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The impact of menopausal symptoms on work ability

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Abstract

Objective: Menopause is an important life event that may have a negative influence on quality of life. Work ability, a concept widely used in occupational health, can predict both future impairment and duration of sickness absence. The aim of this study was to examine the impact of menopausal symptoms on work ability.

Methods: This was a cross-sectional study that used a sample of healthy working Dutch women aged 44 to 60 years. Work ability was measured using the Work Ability Index, and menopausal symptoms were measured using the Greene Climacteric Scale. Stepwise multiple linear regression models were used to examine the relationship between menopausal symptoms and work ability.

Results: A total of 208 women were included in this study. There was a significant negative correlation between total Greene Climacteric Scale score and Work Ability Index score. Total Greene Climacteric Scale score predicted 33.8% of the total variance in the Work Ability Index score. Only the psychological and somatic subscales of the Greene Climacteric Scale were significant predictors in multiple linear regression analysis. Together, they accounted for 36.5% of total variance in Work Ability Index score.

Conclusions: Menopausal symptoms are negatively associated with work ability and may increase the risk of sickness absence.

Key Words: Menopause – Work ability – Sickness absence – Menopausal symptoms – Greene Climacteric Scale – Work Ability Index.

It is well known that menopausal symptoms may have a great impact on quality of life. They may affect physical, emotional, and social aspects of a woman's life. Work participation plays an important role in quality of life because it gives a sense of usefulness and satisfaction. The relationship between menopausal symptoms and work participation has been reported in several studies.[1-3] However, the impact of these symptoms on work ability, a concept widely used in occupational health, has not yet been evaluated.

The concept of work ability was developed in the early 1980s in Finland and was adopted by various other European and Asian countries. According to Ilmarinen,[4] work ability is built on the balance between a person's resources and work demands. It can predict both future impairment[5] and duration of sickness absence.[6] In most countries, women have higher rates of sickness absence than do men, and so do older workers compared with younger colleagues.[7] Furthermore, women 45 years and older have the highest incidence of sickness absence.[7-9]

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To measure work ability, the Finnish Institute of Occupational Health developed the Work Ability Index (WAI).[10] Determinants of work ability are sought in a person's social situation, lifestyle, and work environment. A review by van den Berg et al[11] showed that older age, lower education, being overweight, smoking, and lack of exercise had a negative influence on work ability. This also held true for work-related physical activity and psychosocial stress.

Women undergoing the climacteric are in the age range of women with a higher incidence of sickness absence. This raises the question of whether the presence of menopausal symptoms, besides affecting quality of life, could be a determinant of poor work ability. The effects of menopausal symptoms on work ability are an important subject, especially given the vital importance of women in today's work force. The aim of this study was to examine the impact of menopausal symptoms on work ability through constructing a prediction model that includes menopausal symptoms and important individual and lifestyle factors.

METHODS

Study population and data collection

From October to December 2009, all female employees aged 44 to 60 years at Nij Smellinghe Hospital and at "Palet," a home care organization, were asked to take part in the study and fill out a questionnaire. The hospital is located in Drachten, the Netherlands, and the home care organization is

located in Leeuwarden, the Netherlands. A total of 978 women received a letter or e-mail that outlined the nature and purposes of the study. A link to a Web-based survey was included in this invitation. Participants were informed that the provided data were to be used solely for research purposes. Those returning the questionnaire incompletely were excluded from analysis.

Greene Climacteric Scale

Menopausal symptoms were examined using the Greene Climacteric Scale (GCS), a widely used and psychometrically well-characterized self-report measure of menopausal symptoms.[12] The GCS contains 21 items, divided into various clusters with individual values. These clusters are (1) psychological (11 symptoms), subdivided into anxiety (6 symptoms) and depression (5 symptoms); (2) somatic (7 symptoms); (3) vasomotor (2 symptoms); and (4) sexual (1 symptom). Responses are scored as follows: 0, not existing; 1, sometimes (symptom exists but is not bothersome); 2, often (bothersome during daily activities); and 3, very often (interfering with daily activities). The total GCS score ranges from 0 to 63 points.

