

# The Mediating Effect of Pleasure And Menopausal Symptoms On Sexual Activity Among Young Breast Cancer Survivors

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## Research Article

**Keywords:** Breast Cancer, Young Survivors, Menopause, Sexual activity

**Posted Date:** November 29th, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-1013663/v1>

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**Version of Record:** A version of this preprint was published at Supportive Care in Cancer on February 26th, 2022. See the published version at <https://doi.org/10.1007/s00520-022-06923-9>.

# Abstract

**Purpose:** Young breast cancer survivors often go through a rapid change in menopause status due to cancer treatment and suffer from abrupt symptoms. This transition compels them to deal with unique medical and psychological side effects on their quality of life. One of the most affected quality of life domains is sexual functioning.

This study explored the differences in frequency of sexual activity between young breast cancer survivors and young healthy women. It also examined whether this difference in sexual activity frequency was mediated by discomfort and/or pleasure during intercourse, both of which are affected by early menopausal symptoms.

**Methods:** 97 young breast cancer survivors and 75 young healthy women completed a sociodemographic questionnaire, The Fallowfield's Sexual Activity Questionnaire (FSAQ), and the Menopausal Rating Scale (MRS). Additionally, the breast cancer participants completed a medical data questionnaire.

**Results:** Findings revealed a significant direct effect between group and menopausal symptoms, menopausal symptoms and pleasure, and pleasure and habit. Structural equation modeling explained the differences between the groups in sexual frequency (habit) as mediated by menopausal symptoms and both pleasure and discomfort.

**Conclusions and Implications:** These results highlight the impact of pleasure on the frequency of young breast cancer survivors' sexual activity, and its relation to menopausal symptoms. These young women should be provided with appropriate information and interventions that will help them experience increased pleasure during sexual activity despite their early and induced menopausal symptoms.

## Introduction

Breast cancer is the second most frequently diagnosed and most common cancer among women. Although it is rather rare among young women, it is the most common malignancy and one of the leading causes of cancer-related deaths for this age group [1]. The meaning of a breast cancer diagnosis for a young woman is likely different and more devastating than it would be for an older woman. Recent studies suggest that this population tends to exhibit more aggressive forms of breast cancer [1], with potentially unique and complex biological features [2,3]. Fortunately, the number of women who survive breast cancer has increased over the years due to early diagnosis and more effective treatments [9,10].

However, the price of successful therapy may be long-term treatment-related side effects and the risk of a compromised quality of life [11,12,13]. The vast majority of young breast cancer patients are premenopausal at diagnosis; these women, who are usually found to have hormonal receptor-positive breast cancer, receive hormonal therapy. This type of therapy, continues for at least five to ten years. One of its consequences is induced ovarian failure, which leads to clinical manifestations of estrogen deficiency and a rapid change in menopausal status [14,15,16].

Early menopause due to cancer treatment may manifest in symptoms including hot flashes, night sweats, vaginal dryness, weight gain and tiredness [13,17,18]. These symptoms, in contrast to symptoms that are part of the natural occurrence of menopause, are considered to be particularly severe and unexpected for patients who are, age-wise, pre-menopausal. Thus, menopausal status change plays a crucial role for these young breast cancer survivors, a group which has been found to be at greater risk for poorer quality of life compared with an age-matched general population [19,20], as well as compared with postmenopausal patients [21,22].

One of the affected qualities of life domains is sexuality. Sexuality is considered to be a multi-dimensional construct consisting of several different dimensions, such as sexual desire [23,24,25,26], interest in sex [9,24,26], sexual pleasure [15,27], sexual satisfaction [24, 26,28], the ability to relax and enjoy sex [25,28], pain and discomfort during sexual intercourse [9,15, 27,29], sexual disorders [28] and frequency of sexual activity [15, 24, 26,27].

