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Factors associated with motivation for dementia-preventive lifestyle change in women with surgical menopause

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Abstract

Background

Women with surgical menopause (WSM) may be at increased risk of cognitive decline and dementia because of abrupt estrogen deprivation and associated health-related changes. This study aimed to examine factors associated with motivation for dementia-preventive lifestyle change among WSM.

Methods

This cross-sectional study included 75 WSM recruited from a university hospital in Türkiye between May and August 2025. Data were collected using the Menopause Rating Scale (MRS), Dementia Knowledge Assessment Scale (DKAS), Australian National University Alzheimer's Disease Risk Index–Short Form (ANU-ADRI), and Motivation to Change Lifestyle for Dementia Risk Reduction Scale (MOCHAD-10). Multiple linear regression analysis was performed after adjustment for sociodemographic covariates to identify factors associated with motivation for dementia-preventive lifestyle change.

Results

The mean age of participants was 49.14 ± 5.69 years. Higher ANU-ADRI scores were significantly associated with lower MOCHAD-10 scores (β = −0.32, p = 0.048), while older age at surgical menopause was negatively associated with motivation for lifestyle change (β = −0.32, p = 0.043). Dementia knowledge was not significantly associated with motivation (β = 0.16, p = 0.210). Menopausal symptom burden showed a positive trend toward association with motivation, although the relationship did not reach statistical significance (β = 0.25, p = 0.052).

Conclusions

Lower dementia risk and younger age at surgical menopause were associated with greater motivation for dementia-preventive lifestyle change among WSM. Dementia-related knowledge was not independently associated with motivation. These findings suggest that motivation for dementia-preventive behaviors in this population may be influenced by multiple health-related factors and warrant further investigation in larger longitudinal studies.

Background

Surgical menopause typically follows bilateral salpingo-oophorectomy (BSO), which is performed for both malignant and benign gynecological conditions [1]. Unlike natural menopause, BSO results in an abrupt and permanent decline in estrogen levels, leading to the sudden onset of menopausal symptoms that are often more severe and distressing [2, 3]. Women with surgical menopause (WSM) frequently

experience vasomotor symptoms, sleep disturbances, anxiety, depression, and mood disorders, all of which can negatively affect quality of life [2, 4].

Estrogen plays a critical role in maintaining brain health and cognitive function throughout life. Consequently, the abrupt loss of estrogen following surgical menopause has been associated with adverse neurocognitive outcomes, including impairments in verbal, visual, and semantic memory, verbal fluency, and visuospatial abilities [5–7]. In addition, menopause is often accompanied by sleep disruption, metabolic alterations such as abdominal obesity and insulin resistance, and increased cardiovascular risk factors, which have also been linked to cognitive decline and dementia risk [7–9]. Several studies have suggested that earlier surgical menopause and prolonged estrogen deprivation may increase the risk of cognitive impairment and dementia in later life [5, 10, 11]. WSM may therefore face a unique combination of abrupt hormonal changes, severe menopausal symptoms, and elevated dementia-related risk factors, making them an important target population for dementia prevention efforts.

Given the absence of curative treatments for most forms of dementia, increasing attention has been directed toward prevention strategies targeting modifiable risk factors. The Lancet Commission estimates that up to 40% of dementia cases may be preventable through lifestyle-related interventions [13]. Dementia knowledge is considered an important component of prevention because greater awareness of dementia and its modifiable risk factors may improve individuals' understanding of preventive behaviors and their perceived ability to reduce risk [14, 15]. Individuals with greater dementia knowledge may be more likely to perceive dementia as partially preventable and consequently show greater willingness to engage in risk-reducing lifestyle behaviors. Furthermore, lifestyle modifications recommended for dementia prevention, including regular physical activity, healthy nutrition, and cardiovascular risk management, may also help alleviate menopausal symptoms and improve overall well-being among women experiencing menopause [7].

Motivation is widely recognized as a key determinant of health behavior change and an important precursor to the adoption and maintenance of preventive health practices. Behavioral theories suggest that individuals are more likely to initiate and sustain lifestyle changes when they possess sufficient motivation and perceive such changes as meaningful and beneficial. Therefore, identifying factors associated with motivation for dementia-preventive lifestyle change may provide valuable insights for the development of effective prevention interventions among populations at increased risk of dementia.

