Jurnal Aisyah: Jurnal Ilmu Kesehatan

Volume 6, Issue 4, December 2021, p. 719–724
ISSN 2502-4825 (print), ISSN 2502-9495 (online)

The Relationship Between Menopausal Symptoms and Cognitive Function Among Postmenopause Women in Indonesia

Aminah[1*]; Eli Amaliyah[2]

[1*),2]Nursing Departement, Faculty of Medicine, Universitas Sultan Ageng Tirtayasa, Banten, Indonesia

ARTICLE INFO

Article history:

Received 11 June 2021
Accepted 21 October 2021
Published 10 December 2021

Keyword:

Menopause
Symptoms
Cognitive Function
Indonesia

A B S T R A C T

Although memory changes may be a result of menopausal symptoms in healthy individuals, the nature of the relationship between menopausal symptoms and cognitive deficits in the context of postmenopausal women remains unclear. This study aimed therefore to evaluate the relationship among postmenopausal Indonesian women between distinct menopausal symptoms and the cognitive function. This study was conducted using a cross-sectional design at two public health centers in Banten, Indonesia. A total of 200 participants were recruited. Data included demographic and clinical information, scores from the Green Climacteric Scale (GCS) for menopausal symptom measurements, and scores from Montreal Cognitive Assessment (MoCA). Multiple regression analyses explored the association between menopausal symptoms and cognitive function. The average age of the sample was 65.6 years (standard deviation: 10.3). Postmenopausal women with cognitive impairment were found to have significantly different month since menopause than postmenopausal women without cognitive decline (p = 0.001). The mean score for anxiety and vasomotor symptoms was greater in women with cognitive decline than in women without cognitive decline (3.42.56 vs. 3.72.69, and 0.810.81 vs. 1.071.0, respectively). Anxiety (B = -0.15, p =0.03) was found to be substantially associated with it. Anxiety was associated with poor cognitive function in postmenopausal women. More nurse-enhanced cognitive training interventions should be developed and modified for testing with Indonesian postmenopausal women.

Kata kunci:

Menopause
Gejala
Fungsi Kognitif
Indonesia

**) corresponding author*

Departement of Nursing, Faculty of Medicine, Universitas Sultan Ageng Tirtayasa Jalan Letnan Jidun No.02 Kepandean, Serang, Banten (42117), Indonesia

Email: aminah.untirta@gmail.com

DOI: 10.30604/jika.v6i4.727

A B S T R A K

Meskipun perubahan memori mungkin merupakan hasil dari gejala menopause pada individu yang sehat, sifat hubungan antara gejala menopause dan defisit kognitif dalam konteks wanita pascamenopause masih belum jelas. Penelitian ini bertujuan untuk mengevaluasi hubungan di antara perempuan Indonesia pascamenopause antara gejala menopause yang berbeda dan fungsi kognitif. Penelitian ini dilakukan dengan menggunakan desain cross-sectional di dua pusat kesehatan masyarakat di Banten, Indonesia. Sebanyak 200 peserta direkrut. Data termasuk informasi demografis dan klinis, skor dari skala klimakterik hijau (GCS) untuk pengukuran gejala menopause, dan skor dari penilaian kognitif Montreal (MOCA). Analisis regresi berganda mengeksplorasi hubungan antara gejala menopause dan fungsi kognitif. Usia rata-rata sampel adalah 65,6 tahun (standar deviasi: 10.3). Perempuan pascamenopause dengan gangguan kognitif ditemukan memiliki bulan yang berbeda secara signifikan sejak menopause daripada wanita pascamenopause tanpa penurunan kognitif (p = 0,001). Skor rata-rata untuk gejala kecemasan dan vasomotor lebih besar pada wanita dengan penurunan kognitif daripada pada wanita tanpa penurunan kognitif (3.42,56 vs 3.72,69, dan 0,810,81 vs. 1.071.0).

Kecemasan (b = -0.15, p = 0,03) ditemukan secara substansial dikaitkan dengannya. Kecemasan dikaitkan dengan fungsi kognitif yang buruk pada wanita pascamenopause. Lebih banyak intervensi pelatihan kognitif yang ditingkatkan perawat harus dikembangkan dan dimodifikasi untuk pengujian dengan perempuan pascamenopause Indonesia.

