

# Do psychosocial variables mediate the relationship between menopause symptoms and sexual function in middle-aged perimenopausal women?

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## Abstract

**Aim:** To test a hypothetical path model evaluating the influence of menopause symptoms on sexual function among middle-aged perimenopausal women, as well as identify the mediating roles of body image, depression and sexual communication in this relationship.

**Methods:** We used a cross-sectional, correlational design. We included one exogenous variable (menopause symptoms) and four endogenous variables (body image, depression, sexual communication and sexual function) in the proposed model. All data were collected between January 19 and March 11, 2016, and analyzed using SPSS STATISTICS 25.0 and AMOS 23.0.

**Results:** Eight of the nine hypothesized paths in the model were significant. Specifically, menopause symptoms were significantly associated with sexual function via the effects of body image, depression and sexual communication.

**Conclusion:** This study may provide basic data for counseling and nursing programs to help improve sexual function in middle-aged perimenopausal women. Particularly, these programs should focus on the indirect paths via body image, depression and sexual communication, such as by improving body image and sexual communication and reducing depression.

**Key words:** middle-aged, perimenopause, sexual dysfunction, women.

## Introduction

Middle-aged women transitioning to menopause experience numerous symptoms, such as hot flashes, numbness in the hands and feet, backaches, arthritis, insomnia and anxiety, due to endocrinological changes in the organic connections of the hypothalamus, pituitary gland, ovaries and uterus. The severity of these symptoms varies across individuals.<sup>1</sup> Menopause symptoms begin 5–10 years before menopause and last for up to 7 years after menopause.<sup>2</sup> The management of menopause symptoms is a critical health issue for middle-aged women because it affects not

only their physical and mental health but also their quality of life.<sup>3</sup>

The transition to menopause influences the sexual function of most women.<sup>4</sup> Women in perimenopause experience a reduction in the concentration of sex hormones in the blood, which decreases their level of sexual desire and increases the vaginal/pelvic pain they experience during sexual intercourse, which in turn lowers the frequency of intercourse, and thereby lowers the frequency of sexual intercourse.<sup>4,5</sup> Sexual dysfunctions, such as lowered sexual desire, dysfunction in sexual arousal, lack of vaginal lubrication, orgasm dysfunction and pain during sexual intercourse, can affect the overall quality of life of middle-aged

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women.<sup>6</sup> Between 31.6% and 42.4% of middle-aged women are sexually inactive at the beginning of perimenopause,<sup>7</sup> while 26.8% of middle-aged women have sexual intercourse less than once a month. As a result, the number of middle-aged women in sexless couples is increasing.<sup>8</sup> Sexual health is a fundamental human right and an important measure of women's quality of life. To improve the sexual function of perimenopausal women, practitioners require an approach based on multidimensional factors.

Female sexual function, much more so than male sexual function, is influenced by a range of multidimensional (i.e., physical, psychosocial and emotional) factors.<sup>4</sup> Although middle-aged women in perimenopause experience various menopause symptoms, they are often cautious about discussing changes in their bodies and find it difficult to talk about sex.<sup>9</sup> Such women are also more vulnerable to depression than are men of the same age. Menopause symptoms are associated with depression<sup>10-12</sup> and can negatively affect body image,<sup>12</sup> and depression can in turn affect sexual function.<sup>10-12</sup>

As women age, their bodies undergo dramatic changes that can negatively affect their body image and satisfaction with their bodies.<sup>13,14</sup> This negative body image in turn negatively affects sexual communication and sexual function.<sup>12,15</sup> Many sexual problems actually begin with an inability to communicate about sex with one's spouse, and mutual communication is crucial for maintaining sexual adjustment.<sup>15,16</sup> However, many women are unable to express their sexual identity and do not understand their partner's sexual identity, which can cause them to start viewing sexual intercourse as an obligatory activity, thus leading to sexual dysfunction.<sup>17</sup> Communication about sexual interactions in married couples is one way to reduce sexual dysfunction.

In summary, the sexual function of middle-aged women experiencing menopause symptoms appears to be associated with psychosocial variables such as body image, depression and sexual communication. Previous studies exploring the effect of intervention programs for men who experience sexual dysfunction have already reported promising outcomes, such as improved sexual function.<sup>18</sup> However, psychosocial intervention programs for women experiencing sexual dysfunction are somewhat limited. To improve these programs, and by extension enhance the sexual function of perimenopausal women, it is necessary to explore the psychosocial variables that may mediate the association between menopause symptoms and sexual function in such women. These variables could

be then included as targets of sex education and counseling programs.