Work Ability Index

Work ability was assessed using the Work Ability Index (WAI), developed by the Finnish Institute of Occupational Health.[10] The WAI is a tool with which to assess how well a worker is able to perform his or her work. This questionnaire is widely used in clinical occupational health and research; validity and test-retest reliability have been attained.[13-15] The score is determined through the answers to a series of questions, taking into consideration physical and mental work demands as well as a worker's health status and resources. The WAI covers seven items, each of which is evaluated by one or more questions. The items include (1) current work ability compared with best of lifetime, (2) work ability in relation to job demand, (3) number of current diseases diagnosed by a physician, (4) estimated work impairment due to disease, (5) sickness absence during the past 12 months, (6) own prognosis of work ability 2 years from now, and (7) mental resources (refers to the worker's life in general, both at work and during leisure-time). The total score runs from 7 to 49 points, with a score of less than 37 points indicating "poor" work ability and a score of 37 or greater indicating "good/excellent" work ability.

Individual and lifestyle factors

Information about individual and lifestyle factors was collected using a self-report questionnaire. Length and weight were recorded through self-measuring, and body mass index (BMI) was calculated using the formula weight (in kilograms) divided by height (in meters) squared. Respondents were asked to report the amount of exercise they did per month, scored on a scale from 1 (never) to 6 (5-7 times a week). Smoking status was scored as follows: 1 (never), 2 (quit), 3 (<10 cigarettes per day), and 4 (≥10 cigarettes per day). Level of education ranged from 1 (primary education) to 3 (higher education).

Statistics

To analyze the sample as a whole, the two groups of employees were merged. Descriptive analysis was used to determine possible differences between the two groups in the previously mentioned four individual and lifestyle factors and in GCS and WAI scores. Relationships were assessed using Cramer's V, a measure of association based on the χ^2 test, for discrete measures and the independent samples t test for continuous measures ($\alpha = 0.05$ for all comparisons). Most of the predictor variables were sum variables, the internal consistency of which was validated through calculation of Cronbach α coefficient. $\alpha > 0.6$ was considered acceptable.

Pearson correlation was performed to measure the correlation between GCS (total GCS and the different GCS subscales) and WAI. Linearity was checked using curve estimation procedures. When linearity assumptions were met ($P < 0.05$), predictor variables were included in multiple regression models. The four individual and lifestyle factors were included in the models as covariates. The multicollinearity of the predictor variables was checked by testing the variance inflation factor and tolerance. A stepwise regression approach was used to build a prediction model, with the final model selected on a best-fitting basis. The WAI score was considered the dependent variable, with the others considered independent variables. $P < 0.05$ was considered statistically significant.

RESULTS

Sample characteristics

Of the 978 women asked to participate, 230 (24%) responded. Twenty-two handed in an incomplete questionnaire and were excluded from analysis. Eventually, 208 (21%) women were included. An overview of the population characteristics is presented in Table 1. The median age of the participants was 51 years (range, 44 to 60 years). Age, education level, smoking

TABLE 1. *Sample characteristics*

Characteristic	Hospital (n = 119)	Home care (n = 89)	Total (n = 208)	P^a
Age, median (range), y	52 (44-60)	51 (44-58)	51 (44-60)	0.48
Education, n (%)[b]				0.07
Primary education	0 (0.0)	2 (2.2)	2 (1.0)	
Secondary education	65 (55.6)	58 (65.2)	123 (59.7)	
Higher education	52 (44.4)	29 (32.6)	81 (39.3)	
Smoking, n (%)[b]				0.78
Never	47 (39.8)	30 (34.1)	77 (37.4)	
Quit	52 (44.1)	43 (48.9)	95 (46.1)	
<10 cigarettes/d	11 (9.3)	8 (9.1)	19 (9.2)	
>10 cigarettes/d	7 (5.9)	7 (8.0)	14 (6.8)	
Exercise, n (%)[b]				0.42
(Almost) none	33 (28.2)	29 (32.6)	62 (30.1)	
1-3 times/mo	14 (12.0)	7 (7.9)	21 (10.2)	
1-2 times/wk	50 (42.7)	42 (47.2)	92 (44.7)	
3-5 times/wk	20 (17.1)	10 (11.2)	30 (14.6)	
6-7 times/wk	0 (0.0)	1 (1.1.)	1 (0.5)	
BMI, kg/m^2	24.78 ± 3.75	25.79 ± 4.55	25.21 ± 4.13	0.09