Despite growing evidence linking surgical menopause with increased dementia risk, little is known about factors that may influence women's motivation to engage in dementia-preventive lifestyle behaviors. In particular, the relationships among dementia knowledge, dementia risk, and menopausal symptom burden remain poorly understood in WSM. Understanding these associations may help identify opportunities for tailored educational and behavioral interventions aimed at promoting dementia-preventive lifestyle changes and reducing future dementia risk in this vulnerable population. Therefore, this study aimed to examine the associations among dementia knowledge, dementia risk index, and

menopausal symptom burden in relation to motivation for dementia-preventive lifestyle change among WSM.

Methods

Study design

This cross-sectional study was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Participants

The study sample comprised 75 WSM who attended a gynecology outpatient clinic at a university hospital in Western Turkey between May and August 2025. Inclusion criteria were having undergone surgical menopause at least six months prior, being able to understand and speak Turkish, and providing informed consent. Exclusion criteria included conditions impairing communication, a diagnosis of dementia, and age below 40 years, as dementia risk is considered low in this age group [16]. Based on hospital records from the preceding year, approximately 95 eligible women were expected during the study period. Of these, 75 consented to participate and completed the study questionnaires.

Instruments

Descriptive characteristics form

This form includes 10 items assessing participants' characteristics, such as age, employment status, age at surgical menopause, menarche, smoking status, and use of hormone therapy.

Menopause Rating Scale (MRS)

The MRS comprises 11 items rated on a 5-point Likert scale ranging from 0 to 4, where higher scores indicate more severe menopausal symptoms [17]. The total MRS score can range from 0 to 44, with 0 indicating the absence of symptoms, and 44, the most severe symptomatology. The scale comprises three subdimensions: psychological, somatic-vegetative, and urogenital. The Turkish validity and reliability of the scale was performed by Metintas et al. (2010), and the scale's Cronbach's alpha value is 0.81 [18].

Dementia Knowledge Assessment Scale (DKAS)

The DKAS, originally developed by Annear et al. (2015), is designed to evaluate individuals' knowledge related to dementia [19]. It uses a 5-point Likert-type response format, with response options including

‘false,’ ‘probably false,’ ‘I don’t know,’ ‘probably true,’ and ‘true’. Scoring is structured such that 2 points are awarded for correctly identifying a true or false statement, and 1 point for selecting “probably true” or “probably false” respectively for true and false statements. Responses such as “I don’t know” or incorrect confidence choices receive 0 points. Each item yields a score between 0 and 2. The original scale consists of 25 items with a maximum possible score of 50 [19]. The Turkish version, validated by Akyol et al. (2021), comprises 17 items across four subdimensions (causes and characteristics, communication and behavior, care considerations, and risk factors and health promotion), with higher scores indicating greater dementia-related knowledge [20]. The Turkish validity and reliability study reported a Cronbach’s alpha coefficient of 0.83 [20].

Australian National University Alzheimer's Disease Risk Index-Short Form (ANU-ADRI)

The ANU-ADRI is a questionnaire-based instrument developed at the Australian National University to assess Alzheimer's disease (AD) risk [21]. The instrument evaluates 11 risk factors and 4 protective factors associated with AD. The short form consists of 45 items assessing demographic, lifestyle, medical, and psychosocial factors related to dementia risk. Responses are weighted according to established risk algorithms, and a total score is calculated by summing individual item scores. Higher scores indicate a greater estimated risk of developing AD, whereas lower or negative scores reflect the presence of protective factors. Because the ANU-ADRI incorporates both risk and protective factors, total scores may include both positive and negative values. The Turkish validity and reliability of the scale was performed by Mutlay et al. (2024), and the scale demonstrated excellent reliability with an intraclass correlation coefficient of 0.99 [22].

Motivation to Change Lifestyle for Dementia Risk Reduction Scale (MOCHAD-10)

The MOCHAD-10 is a 10-item self-report instrument developed to assess individuals’ motivation to adopt lifestyle and health behavior changes aimed at reducing dementia risk [23]. Items are rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale comprises two subdimensions: positive cues to action and negative cues to action. Total scores range from 10 to 50, with higher scores indicating greater motivation to engage in dementia-preventive lifestyle changes. The Turkish validity and reliability of the scale was performed by Zehirlioglu et al. (2019), and the scale demonstrated good internal consistency with a Cronbach’s alpha coefficient of 0.79 [24].

In the present study, internal consistency was acceptable to excellent, with Cronbach's alpha coefficients of 0.93 for the MRS, 0.77 for the DKAS, and 0.80 for the MOCHAD-10.