The aims of the current study were to test a hypothetical path model evaluating the association between menopause symptoms and sexual function among middle-aged perimenopausal women, and to identify the mediating effects of body image, depression, and sexual communication on this association. We proposed two hypotheses: (1) menopause symptoms have a significant direct effect on sexual function (Hypothesis 1) and (2) menopause symptoms have a significant indirect effect on sexual function via body image, depression, and sexual communication (Hypothesis 2).

## Methods

### Study design and participants

The study used a cross-sectional survey design. Ethical approval was obtained in November 2015 from the institutional review board at Chonbuk National University (2015-11-010). Participants provided written consent after being informed of the study's purpose, procedure, voluntary participation, guaranteed anonymity and the ability to leave the study at any time.

A convenience sample was employed. Specifically, we recruited 250 women from among the middle-aged perimenopausal women living in J, I and G cities in South Korea. We applied the following inclusion criteria: (1) women between the ages of 45 and 55 (middle age) who have not had a menstrual period in the last 12 months; (2) have not undergone a hysterectomy or an ovarian resection; (3) have not taken hormone therapy; (4) can communicate as well as read and complete the questionnaire and (5) understand the purpose of the study and consented to participate. Of the 250 women selected, 13 women refused to participate, and three did not complete their questionnaires because of personal commitments; these women were excluded. The remaining 234 women were included in the analysis. For a path analysis, the sample size must be at least 200 when there are fewer than 12 explanatory variables.<sup>19</sup> Because 234 women were included in the analysis, the sample size was considered sufficient.

### Measurements

All the measures included in the questionnaire were self-administered. Menopause symptoms were measured using the Korean version of the Menopause Rating Scale (MRS).<sup>20</sup> The MRS is a well-known tool

for the assessment of menopause symptoms among women in a climacteric state; currently, it is available in nine languages, including Korean. The scale consists of 11 items rated on a scale of 0 to 4 points. The total score of the scale thus ranges from 0 to 44, with higher scores indicating greater perceived menopause symptoms. In the MRS development study, the Cronbach's alpha ranged from 0.65 to 0.87 across all countries,<sup>20</sup> while in this study, it was 0.84.

Body image was measured using the Body Image Scale (BIS) developed by Ahn.<sup>21</sup> The BIS comprises 20 items rated on a 5-point Likert scale ranging from 1 ('very rarely') to 5 points ('almost always'). Consequently, the total score ranges from 20 to 100, with higher scores indicating a more positive body image. The Cronbach's alpha was 0.81 in Ahn's study<sup>21</sup> and 0.82 in this study.

Depression was assessed using the Korean version of the Center for Epidemiologic Studies Depression Scale (KCES-D).<sup>22</sup> The KCES-D comprises 20 items rated on a 4-point Likert scale ranging from 0 ('very rarely') to 3 points ('almost always'). Consequently, the total score ranges from 0 to 60, with higher scores indicating higher levels of depression. The Cronbach's alpha was 0.91 in a previous study involving a Korean sample<sup>22</sup> and 0.85 in this study.

Sexual communication was measured using the Dyadic Sexual Communication Scale (DSC), which was developed by Catania<sup>23</sup> and translated into Korean by Lee and Kim.<sup>24</sup> The DSC comprises 10 items rated on a 4-point Likert scale ranging from 1 ('very rarely') to 4 points ('almost always'). The total score ranges from 10 to 40, with higher scores indicating higher levels of marital intimacy. The Cronbach's alpha coefficient of the DSC was 0.67 at its development<sup>23</sup> and 0.71 in this study.

Female sexual function was measured using the Female Sexual Functioning Index (FSFI), which was developed by Rosen *et al.*<sup>25</sup> and translated into Korean by Kim *et al.*<sup>26</sup> The reliability and validity of the Korean version of the FSFI are well-documented.<sup>26</sup> The FSFI comprises 19 items in six domains: sexual desire (two items), sexual arousal (four items), vaginal lubrication (four items), orgasm (three items), satisfaction (three items) and pain during intercourse (three items). Items 1 and 2 (both related to sexual desire) are measured on a 5-point scale ranging from 1 ('nearly or very low') to 5 ('always or very high'). The other 17 items are measured on a 6-point scale where 0 indicates 'no sexual activity', 1 indicates 'almost never', and 5 indicates 'always'. Each domain

score is multiplied by the weighted value of each factor, and the resultant products are summed to arrive at the total sexual function score. The total score ranges from 2 to 36, with higher scores indicating better perceived sexual function. The Cronbach's alpha was 0.99 in Kim *et al.*'s study<sup>26</sup> and 0.98 in our study.