Findings indicate that nearly all women diagnosed with breast cancer experience some degree of sexual dysfunction [26, 28]. However, studies have shown that younger women report a greater degree of decreased quality of life and, specifically, more sexual dysfunction than do older patients [29, 30]. One explanation to account for this finding may be younger patients' early menopause [31]. The transition to menopause frequently affects women's sexual functioning [32]. For younger women, early menopause leads to a rapid change in status and to the abrupt appearance of menopausal symptoms. Thus, for them, the sexual dysfunction, which likely originated from the premature menopause, is often severe and traumatic [14,33]. In their study, Champion et al. (2014) found that in comparison to young healthy women, young breast cancer survivors who underwent premature menopause often reported more sexual dysfunction such as lack of interest in sex, sexual difficulties during intercourse, decreased desire, and poorer ability to relax during sexual activity. In a study that assessed the association between menopause-related symptoms and quality of life among young pre-menopausal breast cancer patients, it was found that patients who had worse menopausal symptoms after cancer therapy reported poorer quality of life in all aspects, among them sexual functioning [34]. Two studies [15] [27] found that compared to the general population, premenopausal women with breast cancer reported on lower frequency of sexual activity, less pleasure and more discomfort during sexual activity. A factor associated with these outcomes in both studies was the experience of a menopausal transition as part of the adjuvant therapy.

It is clear that the occurrence of menopausal symptoms among young breast cancer survivors results in considerable sexual impairment. Several studies provide important explanations for this phenomenon. Hormonal therapy, which often triggers premature ovarian failure, leads to diminished levels of estrogen and testosterone, affecting aspects of sexual functioning [25,35]. The marked depletion of hormones is associated with weakened libido and arousal along with changes in the vulvovaginal area, and increased tissue fragility [36]. Kedde et al. (2013) found that hormonal treatment caused long-term occurrences of genital arousal disorder or lack of lubrication, decreased libido, dyspareunia, or anorgasmia. These disorders, as they result in pain during intercourse, lead to significant disruptions of sexual functioning

[33]. It has also been argued that one of the key factors in the decline of sexual activity is the lack of sexual desire. Vaginal dryness and dyspareunia lead to less satisfaction during sex, and therefore cause women to have less desire for and interest in sex [13,33].

Most studies in this area have focused on the negative dimensions of sexuality, such as pain, discomfort, and difficulty during sex. By contrast, very few studies have focused on pleasure during sex. Our study, suggests that besides the assessment of the discomfort, the evaluation of pleasure as well. We assumed that the symptoms experienced by young breast cancer survivors due to their premature entry into menopause would have a significant impact on their sexual activity. We tried to determine whether the decrease sexual activity resulted from lower levels of pleasure and greater discomfort during sexual activity.

## Hypothesis

Based on the above-reviewed literature, we hypothesized that there would be differences between young breast cancer survivors and young healthy women in sexual activity frequency, such that young breast cancer survivors would report less frequent sexual activity. We also hypothesized that there would be differences between the groups in both the pleasure and the discomfort experienced during sexual activity. Finally, we hypothesized that the differences between the groups in sexual activity frequency would be attributed to pleasure and discomfort, both of which would be attributed to menopausal symptoms.

## Method

### *Participants*

One-hundred-and-ninety women were recruited for the study: 103 young breast cancer survivors under the age of 45 at the time of diagnosis (all treated with hormonal therapy following breast cancer for at least six months) and 87 young healthy women under the age of 45. Inclusion criteria were that participants had to be Hebrew speakers and above the age of 18. Additionally, the healthy participants were included only if they did not have any chronic diseases.

### *Procedure*

Questionnaires and data were generated using Qualtrics© 2015 (Qualtrics, Provo, UT, USA, <http://www.qualtrics.com>). Participants signed an informed consent form and filled out the questionnaires via Qualtrics® using their smartphones or computers. The breast cancer survivors were recruited via social media networks (non-profit organization websites, and Facebook support groups) and through the oncology department at Shaare Zedek Medical Center where patients received a telephone call and were invited to participate. The healthy women's group was recruited via social media networks and the snowball method. All participants were recruited between May and November 2020. The study

received ethical approval from the ethics board of the Academic College of Tel Aviv-Yafo (number 2020050) and the ethics committee of Shaare Zedek Medical Center (szmc-0302-20).

