Attitudes towards the menopause and hormone therapy over the turn of the century. *Maturitas* 2006, in press.
28. Topo P, Luoto R, Hemminki E, Uutela A. Declining socioeconomic differences in the use of menopausal and postmenopausal hormone therapy i Finland. *Maturitas* 1999;32:41-145.

29. Matthews KA, Kuller LH, Wing RR, Meilahn EN, Plantinga P. *Am J Epidemiol* 1996;143:971-978.

30. Sogaard AJ, Tollan A, Berntsen GK, Fonnebo V, Magnus JH. Hormone replacement therapy: Knowledge, attitudes, selfreported use – and sales figures in Nordic women. *Maturitas* 2000;35:201-214.

31. Connelly MT, Rusinak D, Livingstone W, Raeke L, Inui TS. Patient knowledge about hormone replacement therapy: implications for treatment. *Menopause* 2000;7:266-272.
32. Björn I, Bixo M, Nöjd KS, Nyberg S, Bäckström T. Negative mood changes during hormone replacement therapy: a comparisons between two progestogens. *Am J Obstet Gynecol* 2000;183:1419-1426.

33. Björn I, Bäckström T. Drug related negative side-effects is a common reason for poor compliance in hormone replacement therapy. *Maturitas* 1999;32:77-86.

34. Buick DL, Crook D, Horne R. Women's perception of hormone replacement therapy: risks and benefits (1980-2002). A literature review. *Climacteric* 2005;8:24-35.

35. Roberts P. The menopause the hormone replacement therapy: views of women in general practice receiving hormone replacement therapy. *Br J Gen Pract* 1991;41:421-424.
36. Hunter M, Lih Mei Liao K. Intentions to use hormone replacement therapy in a community sampla of 45-years-old women. *Maturitas* 1994;20:13-23.

37. Hunter M, O'Dea I. An evaluation of a health education intervention from mid-aged women: five year follow-up of effects upon knowledge, impact of menopause and health. *Pat Educ Coun* 1999;38:249-255.

38. O'Connor AM, Rostom A, Fiset V et al. Decision aids for patients facing treatment or screening decisions: systematic review. *BMJ* 1999;319:731-734.

39. Sydsjö G, Ekholm K, Nyström K, Oscarsson C, Kjellberg S. Knowledge of the reproduction in teenagers and young adults in Sweden. *Eur J Contracept Reprod Health Care* 2006;11:117-125.