We also obtained information on the following seven general characteristics: age, partner's age, marital status, religion, body mass index (BMI), number of pregnancies and number of deliveries.

### Statistical analysis

The statistical analyses were conducted using IBM SPSS STATISTICS 25.0 (IBM Corp.) and AMOS 23.0. We calculated descriptive statistics for the general characteristics of the participants, as well as Cronbach's alpha values to verify the reliability of the measurement tools. The skewness and kurtosis were measured to verify the normality of the main variables. We also checked for multicollinearity in the variables by calculating tolerance values, variance inflation factors (VIF) and Pearson's correlation coefficients. To evaluate the validity and fitness of the model, we used the following absolute fit indices: normed  $\chi^2$ , goodness of fit index (GFI), standardized root mean square residual (SRMR), root mean square error of approximation (RMSEA), comparative fit index (CFI), normed fit index (NFI) and Tucker-Lewis index (TLI). Indicators of good fit were a normed  $\chi^2$  value of 3 or lower; GFI, CFI, NFI and TLI values of 0.90 or greater; an RMSEA value of 0.08 or lower; and an SRMR value of 0.05 or lower.<sup>27</sup> Additionally, we calculated the squared multiple correlations (SMC) of all the main variables on sexual function in the path model. We calculated standard estimates of the direct, indirect and total effects of all research variables on sexual function. The bootstrapping method was used (using 2000 bootstrap samples). In cases where multiple mediating variables were considered (i.e., a multiple-mediator model), phantom variables were used to verify the indirect effects of specific variables.<sup>27</sup> Two-tailed *P*-values of less than 0.05 were considered statistically significant.

## Results

### Participant characteristics

The general characteristics of the 234 participants are listed in Table 1. Their mean age was 49.87 years (range 45–55 years), while their partners' mean age was 52.44 years (range 44–66 years). They had been

**Table 1** General characteristics (*N* = 234)

Characteristics	Categories	<i>n</i> (%)	Mean ± SD (range)
Age (years)	45–49	120 (51.3)	49.87 ± 3.89 (45–55)
	50–55	114 (48.7)	
Partner's age (years)	<50	67 (28.6)	52.44 ± 4.54 (44–66)
	50–54	85 (36.3)	
	55–59	69 (29.5)	
	≥60	13 (5.6)	
Marital status (years)	<20	56 (23.9)	22.64 ± 6.18 (2–35)
	20–24	103 (44.0)	
	25–29	60 (25.6)	
	≥30	15 (6.4)	
Religious	Yes	108 (49.5)	
	No	110 (50.5)	
Body mass index (kg/m <sup>2</sup> )	<18.5	12 (5.1)	22.13 ± 2.33 (15.8–31.6)
	18.5–22.9	152 (65.0)	
	23.0–24.9	52 (22.2)	
	25.0–29.9	16 (6.8)	
	≥30.0	2 (0.9)	
Number of pregnancies	≤1	17 (7.3)	2.54 ± 0.98 (1–6)
	2	113 (48.3)	
	3	73 (31.2)	
	4	21 (9.0)	
	≥5	10 (4.3)	
Number of deliveries	1	32 (13.7)	1.98 ± 0.63 (1–3)
	2	166 (70.9)	
	≥3	36 (15.4)	

SD, standard deviation.

married for a mean of 22.64 years (range 2–35). One hundred eight participants identified themselves as religious (49.5%). The majority of participants (*n* = 204; 87.2%) had a normal BMI, and their mean BMI was 22.13 kg/m<sup>2</sup>. One hundred thirteen (48.3%) participants reported having two pregnancies, and the mean number of pregnancies was 2.54. Finally, 166 (70.9%) participants reported having two deliveries, and the mean number of deliveries was 1.98 (Table 1).

### Descriptive statistics and normality testing of the study variables

Participants' mean scores for the main variables were as follows: menopause symptoms, 12.57 ± 8.23 (range: 0–44); body image, 65.10 ± 9.91 (range: 1–41); depression, 16.27 ± 10.62 (range: 0–49); sexual

communication, 25.29 ± 3.69 (range: 15–37) and sexual function, 19.95 ± 8.29 (range 2–33). For all these variables, the absolute value of skewness ranged from 0.240 to 0.901, while the absolute value of kurtosis ranged from 0.112 to 0.900. These ranges suggest that none of the variables deviated from a normal distribution.

