

Applying Nonpharmacological Self-Care Strategies to Alleviate Severe Menstrual Symptoms

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Abstract

Objective

To explore the perceived effectiveness (ESCS) and frequency (FSCS) of non-pharmacological self-care strategies used by unmarried young Chinese reproductive women to alleviate severe menstrual symptoms (SMS) and to investigate the influencing factors on the odds of these symptoms.

Methods

An analytical cross-sectional survey via online structured questionnaire was used to collect data.

Results

Research data were collected from 380 unmarried women aged 16 to 30. Seven personal factors were found to significantly impact the odds of SMS. A mediation model was constructed to demonstrate the relationships among research variables. In this model, ESCS directly and significantly reduced the odds of SMS ($B = -0.052$, $p < 0.001$), and ESCS indirectly and significantly reduced the odds of SMS through the mediating effect by FSCS ($B = -0.147$, $p < .001$).

Conclusion

This research demonstrated that using various self-care strategies can significantly alleviate severe menstrual symptoms, with positive contributing factors including frequency of use and the perceived effectiveness. Findings will help develop holistic self-care interventions and educational programs that integrate family and school health education for young women to cope with uncomfortable menstrual symptoms.

INTRODUCTION

According to numerous studies, a significant proportion of reproductive women experience menstrual distress, which refers to all unpleasant menstrual symptoms, ranging in severity from mild to moderate to severe and often impacting their reproductive health and quality of life.^{1–3} Evidence suggests the odds of severe menstrual symptoms are usually related to genetics, age, health status, psychological stress, sociological status, lifestyle, environmental factors, cultural issues and other factors.^{4–6}

Studies found that unmarried young women are more likely to experience severe menstrual symptoms than married women, but they are more likely to endure these symptoms or adopt self-care strategies to alleviate them rather than seek medical treatment.^{5, 7–8, 9–11} Additionally, nonpharmacological self-care strategies are widely used in China and considered to have fewer side effects than pharmacological self-

care strategies, providing unmarried young Chinese women with alternative self-care options for maintaining quality of life and reproductive health during menstruation.^{5, 11–14} Nevertheless, many young Chinese girls reported inadequate knowledge about menstruation, with many holding misconceptions regarding self-care strategies for menstrual distress.^{5–6, 11–12} Due to a lack of scientific evidence regarding the effectiveness and frequency of using non-pharmacological self-care strategies, how to effectively apply these strategies to alleviate menstrual discomfort symptoms is often overlooked, highlighting the need to explore this issue.^{5, 12–13}

The purposes of this study were to explore the relationship between perceived effectiveness and frequency of use of non-pharmacological self-care strategies to alleviate severe menstrual symptoms among unmarried young Chinese women and to investigate factors influencing the odds of these menstrual symptoms.

METHODS

Study design, population, and setting

A cross-sectional study was conducted from March 2023 to May 2024. Study data were collected using a self-reported website questionnaire, and participants were recruited using non-probabilistic purposive sampling. The inclusion criteria of sampling included (1) unmarried Chinese females aged 16 to 30 years without fertility experience, (2) willing to participate in the study, (3) having regular menstrual periods for the last 3 months, and (4) able to read Chinese. The exclusion criteria were women (1) with a history of genital surgery influencing regular menstruation, (2) with serious chronic diseases (such as a cancer, diabetes mellitus or hypertension, etc.), (3) with a history of psychiatric illness, or (4) with a secondary dysmenorrhea. Initially, the researchers posted QR codes for the inclusion criteria and online questionnaire on WeChat Moments, sending recruitment information to participants who met the inclusion criteria at their workplaces and schools. Subsequently, recruitment information was subsequently posted in the WeChat Moments of current participants and recommended to their peers. Research setting included cities in both the north and south of mainland China, with two cities each in Henan Province (north) and Fujian Province (south).

Research instrument

Research instrument was a structured questionnaire developed with reference to both Chinese culture and previous studies.^{5, 7, 13–15} It included four sections: (1) 10 questions including eight questions on demographic information and two questions regarding personal menstrual history, (2) 20 questions rating the perceived intensity of participants' menstrual symptoms, (3) Five questions exploring the frequency of implementation of five non-pharmacological self-care strategies, including "Food therapy," "Exercise therapy," "Traditional Chinese therapy," "Aromatherapy," and "Heat therapy," and (4) Five questions exploring the self-reported effectiveness of these strategies.

Definition of research variables

(1) Scores of Menstrual Symptoms and Identified Severe Menstrual Symptoms

Menstrual symptoms were defined as the uncomfortable physical and emotional symptoms occurring before and during menstruation. Drawing from previous literature, the study questionnaire included 20 self-reported questions about the intensity of menstrual symptoms.^{2, 7, 17} Research participants were asked to rate their perception of the intensity of distress from the following response options: 1 = not obvious, 2 = mild, 3 = moderate, 4 = severe. Following the initial descriptive analysis, severe menstrual symptoms were selected from the list of 20 menstrual symptoms based on their reported severity (items with the mean value of intensity of distress exceeding 2.2). Then, these severe menstrual symptoms (SMS) were recoded as 0 = none or mild (previously coded as 1 or 2) or 1 = moderate to severe (previously coded as 3 or 4), and included in the second stage of statistical analysis.