Values expressed as mean ± SD.
BMI, body mass index.
[a] P value of Cramer's V for discrete measures and P value of independent samples t test for continuous measures.
[b] Data missing for two participants.

status, amount of exercise, and BMI did not differ significantly between the employees of the hospital and those of the home care organization. Most of the 208 women had secondary education, were currently nonsmokers, and exercised at least once or twice a week. Mean (SD) BMI was 25.21 (4.13) kg/m^2. The mean (SD) total GCS score was 14.20 (7.68), with no significant differences between the two groups (Table 2). The scores on the subscales did not differ significantly either ($P \geq 0.13$ for all comparisons).

On average, the estimated work ability reported by employees of the home care organization was two points lower than the estimated work ability reported by hospital employees ($P = 0.02$; Table 2). However, at the time of evaluation, 35 (29.4%) hospital employees and 33 (37.1%) employees of the home care organization had a WAI score less than 37, indicating poor work ability ($P = 0.24$). According to these findings, it was permissible to merge the two groups of employees.

For the population in the present study, the internal consistency of the GCS and the WAI scores was acceptable (Cronbach α ranged from 0.631 to 0.865).

Association of menopausal symptoms with work ability

The association between menopausal symptoms and work ability was examined using the total GCS score. There was a significant negative correlation between total GCS score and WAI score ($r = -0.58$, $P < 0.01$; Table 2). In a stepwise multiple linear regression model including total GCS score and important individual and lifestyle factors such as age, level of education, smoking, amount of exercise, and BMI, the variance in WAI score accounted for by the final model was 35.9% ($R^2 = 0.359$; Table 3). Age, smoking, amount of exercise, and BMI were excluded from the equation because these were nonsignificant predictors. The R^2 change when level of education was added to the equation was 0.021 (2.1%). Indicating that total GCS score accounted for 33.8% of the variance in WAI score. For every point on total GCS score, WAI score decreased by 0.45 point.

To determine which GCS subscale would be the strongest predictor, WAI score was regressed on all the different GCS subscales and on important individual and lifestyle factors. To include all GCS subscales in a stepwise multiple linear regression model, Z scores were used. There were no multicollinearity issues, as indicated by the variance inflation factor and tolerance testing. As can be seen in Table 4, only the psychological score, the somatic score, and level of education seemed to be true predictors. After adding these variables into the model, none of the remaining predictors were significant. The final model accounted for 38.4% of the total variance in WAI score. Psychological score ($\beta = -0.45$, $P < 0.001$) was the most influential predictor, followed by somatic score ($\beta = -0.23$, $P = 0.001$) and level of education ($\beta = 0.15$, $P = 0.009$).

TABLE 3. *Stepwise multiple linear regression model of total GCS score and important individual and lifestyle factors and their association with WAI*

	Model 1		Model 2 (final model)	
Predictors	β	P	β	P
Total GCS score	−0.59	<0.001	−0.57	<0.001
Level of education	-	-	0.15	0.009
Age	-	-	−0.04	NS
Smoking	-	-	−0.02	NS
Exercise	-	-	0.05	NS
BMI	-	-	−0.11	NS
Intercept	45.23	<0.001	42.45	<0.001
R^2 or R^2 change	0.338	0.338	0.359	0.021

Cell values are β weights.
R^2 times 100 is the proportion of total variance in WAI explained by the model.
R^2 change refers to the amount by which R^2 increases when a significant predictor is added to the equation.
GCS, Greene Climacteric Scale; WAI, Work Ability Index; BMI, body mass index; NS, nonsignificant.