INTRODUCTION

Menopausal symptoms occur as estrogen levels decline during the menopausal periods (Rahman et al., 2010). Menopause is characterized by the cessation of menstrual bleeding for a period of twelve months or more, with the typical age of menopause falling between 45 and 50 years old on the female reproductive cycle. (Fuh et al., 2001). Menopause occurs in nearly all postmenopausal women, with 89% of these women reporting some or even several menopausal symptoms. (Singh & Pradhan, 2014) Almost 30% of women with postmenopausal diseases are severe, compared with 26% of women with perimenopausal diseases and 12.9% of premenopausal (Blümel et al., 2012).

Symptoms can be categorized into physical symptoms such as hot flushes and night sweats, as well as vasomotor symptoms (such as hot flushes and night sweats). The physical symptoms can be further categorized into other physical symptoms (such as dizziness, a feeling of tightness in the head or body, numbness, headaches, muscle and joint pain, and reduced feeling in hands or feet). Further, emotional symptoms such as anxiety and depression can also be categorized as mental symptoms (loss of interest in sex). (Greene, 2008) Postmenopausal symptoms vary according to biological and psychological variables. (Blümel et al., 2012) Women who suffer from chronic conditions such as diabetes or HIV experience an increased number of menopausal symptoms. (Boonyanurak et al., 2012; H.-L. Wang et al., 2013). Even in the absence of cardiovascular disease, women with psychological and vasomotor symptoms reported considerably more severe problems. (H.-L. Wang et al., 2013) Some studies have documented alterations in memory due to the indirect effects of menopause symptoms like anxiety, mood, and vasomotor symptoms (Nelson et al., 2002). Another study indicated that vasomotor symptoms (hot flashes) have a deleterious effect on middle-life female verbal memory ability. (Greendale et al., 2010)found that high levels of anxiety are inversely correlated with learning. A further finding was that women who experienced more menopausal symptoms, such as hot flashes and difficulties concentrating, had worse memory losses. (Woods et al., 2010) Although the majority of women are postmenopausal, there is scant evidence that menopausal symptoms lead to cognitive impairment in this group of women.

Despite advances in this research, the processes behind cognitive deterioration in postmenopausal women remain unknown.(Chen et al., 2010) Estrogen also influences both the frontal and hippocampal regions, both of which are essential for cognitive capacities, such as executive function and memory. (Maki & Resnick, 2001) Menopausal symptoms are a significant risk factor for cognitive deterioration in elderly women who are otherwise healthy. (Ryan et al., 2014; J. H. Wang & Chen, 2012) Menopause and cognitive alterations are both connected by two theories. The first factor involved is lowering levels of estradiol. These have an effect on the hippocampus and the prefrontal cortex, which are involved in cognitive performance in both animals and humans. (Lim et al., 2012) Secondly, an indirect cause of cognitive alterations such as sleep and mood problems, anxiety, and maybe vasomotor symptoms is another possible etiology to consider. (Fredrickson et al., 2010) However, little research has been done on the relationship between menopausal symptoms and cognitive deterioration in postmenopausal women. This study aimed therefore to evaluate the relationship among postmenopausal Indonesian women between distinct menopausal symptoms and the cognitive function.

METHOD

Study design

A cross-sectional, correlational study design was conducted.

Sample

Women were specifically targeted for recruitment, and the following conditions were met in order to be eligible to take part in the research: 1) over 65 years old; 2) no menstrual periods for 12 months; 3) Able to communicate in and write the Indonesian language; and 4) no serious medical conditions. Women were excluded if they had a known disorder that impairs cognitive function.

Instrument

A demographic and clinical information form comprising age, marital status, education, work, the Body-mass index was obtained. Menopausal data were also gathered (age at menstruation and menopause, taking hormone).

The Greene Climacteric Scale was used to assess the severity of menopausal symptoms (GCS). The GCS is composed of 21 self-reported items separated into four subscales: vasomotor, psychological, somatic, and loss of interest in sex symptoms. Each symptom is graded on a four-point Likert scale ranging from 0 to 3 (0 equals not at all; 1 equals a little; 2 equals quite a deal; and 3 equals excessively). The scale ranges from 0 to 63, with higher values indicating greater symptoms. The internal consistency reliability was between 0.70 and 0.91.18,25.

Overall cognitive function was assessed using the Montreal Cognitive Assessment (MoCA) (Nasreddine et al., 2005). The MOCA is a one-page multiple-choice test with 30 questions that takes 10 minutes to complete. The domain including aattention, abstraction, 5-min delayed verbal memory, and orientation. The MoCA scale has a range of 0 to 30, with a higher score indicating greater overall cognitive function. The alpha of Cronbach was 0.83 for the MoCA.