### *Questionnaires*

*Sexual activity.* Fallowfield's Sexual Activity Questionnaire (FSAQ) [37] is a 10-item inventory rated on a four-point Likert scale. It has been used in previous research and found to be valid and reliable [38]. The questionnaire measures female sexual functioning via three domains: (i) Pleasure ("Did you enjoy sexual activity over the last month?"), (ii) Discomfort ("Did you feel pain or discomfort this month?"), and (iii) Habit ("How did this frequency of sexual behavior compare with what is usual for you?"). The pleasure subscale consists of six items; the discomfort subscale consists of two items; and habit is a one-item subscale. All the subscales range from 0-3. A higher score indicates a lower level of pleasure and discomfort, and a higher level of habit (i.e., frequency). For the current study, the FSAQ was translated into Hebrew, using the standard forward-backward translation procedure. We reversed the scale, with higher scores indicating higher levels of all subscales. Sum scores were calculated. Cronbach's  $\alpha$  in the current study was high for the pleasure and discomfort subscales (0.923, 0.908, respectively).

*Menopausal symptoms.* The Menopausal Rating Scale (MRS) [39] is an 11-item questionnaire rated on a five-point Likert scale (range 0-44). It has been used in previous research and found to be valid and reliable [32, 40]. The questionnaire was developed in order to assess menopausal symptoms of different groups of women during their maturing process, evaluating the severity of symptoms over time, and measuring changes pre- and post- treatment. The MRS is divided into three dimensions (subscales): 1) psychological ("depressive mode," "irritability"), 2) somatic-vegetative ("hot flashes," "sleep problems"), and 3) urogenital ("sexual problems," "bladder problems"), and a composite score (total score). Higher scores indicate higher severity of reported symptoms. For the current study, the MRS was translated into Hebrew, using a standard "forward-backward" translation procedure. For the statistical analyses, we used only the total score of this questionnaire. Cronbach's  $\alpha$  in the current study was high, 0.904.

*Sociodemographic data* consisted of questions regarding personal information (e.g., age, marital status, level of education).

*Medical data* were obtained only for the breast cancer survivors and included items regarding the cancer diagnosis (e.g., year of diagnosis, cancer stage, surgery type).

## **Statistical analysis**

Descriptive statistics were calculated for the sociodemographic variables and the main study variables. Next, the study variables were compared between the groups by means of independent-samples t-tests. Pearson's correlations between the study's main variables were calculated for each group separately. The study mediation model consisted of the group (young breast cancer survivors vs. young healthy women) as the independent variable, and sexual activity frequency (habit) as the dependent variable. The relationship between them was mediated by three mediators: first, menopausal symptoms, and then both

pleasure and discomfort. Model coefficients were estimated by bootstrap. Results were considered significant at a 0.05 significance level. The SPSS v.25 software (IBM Statistics) was used for statistical analysis and AMOS v.26 (IBM Statistics) was used for structural equation analysis.

## Results

### *Sociodemographic variables*

The final sample comprised 172 participants (0.90%) who completed the whole survey and met the inclusion criteria: 97 young breast cancer survivors and 75 young healthy women. Descriptive statistics for sociodemographic and medical variables are presented in Tables 1 and 2. As can be seen, the majority of the participants were married/in a relationship, were secular, and had educated. Most members of the breast cancer survivor group had stage 2 breast cancer at the time of diagnosis, and the mean time since diagnosis was 3.2083 years (SD=1.6 years). The majority of them had lumpectomy, chemotherapy and radiation therapy. In addition, they did not report suffering from fertility problems and had not gone through fertility conservation. We found significant differences between the two groups across sociodemographic variables using chi-square and t-tests. As can be seen in Table 1, the differences were found in the variables of age, marital status, number of children, religiousness, and years of education. The breast cancer survivors were older, had more children, less educated and more religious. Thus, we tested correlations between these demographic variables and the dependent variable (habit) and found no correlations except for years of education. Therefore, we didn't include any of the demographic variables in the final model.