Data collection

Participants were recruited using purposive sampling. The participants were informed about the study objectives and procedures and advised that participation was voluntary and that they could withdraw at any time without consequences. Data were collected through face-to-face administration of the instruments after obtaining informed consent. Completion of the questionnaires took approximately 25 minutes.

Data analysis

Data were analyzed using IBM SPSS Statistics version 24.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics are presented as frequencies, percentages, means, and standard deviations. The normality of continuous variables was evaluated using skewness and kurtosis values, histograms, and Q–Q plots. Multiple linear regression analyses were performed to examine the associations of dementia knowledge assessment (DKAS), dementia risk (ANU-ADRI), and menopausal symptom burden (MRS) with motivation for dementia-preventive lifestyle change (MOCHAD-10). Age, education level, employment status, place of residence, marital status, income status, smoking status, age at menarche, age at surgical menopause, and use of hormone therapy were included as covariates based on theoretical relevance and evidence from previous literature regarding menopausal health and dementia risk. Prior to regression analyses, assumptions of linearity, normality, homoscedasticity, independence of errors, and multicollinearity were assessed. Independence of residuals was evaluated using the Durbin–Watson statistic. Standardized regression coefficients (β), adjusted R^2 values, and corresponding p-values are reported. Given the cross-sectional design, findings are interpreted as associations rather than causal relationships. Statistical significance was set at $p < 0.05$.

Results

The mean age of the participants was 49.14 ± 5.69 years, and the mean age at surgical menopause was 45.10 ± 4.40 years. Most participants had a university education (62.7%), were unemployed (58.7%), resided in urban areas (81.3%), and were married (72.4%). More than half reported that their income was equal to their expenses (56.0%), and most had not received hormone therapy following surgical menopause (73.3%) (Table 1).

Table 1
Descriptive characteristics of women with surgical menopause (n = 75)

Age (year)	***Mean* (SD)**	**min-max**
	49.14 (5.69)	**40–73**
Age at Menarche (year)	13.16 (1.23)	11–15
Age at Surgical menopause (year)	45.10 (4.40)	27–52
	n	**(%)**
Education level		
Elementary school	9	12
High school	19	25.3
University	47	62.7
Employment status		
Employed	31	41.3
Unemployed	44	58.7
Place of residence		
Urban	61	81.3
Rural	14	18.7
Marital status		
Married	58	72.4
Not married	17	27.6
Income status		
Income greater than expenses	15	20
Income equal to expenses	42	56
Income lower than expenses	18	24
Smoking status		
Yes	44	58.7
No	31	41.3
Use of hormone therapy		
SD: standard deviation, min: minimum, max: maximum		

Age (year)	*Mean* (SD)	min-max
	49.14 (5.69)	**40–73**
Yes	20	26.7
No	55	73.3
SD: *standard deviation, min: minimum, max: maximum*		

The mean scores of the study variables were 21.52 ± 11.57 for the MRS, 11.26 ± 5.82 for the DKAS, 3.05 ± 7.15 for the ANU-ADRI, and 33.09 ± 6.40 for the MOCHAD-10.

Table 2 presents the results of the multiple linear regression analysis. The regression model accounted for 31.0% of the variance in motivation for dementia-preventive lifestyle change ($R^2 = 0.31$), with an adjusted R^2 of 0.16. Higher dementia risk scores (ANU-ADRI) were significantly associated with lower motivation for dementia-preventive lifestyle change ($\beta = -0.32$, $p = 0.048$). Similarly, older age at surgical menopause was negatively associated with motivation scores ($\beta = -0.32$, $p = 0.043$). Dementia knowledge (DKAS) was not significantly associated with motivation for lifestyle change ($\beta = 0.16$, $p = 0.210$). Menopausal symptom burden (MRS) showed a positive trend toward association with motivation scores, although the relationship did not reach statistical significance ($\beta = 0.25$, $p = 0.052$).