Procedure

Data were collected from January 2020 to March 2020 at two public health centers in Banten, Indonesia. The ethics committee of the affiliated university granted permission to perform this study. Prior to data collection, both written and oral consent were obtained. Patients were given the option of declining to participate in the research at any point. The face-to-face interview was conducted in a private room. Each interview was conducted by a neuropsychologist on the research team. Data comprising demographic and clinical information, menopause symptoms, and neuropsychological information were obtained. The examinations and surveys were administered for about 40 to 60 minutes.

Data Analysis

The statistical software for social science (SPSS) version 20.00 for Windows was used to conduct all data analyses. A descriptive analysis was conducted employing the frequency, mean, and standard deviation distributions. Fisher test, Pearson correlation, ANCOVA, and stepwise regression analysis were employed in an analytic study. The *p* level was determined to significantly be 0.05.

RESULTS

Approximately 200 women were recruited for this research (Table 1). The average age of the sample was 65.6 years (standard deviation: 10.3). Women had an average of seven years of education (SD=3.3). The majority of participants were married (79.9%), unemployment (91.9%), and living with relatives (83.3 percent). We analyzed the two subgroups' demographic and clinical features. Postmenopausal women with cognitive impairment were found to have significantly different month since menopause than postmenopausal women without cognitive decline (p = 0.001).

Table 1.
Demographic and clinical characteristics by group

	Total	Women with cognitive decline	Women without cognitive decline	P-value
Characteristic	(n = 200)	(n=76)	(n=124)	
Age, mean (SD)	65.6 (10.8)	66.1 (8.54)	65.1 (9.49)	0.057
Education, mean (SD)	7.5 (3.7)	6.9 (2.39)	7.1 (3.27)	0.126
Marital status, n (%)				
Married	124 (62)	32 (42.1)	92 (74.2)	0.063
Single	76 (38)	34 (56.9)	42 (23.9)	
Employment status, n (%)				0.167
Unemployed	158 (79)	43 (56.6)	80 (64.5)	
Employed	42 (21)	33 (43.4)	44 (35.5)	
Live alone, n (%)				
No	112 (56)	30 (39.5)	82 (66.1)	0.123
Yes	88 (44)	46 (60.5)	42 (39.1	
Number of comorbidities, mean (SD)	1.3 (0.7)	1.6 (0.67)	1.1 (0.22)	0.101
Months since menopause, mean (SD)	227 (134)	287.9 (104.7)	169.2 (112.4)	< 0.001**
Currently using HRT, n (%)				
No	168 (84)	65 (85.5)	103 (83.1)	0.693
Yes	32 (6)	11 (14.5)	21 (16.9)	

Abbreviations: HRT, hormone replacement therapy; *P < 0.05 **P <0.01 ***P<0 .001

Anxiety, depression, somatic, vasomotor, and sexual symptoms were not statistically different between women with and without cognitive decline. The mean score for anxiety and vasomotor symptoms was greater in women with cognitive decline than in women without cognitive decline (3.42.56 vs. 3.72.69, and 0.810.81 vs. 1.071.0, respectively), even though the difference was not statistically significant (Table 2).

Table 2.
Menopausal symptoms and cognitive function by groups (N= 200)

	Women with cognitive decline mean (SD)	Women without cognitive decline mean (SD)	*p*-value
The GCS			
Anxiety symptoms	3.9 (1.76)	2.5 (1.69)	0.013
Depressive symptoms	3.3 (2.88)	3.4 (2.65)	0.277
Somatic symptoms	5.8 (4.55)	5.4 (3.66)	0.165
Vasomotor symptoms	1.81 (1.04)	1.0 (0.42)	0.038
Sexual symptoms	0.23 (0.18)	0.26 (0.15)	0.188

Note. *P < 0.05 **P <0.01 ***P<0 .001;

Postmenopausal women were enrolled in a study that included a series of regression models that were adjusted for age, years of schooling, and comorbidities, as well as relationships between GCS subscales scores and MOCA scores. When MOCA was used as the dependent variable, anxiety (B = -0.15, p =0.03) was found to be substantially associated with it. Women with higher levels of anxiety demonstrated a decline in general cognitive function (Table

3). This study partially supported the relationship between menopausal symptoms and general cognitive.