Table 1  
Sociodemographic variables

Sociodemographic characteristics	Young breast cancer survivors	Young healthy women	Comparison			
			x <sup>2</sup>	p	t	p
	Mean (SD) / N(%)	Mean (SD) / N(%)				
<i>Age</i>	38.32 (5.73)	30.48 (5.21)			8.708	0.000
<i>Number of children</i>	3.17 (1.622)	1.79 (0.588)			5.471	0.000
<i>Years of education</i>	14.97 (2.233)	16.12 (2.269)			3.084	0.002
<i>Marital status</i>		17 (22.7) 58 (77.3)	7.979	0.019		
Single	12 (16.4)					
In a relationship/married	54 (74)					
Separate/divorced	7 (9.6)					
<i>Religiousness</i>		64 (85.3)	20.420	0.000		
Secular	37 (50.7)	10 (13.3)				
Religious	27 (37)	1 (1.3)				
Ultraorthodox	8 (11)					
<i>Occupational status</i>		30 (40)	2.417	0.491		
Full-time job	29 (39.7)	29 (38.7)				
Part-time job	23 (31.5)	15 (20)				
Unemployed	20 (27.4)	-				
Other	1 (1.4)					

Table 2  
Medical characteristics – young breast cancer group

Medical characteristics		N (%)
Cancer stage at diagnosis	I	24 (33)
	II	33 (45.2)
	III	16 (22)
Surgery type	Lumpectomy	41 (56.2)
	Mastectomy	26 (35.6)
	Bilateral mastectomy	6 (8.2)
Treatment type	Neo-adjuvant chemotherapy	34 (46.6)
	Adjuvant chemotherapy	25 (34.2)
	Radiation	52 (71.2)
	Biological therapy	24 (33)
BRCA gene carrier		8 (11)
Other chronic disease		12 (16.4)
Fertility problems		5 (6.8)
Fertility conservation		22 (30.1)

### *Sexual activity*

Independent t-tests showed significant differences between the groups for all sexual activity subscales: pleasure,  $t(134) = -5.098$ ;  $p < 0.01$ ; discomfort,  $t(101.087) = 6.681$ ;  $p < 0.01$ ; and habit,  $t(129) = -4.636$ ;  $p < 0.01$ . Young breast cancer patients reported lower levels of pleasure ( $M = 6.79$ ,  $SD = 5.286$ ), higher levels of discomfort ( $M = 3.29$ ,  $SD = 2.315$ ), and less sexual activity ( $M = 1.03$ ,  $SD = 0.872$ ) than did young healthy women ( $M = 11.44$ ,  $SD = 5.364$ ;  $M = 1$ ,  $SD = 1.465$ ;  $M = 1.69$ ,  $SD = 0.743$ , respectively).

### *Menopausal symptoms*

Independent t-tests showed a significant difference between the groups for menopausal symptoms,  $t(115.048) = 11.162$ ;  $p < 0.01$ . Young breast cancer patients reported more menopausal symptoms ( $M = 18.52$ ,  $SD = 5.91$ ) than did young healthy women ( $M = 5.91$ ,  $SD = 4.869$ ). This difference was expected given the early and proactive cessation of ovarian activity as part of the cancer treatment.

### *Sexual activity and menopausal symptoms*

Correlations between the study variables which were calculated for each group separately are presented in Table 3. For the young breast cancer survivor group, habit was found to be positively related to

pleasure, and discomfort was found to be positively related to menopausal symptoms. Pleasure was found to be insignificantly related to habit. For the young healthy women group, habit was found to be positively related to pleasure; discomfort was found to be positively related to menopausal symptoms; and, unlike among the breast cancer group, pleasure was found to be negatively related to menopausal symptoms.