### Testing of multicollinearity between variables

The multicollinearity testing results revealed tolerance and VIF ranges of 0.456–0.795 and 1.259–2.194, respectively, while the significant correlation coefficients among the variables ranged from 0.317 to 0.693. These results confirmed that there is no problem of multicollinearity between the observed variables (Table 2).

**Table 2** Correlational relationships between the variables (*N* = 234)

Variables	<i>r</i> ( <i>P</i> )			
	Menopause symptom	Body image	Depression	Sexual communication
Body image	–0.568 (<0.001)	—	—	—
Depression	0.693 (<0.001)	–0.602 (<0.001)	—	—
Sexual communication	–0.414 (<0.001)	0.386 (<0.001)	–0.317 (<0.001)	—
Sexual function	–0.534 (<0.001)	0.511 (<0.001)	–0.579 (<0.001)	0.381 (<0.001)

**Evaluation of the path model**

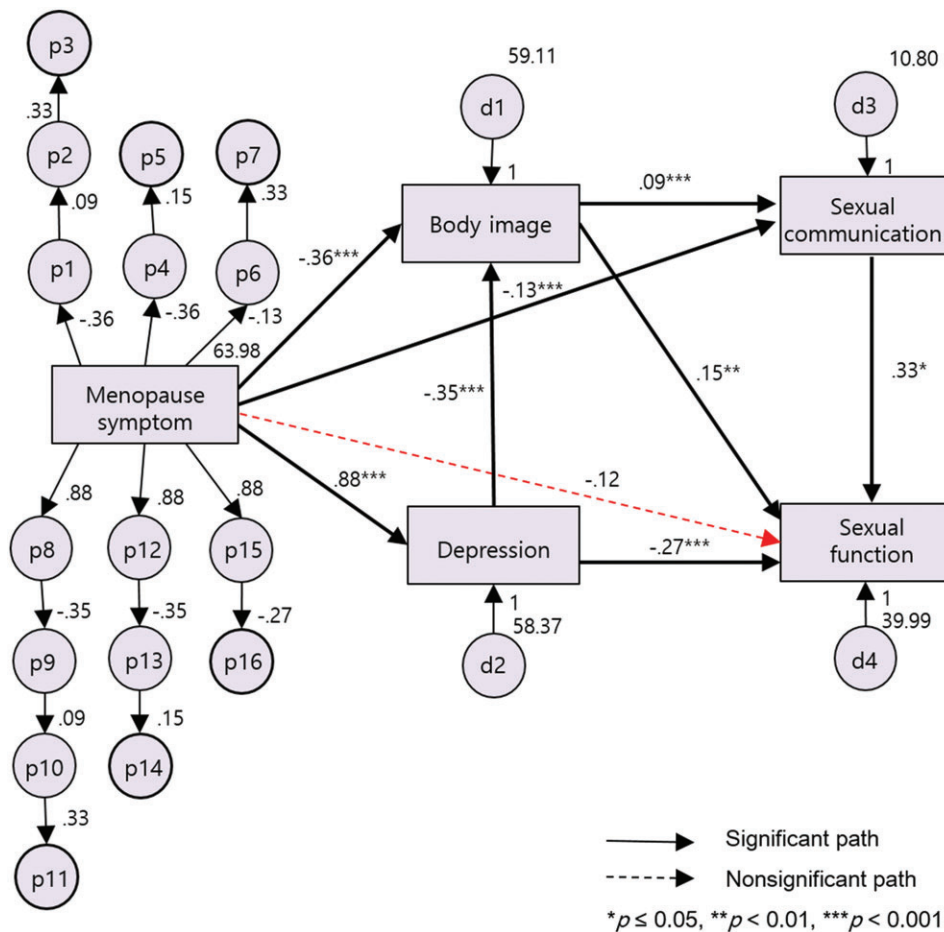
The overall fit of the hypothetical model study was good, as indicating by the following indices:  $\chi^2 = 0.18$  (df = 1,  $P = 0.674$ ), normed  $\chi^2 = 0.18$ , GFI = 1.000, CFI = 1.000, NFI = 1.000, TLI = 1.000, RMSEA = 0.000 and SRMR = 0.005 (Figure 1). Among the nine paths in the final diagram, only one was nonsignificant (and therefore rejected): menopause symptoms → sexual function (Fig. 1).