DISCUSSION

The aim of this study was to examine the impact of menopausal symptoms on work ability within a healthy working population. Among 208 women aged 44 to 60 years, menopausal symptoms were negatively associated with work ability. The total GCS score predicted 33.8% of the variance in score on the WAI. Psychological and somatic GCS subscales seemed to be the strongest predictors, together accounting for

TABLE 2. *GCS subscales, total GCS score, WAI score, internal consistency of these sum variables and Pearson correlation coefficient with WAI score*

Subscale	Hospital (n =122)	Home care (n = 89)	Total (n = 211)	P	Cronbach α[a]	Pearson r[b]
Anxiety score	3.74 ± 2.27	3.81 ± 2.03	3.77 ± 2.17	0.82	0.631	−0.53
Depression score[c]	3.28 ± 2.42	3.49 ± 2.67	3.38 ± 2.53	0.55	0.813	−0.52
Psychological score[c]	7.10 ± 4.32	7.30 ± 4.30	7.20 ± 4.30	0.75	0.826	−0.57
Somatic score	3.64 ± 2.61	4.28 ± 3.32	3.91 ± 2.94	0.13	0.730	−0.47
Vasomotor score	1.99 ± 1.69	2.07 ± 1.62	2.02 ± 1.66	0.75	0.803	−0.25
Sexual dysfunction score[d]	0.91 ± 0.81	1.02 ± 0.90	0.96 ± 0.85	0.33	-	−0.21
Total GCS score[c]	13.79 ± 7.32	14.67 ± 8.10	14.20 ± 7.68	0.43	0.865	−0.58
WAI score	39.59 ± 5.30	37.47 ± 7.01	38.69 ± 6.16	0.02	0.794	-
WAI, n (%)				0.24	-	-
<37 (poor)	35 (29.4)	33 (37.1)	68 (32.7)			
≥37 (good/excellent)	84 (70.6)	56 (62.9)	140 (67.3)			

Continuous values expressed as mean ± SD.
GCS, Greene Climacteric Scale; WAI, Work Ability Index.
[a]*P* value of independent samples *t* test for continuous measures.
[b]Pearson correlation coefficient with WAI score. $P < 0.001$ for all correlations.
[c]Data missing for 14 participants.
[d]Data missing for 1 participant.

TABLE 4. *Stepwise multiple linear regression model of the GCS subscales and important individual and lifestyle factors and their association with WAI*

	Model 1		Model 2		Model 3 (final model)	
Predictors	β	*P*	β	*P*	β	*P*
Psychological score	−0.57	<0.001	−0.44	<0.001	−0.45	<0.001
Somatic score	-	-	−0.26	<0.001	−0.23	0.001
Anxiety score	-	-	-	-	−0.04	NS
Depression score	-	-	-	-	0.04	NS
Vasomotor score	-	-	-	-	−0.00	NS
Sexual dysfunction score	-	-	-	-	0.08	NS
Level of education	-	-	-	-	0.15	0.009
Age	-	-	-	-	−0.09	NS
Smoking	-	-	-	-	−0.03	NS
Exercise	-	-	-	-	0.06	NS
BMI	-	-	-	-	−0.10	NS
Intercept	38.52	<0.001	38.56	<0.001	35.99	<0.001
R^2 or R^2 change	0.320	0.320	0.365	0.045	0.384	0.019

Cell values are β weights.
R^2 times 100 is the proportion of total variance in WAI explained by the model. R^2 change refers to the amount by which R^2 increases when a significant predictor is added to the equation.
GCS, Greene Climacteric Scale; WAI, Work Ability Index; BMI, body mass index; NS, nonsignificant.

36.5% of the variance in WAI score. The only covariate attributing to the prediction model was level of education, although it does so to a far smaller extent than that of the menopausal symptoms, explaining 2.1% of the variance in WAI score.