Table 3  
Correlations between main variables

	<b>Pleasure</b>	<b>Discomfort</b>	<b>Menopausal symptoms</b>
Habit	<b>.538**</b>	<b>.236</b>	<b>-.208</b>
	.467**	-.060	-.164
Pleasure		<b>.103</b>	<b>-.234</b>
		-.151	-.400**
Discomfort			<b>.307**</b>
			.344**
<i>Bold – breast cancer survivors, Not bold – healthy women</i>			

*The mediation model - Structural Equation Model SEM)*

To test the study's mediation model, we used SEM, which explained the differences between the groups in sexual frequency (habit) as mediated by menopausal symptoms and both pleasure and discomfort during sexual activity, operating one (menopausal symptoms) after the other (pleasure and discomfort). An examination of the model (Fig. 1) shows a statistical significance of most of the paths, but the overall fit of the model was not very good: NFI 0.953, TLI 0.813, CFI 0.963, RMSEA 0.14,  $\chi^2(3) = 11.582$ ,  $p = 0.009$ . A direct effect between group variable and habit was found to be significant, although the magnitude of this effect was weak. We calculated a 2nd model (Fig. 2) omitting the discomfort variable (which was found to be insignificantly related to habit,  $B=0.133$ ,  $p=0.082$  N.S.). This model yielded satisfactory goodness of fit measures: NFI 0.985, TLI 0.978, CFI 0.996, RMSEA 0.051,  $\chi^2(2) = 2.771$ ,  $p = 0.25$ . This model showed statistical significance of all paths and a stronger magnitude of the standardized direct effects.

In the final model, there was a significant direct effect between group and habit, showing that there were differences in the frequency of sexual activity between the groups. The magnitude of this effect was still weak, implying that this relationship didn't provide a full explanation for the differences between the groups. We found a significant direct effect between the following: group and menopausal symptoms, menopausal symptoms and pleasure, and pleasure and habit. We also found a significant indirect effect between group and habit via both menopausal symptoms and pleasure. Thus, as the model shows,

although breast cancer might have a small effect on the frequency of young survivors' sexual activity, it seems to have a strong effect on such activity via the influence of menopausal symptoms, which in turn affects the women's experience of pleasure during sexual activity.

## Discussion

In the current study, we examined differences in the frequency of sexual activity between young breast cancer survivors and young healthy women. Furthermore, we examined how pleasure and discomfort impacted the frequency of sexual activity as well as the effect of menopausal symptoms on the experience of pleasure and discomfort. Young breast cancer survivors reported less frequent sexual activity compared to that reported by young healthy women. Moreover, our mediation model was partially confirmed; the difference between the groups was mediated by differences in menopausal symptoms and, interestingly, by pleasure but not by discomfort in sexual activity. These findings reveal the significant effect of pleasure on the frequency of sexual activity and suggest an indirect effect of breast cancer on the frequency of sexual activity via menopausal symptoms and pleasure.

Sexual function is an essential quality of life domain for women, including for breast cancer survivors. Our results are consistent with previous studies that found that young breast cancer survivors who suffered from menopausal symptoms as a result of cancer therapy reported reduced frequency of sexual activity, and less pleasure and more discomfort during sexual intercourse than did young healthy women [22,26,28, 33,36].

Most studies examining the relationship between sexuality and breast cancer have usually focused on the negative aspects of sexual functioning, such as pain, discomfort, difficulties during sexual intercourse, and sexual disorders [29,33,36]. These studies have emphasized that hormonal treatments cause long-term changes in the vulvovaginal area, leading young breast cancer survivors to experience pain and discomfort during sexual intercourse. We found the same; namely, young breast cancer survivors who suffer from menopausal symptoms reported more discomfort in sexual intercourse than did healthy young women.

However, in the current study, we went further by looking at sexuality as a multi-dimensional construct consisting of a negative aspect (discomfort) along with a positive aspect (pleasure) and examined how they were related to sexual frequency. We found a direct negative effect of menopausal symptoms on pleasure. This effect mediated the relationship between group and sexual activity frequency, indicating that young breast cancer survivors who suffer from more menopausal symptoms are more likely to report lower levels of pleasure during sex. This lower level of pleasure seems to result in a decline in sexual activity frequency, compared with what occurs among age-matched healthy women, and is a finding that resembles findings from previous studies [15,34]. This association might be attributable to hormonal therapy, which induces a transition to menopause among young breast cancer survivors, and is considered to be a cause of low desire, lower satisfaction, and lower ability to relax and enjoy sex [24,36]. When a woman suffers from these effects, it can be assumed that she experiences less pleasure during

sexual activity. Sexual pleasure is likely impaired as a result of the decline in sexual desire and ability to achieve orgasm, capabilities that seem to be damaged due to the rapid transition to menopause [41].