**Analysis of the variable effects**

Table 3 shows the standardized estimates of the direct, indirect and total effects of the exogenous

variable on the endogenous variables, as well as the SMC values for the entire path model. Hypothesis 1 was not supported; that is, menopause symptoms had no significant direct effects on sexual function ( $\beta = -0.465$ ,  $P = 0.001$ ). However, Hypothesis 2 was supported, as menopause symptoms had significant indirect and total effects on sexual function ( $\beta = -0.465$ ,  $P = 0.001$ ;  $\beta = -0.465$ ,  $P = 0.001$ ). This finding indicates that body image, depression and sexual communication completely mediated the menopause symptoms → sexual function path.

In cases where multiple indirect effects were present, phantom variables were used to estimate the specific indirect effects. The pathway of menopause



**Figure 1** Specific indirect effects in multimедiation model, including phantom variables. Path of P1 → P2 → P3: ‘Menopause symptom’ → ‘Body image’ → ‘Sexual communication’ → ‘Sexual function’; path of P4 → P5: ‘Menopause symptom’ → ‘Body image’ → ‘Sexual function’; path of P6 → P7: ‘Menopause symptom’ → ‘Sexual communication’ → ‘Sexual function’; path of P8 → P9 → P10 → P11: ‘Menopause symptom’ → ‘Depression’ → ‘Body image’ → ‘Sexual communication’ → ‘Sexual function’; path of P12 → P13 → P14: ‘Menopause symptom’ → ‘Depression’ → ‘Body image’ → ‘Sexual function’; path of P15 → P16: ‘Menopause symptom’ → ‘Depression’ → ‘Sexual function’. Path coefficients were unstandardized estimates.

**Table 3** Standard direct, indirect and total effects and SMC of variables

Endogenous variables	Exogenous variables	$\beta$ ( <i>P</i> )			SMC
		Direct effect	Indirect effect	Total effect	
Body image	Menopause symptom	-0.294 (0.002)	-0.255 (0.001)	-0.549 (0.001)	0.378
	Depression	-0.376 (0.001)	—	-0.376 (0.001)	
Depression	Menopause symptom	0.678 (0.001)	—	0.678 (0.001)	0.460
Sexual communication	Menopause symptom	-0.284 (0.001)	-0.131 (0.002)	-0.415 (0.001)	0.212
	Body image	0.239 (0.001)	—	0.239 (0.001)	
	Depression	—	-0.090 (0.001)	-0.090 (0.001)	
Sexual function	Menopause symptom	-0.119 (0.122)	-0.390 (0.001)	-0.509 (0.001)	0.400
	Body image	0.178 (0.004)	0.035 (0.002)	0.213 (0.001)	
	Depression	-0.341 (0.001)	-0.080 (0.001)	-0.421 (0.001)	
	Sexual communication	0.148 (0.003)	—	0.148 (0.003)	

$\beta$ , standardized regression weight; SMC, squared multiple correlation.

symptoms → body image → sexual communication → sexual function was expressed as the phantom variable of 'P1' → 'P2' → 'P3'; the pathway of menopause symptoms → body image → sexual function was expressed as 'P4' → 'P5'; the pathway of menopause symptoms → body image → sexual function was expressed as 'P6' → 'P7'; the pathway of menopause symptoms → depression → body image → sexual communication → sexual function was expressed as 'P8' → 'P9' → 'P10' → 'P11'; the pathway of menopause symptoms → depression → body image → sexual function was expressed as 'P12' → 'P13' → 'P14'; and the pathway of menopause symptoms → depression → sexual function was expressed as 'P15' → 'P16'.

All the following indirect effects were significant. Indirect effect P3, which had effects on the pathway of menopause symptoms → body image → sexual communication → sexual function, was -0.011 ( $P = 0.001$ ); indirect effect P5, which had effects on the pathway of menopause symptoms → body image → sexual function, was -0.053 ( $P = 0.002$ ); indirect effect P7, which had effects on the pathway of menopause symptoms → sexual communication → sexual function, was -0.043 ( $P = 0.002$ ); indirect effect P11, which had effects on the pathway of menopause symptoms → depression → body image → sexual communication → sexual function, was -0.009 ( $P = 0.001$ ); indirect effect P14, which had effects on the pathway of menopause symptoms → depression → body image → sexual function, was -0.046 ( $P = 0.003$ ); and indirect effect P16, which had effects on the pathway of menopause symptoms → depression → sexual function, was -0.236 ( $P = 0.001$ ).