This is the first study to use the WAI to examine the impact of menopausal symptoms on work ability. Several previous studies have addressed the possibility of a relationship between menopausal symptoms and work participation. In 1997, Ilmarinen et al[5] recommended the study of physiological and mental changes associated with menopause in relation to work ability. They reported that women around the age of 51 years had the highest annual declining rate in work ability. Williams et al[2] reported that severe vasomotor symptoms were nearly 3 times as likely to have a negative impact on work life of women compared with mild to moderate symptoms. Another study showed that sleep disturbances resulting from nightly hot flashes decrease work productivity.[16] Burton et al[17] compared patterns and severity of self-reported work impairment associated with common medical conditions (including menopause) and demonstrated that menopause was not associated with an increased likelihood of productivity impairment. In all of these studies, the relationship between menopausal symptoms and work only played a minor role in the analysis. Moreover, menopausal symptoms and work productivity were assessed using a single question. To evaluate symptoms, Sarrel et al[3] measured the effect of menopausal symptoms on the capacity to function at work using a 0 to 4 scale ranging from "no effect" to a "severe effect." Two thirds of the women stated that their menopausal symptoms had a moderate to severe effect and that some had even quit working as a result. The most frequently cited symptoms affecting work were sleep disturbance and hot flashes. This is partly corresponding to our findings because sleep disturbance is represented in the psychological GCS subscale, a significant predictor of the variance in WAI score.

The finding that psychological and somatic GCS subscales were strong predictors seems consistent with other studies examining the effect of various determinants on work ability.[18-20] These studies reported an association between poor physical condition and low WAI score. The association between work ability and psychosomatic symptoms was demonstrated by Pohjonen.[21] The symptoms were assessed using a seven-item questionnaire, of which six items were similar to those in the psychological and somatic GCS subscales. The presence of psychosomatic symptoms seemed to be a strong predictor of work ability, even after adjustment for age. Besides this study, no comparable data are available concerning menopausal symptoms and the WAI.

Previous research has shown that vasomotor symptoms have a negative influence on quality of life; the suggestion that they might have a negative impact on work ability has been made.[2,3,22] In our study, the vasomotor GCS subscale did not obviously influence the WAI score. Although the scale had a significant negative linear correlation with the WAI score ($r = -0.25$, $P < 0.01$), no significant attribution was observed in the multiple regression model. The mean (SD) score on the vasomotor GCS subscale was 3.91 (2.94), indicating that most of the women rated their vasomotor symptoms as "symptom exists but is not bothersome." If they perceived their vasomotor symptoms as "not bothersome," then it is expected that no effect on work ability was seen. This could explain the difference in findings between this study and other studies in which the women had severe hot flashes. Several studies indicated a causal relationship between vasomotor symptoms and elements of the psychological and somatic subscales. Blumel et al[23] showed that vasomotor symptoms were an important marker of psychological and somatic symptoms. Joffe et al[24] reported that perimenopausal women with vasomotor symptoms were 4.39 times more likely to be depressed than those without vasomotor symptoms. A similar impact was found by Juang et al,[25] who found significant higher anxiety

and depression scores for women with hot flashes compared with those without. According to Freedman and Roehrs[26] and Ohayon,[27] vasomotor symptoms are associated with sleep disturbances like arousal from sleep and chronic insomnia, an item that is part of the psychological GCS subscale. Future research on the relationship of vasomotor symptoms with WAI should focus on women with more severe complaints.

This study has several limitations. The cross-sectional design makes it impossible to determine the exact nature of the association between menopausal symptoms and work ability. Study participants were employees in health and social services, and these jobs are physically more strenuous than average. Generally, this would result in higher prevalence rates of poor work ability.[5] On the other hand, work-related factors are less confounding because they are roughly the same in all participants. Participants might also have had easier access to and better knowledge of (self-help) medication and lifestyle interventions because of their occupational background. This, together with the fact that all participants were working employees at the time of inquiry, may have resulted in better GCS scores, particularly because it is known that women who work have a better menopause-specific quality of life.[2]

Finally, the response rate was rather low (24%), and this may have led to sampling bias. It can also be hypothesized that those women with decreased work ability were less likely to participate. All women received a questionnaire through their employer. This may have led some of them to believe that the outcome of the WAI might become available to their employer, thus preventing them from taking part in the study.

CONCLUSIONS

In conclusion, this is the first study to use the WAI to examine the impact of menopausal factors on work ability. Menopausal symptoms are negatively associated with work ability. These findings suggest that menopausal symptoms may increase the risk of sickness absence, although this would need to be investigated in a future study. A better understanding of this relationship could enable us to determine future interventions to improve work ability, thereby maintaining the position of women challenged by menopausal symptoms in working life.

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