It is important to note that we found a relationship between pleasure and frequency of sexual activity, demonstrating the critical impact of pleasure during sex on frequency of engagement in it. With lower levels of pleasure during sex, it is reasonable to assume that women would be less likely to be interested in having sex and to avoid sexual intercourse.

Surprisingly, we did not find a statistically significant association between discomfort and frequency of sexual activity. This finding is not in line with previous studies showing a significant relationship between the two [15,33,35]. This matter thus needs further research and investigation. It is also worth noting that in the current study we did not find a relationship between pleasure and discomfort. This finding implies that pleasure and discomfort should be studied as two different and independent phenomena, with each having its own distinct features, and also suggests the importance of employing a different intervention approach: that is, finding ways to increase pleasure—even if discomfort exists—given that the experience of pleasure seems to affect the frequency of sexual activity.

Breast cancer poses many challenges for the sex lives of young breast cancer survivors. Some of these challenges have already been mentioned, such as less desire, pain during sex, less satisfaction, and a lessened ability to relax. However, our study shows that induced menopausal symptoms have a crucial role in the reduced pleasure that leads to significantly reduced sexual activity frequency. Although young women who have had breast cancer may feel discomfort during sex, the prominent reason for the decreased frequency in sexual activity seems to be the lower level of pleasure experienced.

## Limitations

The current study had several limitations. First, the study did not include a control group of young breast cancer survivors who had not been treated with hormonal therapy. Future research would benefit from comparing the sexuality of young breast cancer survivors who received hormonal therapy with those who did not. Second, the study's cross-sectional nature precludes the ability to suggest a causal relationship between the study's variables and the detection of changes over time. Furthermore, there were differences between the groups in some of the sociodemographic characteristics. Although these variables were not associated with the dependent variable, caution still needs to be taken in generalizing from the findings.

We must aim to understand the long-term impact that a breast cancer diagnosis has on young breast cancer survivors, focusing on sexuality as a meaningful part of their quality of life. The current study emphasizes the importance of pleasure as a factor that has an essential effect on the frequency of sexual activity and its relation to early and induced menopausal symptoms.

The literature suggests that there is an unmet need for symptomatic management and counseling for young breast cancer survivors [42]. Young breast cancer patients must be informed at the time of diagnosis and prior to treatment about the unique sexually related issues they will encounter, and a

formal follow-up for potential sexual dysfunction during and after recovery should be required. Clinicians should be cognizant of the fact that this unique population is at risk for sexual dysfunction and offer them interventions that address sexuality not just through a prism of discomfort but rather through a prism that puts an emphasis on the importance and value of sexual pleasure.

## Declarations

### *Acknowledgments*

Prof. Gil Goldzweig for his meaningful comments and suggestions.

Funding – Not applicable

Conflicts of interest - All authors declare no conflict of interests.

Availability of data and material - The data that support the findings of this study are available from the corresponding author upon reasonable request.

Code availability- Not applicable

Authors' contributions-

Shiran Klein- Conceptualization, Methodology, Data curation, Formal analysis, Writing.

Michal Braun- Conceptualization, Methodology, Formal analysis, Writing, Supervision.

Ethics approval - The study received ethical approval from the ethics board of the Academic College of Tel Aviv-Yafo (number 2020050) and from the institutional review board (IRB) of Shaare Zedek Medical Center (szmc-0302-20).

Consent to participate - Informed consent was obtained from all individual participants included in the study.

Consent for publication - Not applicable.