Finally, according to the SMC values, menopause symptoms, body image, depression and sexual

communication explained a total of 40.0% of the variance in sexual function (Table 3).

## Discussion

The focus of this study was to confirm the mediating effects of body image, depression and sexual communication on the relationship between menopause symptoms and sexual function in middle-aged perimenopausal women. These effects have not been reported in previous studies.

First, we will discuss the overall level of sexual function among middle-aged perimenopausal women. The FSFI cutoff for sexual dysfunction is a total score of less than or equal to 26.6 out of 36.<sup>28</sup> Participants in this study (middle-aged perimenopausal women with a mean age of 49 years) had a mean FSFI score of 19.3, which is much lower than the aforementioned cutoff; indeed, 66.2% of participants were below the cutoff for sexual dysfunction. For comparison, in a study of middle-aged Spanish women, the mean FSFI score was 30,<sup>29</sup> while that among middle-aged women in Latin America was 27.2.<sup>30</sup> Both these studies found higher mean scores than did the present study. However, the mean FSFI score in this study was similar to that among women with sexual dysfunction in the United States, which was 19.2.<sup>26</sup> Taken together, it would seem that middle-aged women experiencing the transition to menopause require interventions to enhance their sexual function.

Second, we will discuss the feasibility of the sexual function path model we tested in this study. Together, menopause symptoms, body image, depression and sexual communication accounted for 40.0% of the

variance in sexual function in middle-aged perimenopausal women. This represents the first attempt to verify a structural model of variables related to sexual function in perimenopause women. One previous study used a multiple regression analysis to examine factors related to sexual dysfunction in middle-aged women, of which 74% were perimenopausal.<sup>30</sup> In that study, education level, partner's age and birth experience together explained 66.0% of the variance in sexual dysfunction. Given the lack of past studies on this issue, future research should replicate the sexual function model to yield more definitive conclusions.

We used covariance structure analysis to confirm the direct, indirect and total effects among the variables. Menopause symptoms had significant direct and total effects on body image, depression and sexual communication. These results support previous research, in which menopause symptoms did indeed affect body image,<sup>12</sup> depression<sup>10–12</sup> and sexual communication.<sup>9</sup> Moreover, the latter three variables had significant direct and total effects on sexual function, which supports previous research showing that body image,<sup>12</sup> depression<sup>4,10</sup> and sexual communication<sup>15–17</sup> influence sexual function. Unlike previous studies, menopause symptoms only had significant indirect and total effects on sexual function<sup>4,5</sup>; no significant direct effects were found. This suggests that the psychosocial variables (body image, depression and sexual communication) completely mediated the association between menopause symptoms and sexual function. These findings have definite implications for the intervention strategies used by nurses and counselors, which should aim to reduce depression, elevate body image and enhance communication regarding sexual function among middle-aged perimenopausal women. Depression could be reduced by emphasizing the positive aspects of menopausal transition, encouraging women to be receptive to changes in their bodies, and discussing their feelings about the transition. Furthermore, it is recommended that couples communicate positively, help one another, and express their views about married life. One internet-based psychological treatment program that includes communication skills training, sensate focus exercises and regular contact with a therapist has been reported to significantly improve the sexual and relationship functioning of females with sexual dysfunction.<sup>31</sup> Such a program may therefore be effective for enhancing sexual function in perimenopausal women.

Despite the aforementioned findings, this study has some limitations. First, it is not possible to generalize

the results of this study because we did not randomly sample the participants from different regions. Second, since this study does not take into account partner characteristics other than their age, we suggest that the degree of sexual function in the partner be included in future studies. Finally, while this study confirmed that sexual function might be improved by reducing depression and improving body image and sexual communication among middle-aged perimenopausal women when they experience menopause symptoms, this was only a cross-sectional study. Longitudinal research is recommended to confirm the causal paths we propose in this study.

Despite these limitations, this study is the first to demonstrate that psychosocial variables have mediating effects on the association between menopause symptoms and sexual function among middle-aged women. It provides basic data for counseling and education programs on how to improve sexual function in middle-aged perimenopausal women by targeting body image, depression, and sexual communication. The development of interventions that can enhance body image and sexual communication and reduce depression should be encouraged to enhance the sexual function among middle-aged perimenopausal women experiencing menopause symptoms.

## Disclosure

The authors declare no actual or potential conflict of interest.

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