Table 2. Multiple linear regression analysis of factors associated with motivation for dementia-preventive lifestyle change

	Model	B	Std Error	β	t	p*	VIF
MOCHAD-10	ANU-ADRI	-.286	.142	-.320	-2.015	**.048**	1.164
	MRS-Total	.139	.073	.252	1.899	.052	1.191
	DKAS-Total	.177	.140	.161	1.266	.210	1.354
	Age	.323	.177	.288	1.829	.072	1.363
	Education level	1.330	1.679	.146	.792	.431	-
	Employment status	.421	.954	.065	.441	.661	1.506
	Place of residence	.607	1.776	.041	.341	.734	1.229
	Marital status	-.431	.972	-.057	-.443	.659	1.298
	Income status	-1.522	1.346	-.158	-1.131	.263	1.436
	Smoking status	-.542	1.496	-.042	-.362	.718	1.132
	Age at Menarche	-.381	.620	-.073	-.614	.542	1.299
	Age at Surgical menopause	-.370	.179	-.316	-2.064	**.043**	1.629
	Use of hormone therapy	2.613	1.740	.182	1.502	.138	1.220
	Constant	30.028	14.804		2.028	0.047	
Model statistics		***Value***					
R		0.556					
R^2		0.310					
Adjusted R^2		0.162					
F		2.104					
DW		2.292					

β: Beta, Std Error: Standart Error, DW: Durbin-Watson,VIF: Variance Inflation Factor Statistical significance was set at p < 0.05.

ANU-ADRI: Australian national university Alzheimer's disease risk index-short form

DKAS: Dementia knowledge assessment scale

MOCHAD-10: Motivation to change lifestyle for dementia risk reduction scale

MRS: Menopause rating scale

DISCUSSION

Despite increasing awareness of dementia prevention, factors associated with motivation for dementia-preventive lifestyle change among WSM remain poorly understood. This study examined the associations of dementia knowledge, dementia risk, menopausal symptom burden, and selected sociodemographic characteristics with motivation for dementia-preventive lifestyle change. The findings indicate that lower dementia risk scores and younger age at surgical menopause were associated with greater motivation for lifestyle change. Dementia knowledge was not independently associated with motivation after adjustment for covariates, while menopausal symptom burden showed a positive trend toward association with motivation.

WSM in the present study reported a moderate level of menopausal symptom burden, which is broadly consistent with previous reports describing moderate to high symptom severity in this population [25–27]. For example, Demir et al. (2020) reported elevated vasomotor and psychological symptoms among WSM, while Mahajan et al. (2015) highlighted the earlier onset and greater intensity of menopausal symptoms following surgical menopause [25, 26]. Participants also demonstrated relatively low levels of dementia-related knowledge while presenting a moderate level of dementia risk [28]. Nevertheless, motivation for dementia-preventive lifestyle change was moderate to high. These findings may suggest that WSM are generally receptive to preventive health behaviors, although the factors underlying such motivation may extend beyond dementia-related knowledge alone.

In the present study, lower dementia risk scores were associated with greater motivation for dementia-preventive lifestyle change. One possible explanation is that women with lower dementia risk may feel more capable of engaging in health-promoting behaviors and maintaining lifestyle changes, whereas those with multiple risk factors may experience barriers that reduce motivation. This association may also reflect differences in overall health status, self-efficacy, or perceived control over health-related behaviors. Previous studies have reported associations between dementia-related risk profiles and engagement in preventive behaviors [5, 29]. Furthermore, evidence linking surgical menopause and early menopause with increased risk of cognitive decline and dementia highlights the importance of preventive strategies in this population [5, 30]. Collectively, these findings underscore the potential relevance of dementia risk status in shaping motivation for preventive lifestyle change among WSM.

Younger age at surgical menopause was associated with greater motivation for lifestyle change. One possible explanation is that women who experience surgical menopause at younger ages may perceive a longer period of future health risk exposure and therefore be more motivated to engage in preventive behaviors. Alternatively, younger women may be more likely to seek information, adopt health-promoting behaviors, and participate in preventive health initiatives. Although the mechanisms underlying this association remain unclear, previous studies have suggested that age-related differences in preventive behaviors may be influenced by symptom burden, health awareness, and future health expectations [5, 26, 31]. Further research is needed to better understand the relationship between age at surgical menopause and motivation for dementia-preventive lifestyle change.

Menopausal symptom burden showed a positive trend toward association with motivation for dementia-preventive lifestyle change, although this relationship did not reach statistical significance after adjustment for other variables. Women experiencing more severe menopausal symptoms may be more likely to seek strategies to improve their health and well-being, which could potentially increase their interest in lifestyle modifications. Previous studies have shown that interventions such as physical activity, healthy nutrition, smoking cessation, stress management, mindfulness, and improved sleep hygiene may alleviate menopausal symptoms while also contributing to healthier aging [32–35]. Although the present findings should be interpreted cautiously, they may suggest that symptom burden could play a role in motivating preventive lifestyle behaviors among WSM and warrants further investigation in larger studies.