Table 3.
Multiple regression analysis: explanatory variables of the Greene Climacteric Subscales

Models	Independent Variables	B	SE B	Beta	*t*	P value
MOCA	Anxiety symptoms	-0.15	0.06	-0.15	-2.01	0.03
	Depressive symptoms	-0.06	0.03	-0.06	-0.42	0.65
	Somatic symptoms	-0.03	0.05	-0.17	-1.23	0.21
	Vasomotor symptoms	0.06	0.28	0.08	0.17	0.84
	Sexual symptom	-0.03	0.01	-0.07	-0.13	0.63

Note: Linear regression analysis adjusted by age, level education and comorbidity

DISCUSSION

To our knowledge, these are the few studies which study the relationship between menopause and cognitive function in women who are postmenopausal. Women with cognitive decline experienced significantly more severe anxiety and somatic symptoms than women with normal cognitive function, despite the fact that the difference was not statistically significant. Moreover, the cognitive performance is associated substantially with anxiety.

According to the findings of the current study, there were no statistically significant differences in menopause symptoms between postmenopausal women with cognitive decline and those with normal cognitive function. The explanation possibilities are women with cognitive decline who might forget to remember their symptoms, due to difficulties with memory, or people with diminished cognitive function. Both study results show that the differences in menopause symptoms between women with normal cognition and those with diminished cognitive function are significant (Pressler et al., 2010). Another possible explanation for the absence of differences between two groups is that women can be more severely affected by symptoms. Because these symptoms impair quality of life, future interventions to alleviate menopausal symptoms are required.

No correlations between particular menopausal symptoms and cognitive ability have been observed in previous investigations of cognitive function. Our study discovered that anxiety symptoms influenced women's performance on cognitive tasks. Researchers observed that HRT improved verbal memory for women with menopausal symptoms in a meta-analyzed study with regard to the effect of HRT on cognitive declines among healthy postmenopausal women, but no effect on asymptomatic women. Even though this research did not investigate the possibility of a relationship between menopausal symptoms and memory, these investigations at least provide insight into this area.

Women who experienced anxiety symptoms had worse cognitive function, similarly to people in other populations of women who experienced anxiety symptoms. The association between anxiety symptoms and memory has received little attention in Indonesian postmenopausal women. It is possible that psychological anxiety causes a rise in cortisol levels by activating the hypothalamus-pituitary adrenal (HPA) axis(Wolf, 2009), which is thought to be the cause of the connection. Increased cortisol hindered memory retrieval by decreasing hippocampal activation, according to fMRI (Oei et al., 2007). Further research into the relationship between anxiety and memory in postmenopausal women is required.

There was no direct correlation between depressed, somatic, vasomotor, or sexual symptoms and cognitive function in the current group. Some studies that looked at memory and other reported symptoms, such as depression 6 and health-related quality of life (Pressler et al., 2010), came up with similar findings. Previous research has revealed that objective measures do not have a substantial correlation with subjective measures (Pressler et al., 2010). It is also possible that the low levels of depressive (mean=2.43), somatic (mean=3.55), vasomotor (mean=0.91), and sexual symptoms (mean=) in this population did not have an impact on cognitive function. In future studies in women, actual depressive measurements, somatic and vasomotor symptoms can be applied, and their relation to the cognitive function can be explored.

In addition, the mean age of the women in our sample was 65.6 years (standard deviation = 10.8). A recent study(Espeland et al., 2004) found no evidence of estrogen having a neuroprotective effect in elderly women. The effect of estrogen on the aging brain may differ from that on the brains of younger people; the relationship between menopausal symptoms, estrogen loss, and cognitive performance may differ with age. Future research should involve younger women to further understand the relationship.

There are various limitations to this study. First, the findings are not applicable to women with other menopausal statuses or diseases. The convenience sample was also collected from a public health center which is not often representing women after menopause.

CONCLUSION

Anxiety was associated with poor cognitive function in postmenopausal women. Postmenopausal women who exhibit increased anxiety and sexual sensations may be at increased risk of cognitive deficit. These findings indicate the necessity for intervention trials to addressmenopausal symptoms and cognitive function decrease. Health care providers may consider strategies in education programs for any symptoms or disease management that provide not only verbal explanations but also use media, such as video, pamphlets, or leaflets, as reminders. Cognitive training interventions have been limited in this population. More nurse-enhanced cognitive training interventions should be developed and modified for testing with Indonesian postmenopausal women.

Conflict of Interest

All authors declare no conflict of interest.

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 ISSN 2502-4825 (print), ISSN 2502-9495 (online)