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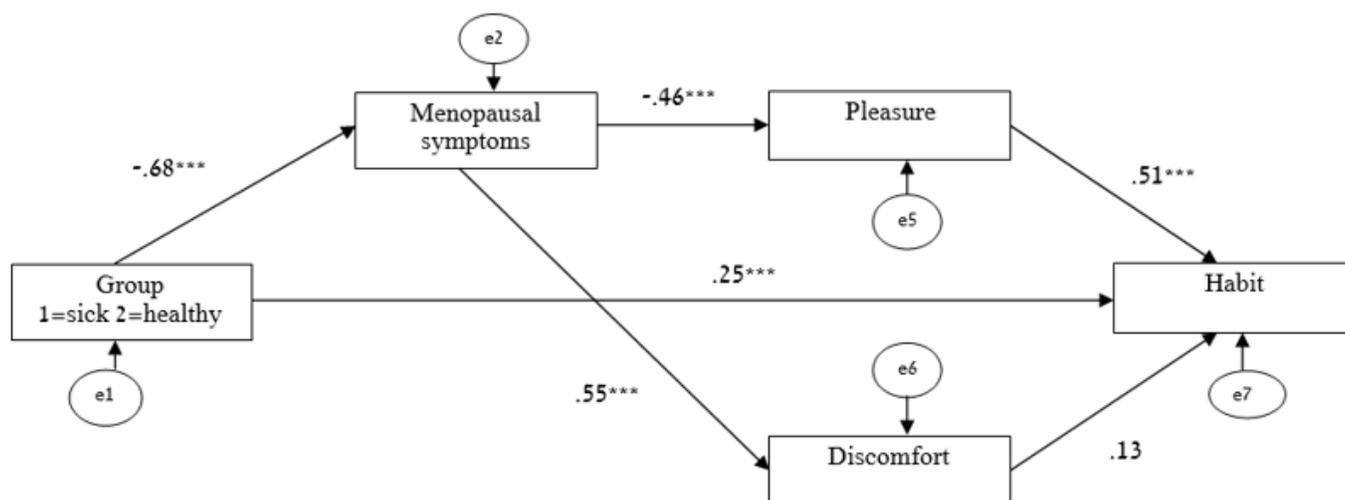
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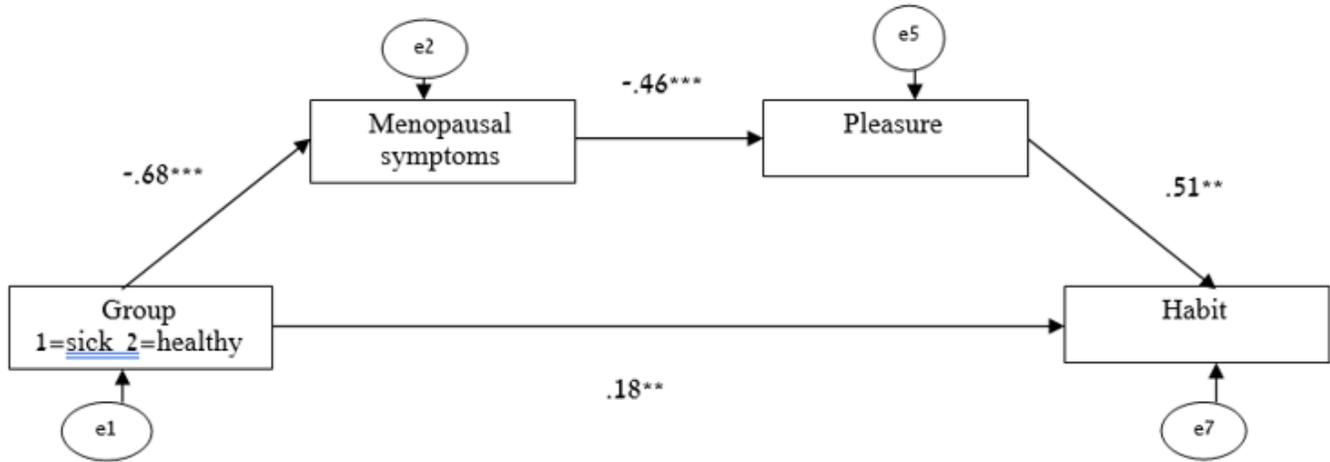
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## Figures



**Figure 1**

Full SEM model. Numbers on the paths are standardized path coefficients.



**Figure 2**

SEM model without discomfort variable. Numbers on the paths are standardized path coefficients.