In this study, dementia-related knowledge was not significantly associated with motivation for dementia-preventive lifestyle change after adjustment for other variables. This finding suggests that knowledge alone may not be sufficient to influence motivation when dementia risk and menopausal symptom burden are considered simultaneously. Previous studies have reported positive associations between dementia awareness and engagement in preventive behaviors [29, 36–40]; however, such relationships may vary according to population characteristics and contextual factors. Notably, research specifically examining this association among WSM remains scarce. The relatively low level of dementia-related knowledge observed in the present sample may also have limited the ability to detect an association. The 2024 Lancet Standing Commission emphasizes the importance of dementia-related knowledge, particularly among women experiencing early or surgically induced menopause, as part of broader dementia risk reduction strategies [13]. Therefore, while dementia knowledge remains an important component of prevention frameworks, its influence on motivation among WSM may be more complex than previously assumed.

This study has several limitations that should be considered when interpreting the findings. The single-center design and relatively small sample size may limit generalizability. Although a post hoc power calculation based on the observed R^2 value suggested acceptable power for detecting the overall regression model effect, the relatively small sample size and the number of predictors included in the model may have increased the risk of model instability and overfitting. The modest explained variance of the model (adjusted $R^2 = 0.162$) further suggests that additional unmeasured factors may contribute to motivation for lifestyle change. Therefore, the findings should be interpreted cautiously and confirmed in larger, adequately powered studies. The high proportion of university-educated and urban-dwelling participants may also limit representativeness. Data were collected using self-report instruments and may therefore be subject to recall and social desirability bias. Furthermore, the cross-sectional design precludes causal inference. Family history of dementia, which may influence both dementia risk and motivation for preventive behaviors, was not assessed. Finally, cultural and contextual influences may limit the transferability of these findings to other populations and healthcare settings.

The findings have potential implications for clinical practice. WSM may benefit from interventions that simultaneously address menopausal symptoms and promote dementia-preventive lifestyle behaviors.

Healthcare professionals working in gynecology and menopause clinics may be well positioned to integrate dementia risk reduction counseling into routine follow-up care. Programs encouraging physical activity, healthy nutrition, cognitive engagement, and cardiovascular risk management may support both menopausal health and dementia prevention. Future multicenter and longitudinal studies are needed to further evaluate these associations and assess the effectiveness of tailored interventions in diverse populations.

CONCLUSION

This study provides insight into factors associated with motivation for dementia-preventive lifestyle change among WSM. Lower dementia risk scores and younger age at surgical menopause were associated with greater motivation for lifestyle change, whereas dementia-related knowledge was not independently associated with motivation after adjustment for covariates. Menopausal symptom burden demonstrated a positive trend toward association with motivation, although this relationship did not reach statistical significance. These findings suggest that motivation for dementia-preventive behaviors in WSM may be influenced by multiple health-related factors rather than knowledge alone. Further multicenter, longitudinal, and adequately powered studies are needed to confirm these findings, clarify underlying mechanisms, and inform the development of targeted dementia prevention strategies for this population.

Abbreviations

ANU-ADRI: Australian National University Alzheimer's Disease Risk Index-Short Form

BSO: Bilateral salpingo-oophorectomy

DKAS: Dementia Knowledge Assessment Scale

MOCHAD-10: Motivation to Change Lifestyle for Dementia Risk Reduction Scale

MRS: Menopause Rating Scale (MRS)

WSM: Women with surgical menopause

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Dokuz Eylül University Non-Interventional Research Ethics Committee (dated 28 May 2025; decision no. 2025/18-09). The study was conducted in accordance with the principles of Declaration of Helsinki. Written and verbal informed consent was obtained from all participants. Participation was voluntary, and no incentives were provided.

Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interest

The authors declare that they have no competing interests.

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Authors' contributions

SZEA, EÖ, DB and BAS **conceptualized the study.** SZEA curated the data. SZEA and EÖ conducted the investigation. SZEA and EÖ designed the methodology, while EÖ performed the formal analysis. Supervision was provided by DB and BAS. SZEA and EÖ drafted the original manuscript. SZEA, EÖ, DB, BAS, NY and BT reviewed and edited the final version of the manuscript. All authors read and approved the final manuscript.

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