(2) Effectiveness and Applying Frequency of Non-pharmacological Self-Care

Non-pharmacological self-care strategies were defined as behaviors performed to prevent or relieve menstrual symptoms in order to maintain a feeling of well-being and stabilize emotions, excluding the use of medications. Based on the literature, we selected five commonly used non-pharmacological self-care strategies for reducing menstrual distress, including food therapy (such as eating more dark chocolate, meat, and fruit; avoiding sodium intake, and cutting down on fried dishes), exercise therapy (such as aerobic exercise or yoga), traditional Chinese therapy (such as acupuncture, acupressure, or herbal tea), aromatherapy, and heat therapy.^{5, 13, 15-16}

The scoring options and coding numbers for the effectiveness of non-pharmacological self-care strategy application (ESCS) were defined as: 0 = not used regularly; 1 = ineffective; 2 = unsure; 3 = effective; 4 = very effective. Additionally, the response options of the five questions regarding the frequency of application of non-pharmacological self-care strategies (FSCS) were defined as: 1 = never; 2 = seldom (1-3 times during 6 menstrual periods); 3 = sometimes (3-5 times during 6 menstrual periods); and 4 = most of the time (every menstrual period).

Reliability and validity of research instrument

The feasibility and Cronbach's α were tested by a pilot test on a convenience sample of 10 women aged 20 to 25 years. Cronbach's α coefficient was 0.95 for the total scale, 0.97 for assessment of menstrual symptoms, 0.76 for evaluation of the implementation of self-care strategies and 0.76 for evaluation of the effectiveness of self-care strategies. In the second stage of the study, the total Cronbach's α coefficient was 0.84 and 0.82 for twelve recorded severe menstrual symptoms. Face validity and content validity index (CVI) were established by a panel of experts. The overall CVI of the research questionnaire was 0.92 as evaluated by a panel of five experts consisting of three clinical experts (two gynecologists and one senior nurse) and two nursing educators.

Hypotheses and hypothesized model

Due to the influence of multiple contributing factors and the complex interactions among menstrual symptoms, menstruating women require diverse self-care strategies to improve individual physical, psychological, and spiritual well-being.^{5, 10, 13, 14} Accordingly, we proposed a mediation model to test the following three research hypotheses: (1) ESCS would significantly reduce the odds of SMS; (2) FSCS would significantly reduce the odds of SMS; (3) FSCS has a significant mediating effect on the ESCS in reducing the odds of SMS.

Ethical considerations

This study was approved by the Human Research Ethics Committee of the researchers' universities. Before participating this study, all participants signed an informed consent form to participate in this study after understanding the research process and that their privacy would be protected. According to the "Declaration of Helsinki", questionnaires were anonymous, and the participants were assured confidentiality.

Statistical analysis and expected sample size

Research data were analyzed in two stages. In the first stage, we conducted descriptive analysis on all research data to identify severe menstrual symptoms (those with a mean value over 2.2) from among 20 symptoms and recorded the data to binominal distributed random variables (0: none or mild, or 1: moderate to severe). In the second stage, generalized structural equation modeling (GSEM) was used to evaluate the impact of frequency of application of self-care strategies and effectiveness of self-care strategies on the odds of severe menstrual symptoms and to test the three research hypotheses simultaneously (Kim et al., 2018). Multiple linear regression was used to evaluate the potential impacting factors on the total score of severe menstrual symptoms. All descriptive analysis and multiple linear regression were performed with SPSS V26, and GSEM was performed with STATA V.14. The significance level was set at $p < .05$.

According to the research hypotheses, six estimated parameters and three observed variables comprised the research mediation model. Based on 20 participants per parameter and 20 participants per study observed variable, the minimum effective sample size was 180 ($20 \times 6 + 20 \times 3 = 180$).¹⁸⁻¹⁹

RESULTS

Sample characteristics and menstrual symptoms

Research data were collected between March 2023 and May 2024. 380 unmarried women, 154 from southern region and 226 from the northern region, completed the web-based questionnaire with a 75 % response rate. The mean body mass index (BMI) of participants was $20.74 \pm 5.65 \text{ kg/m}^2$ with a BMI ranging from 14 to 28. Table 1 displays the distribution of demographic data. The supplementary table shows the distributions of five self-care strategies and 20 menstrual symptoms.

Identifying severe menstrual symptoms

In the first stage of statistical analysis, 12 out of 20 menstrual symptoms had an average value (mean) exceeding 2.2, including low back pain, diarrhea, period acne, mood swings, insomnia, impaired concentration, breast tenderness, sweatiness, anxiety, irritability and fatigue. We then recoded these severe 12 menstrual symptoms and included them in the second stage of statistical analysis.

Impacting factors on the odds of severe menstrual symptoms (SMS)

Multiple linear regression was used to explore the impacting factors on participants' severe menstrual symptoms. As shown in Table 2, the significantly influential factors were: residential area, age, body mass index (BMI), health status, family history of dysmenorrhea, FSCS, and ESCS. More specifically, after adjusting for the effects of other factors in the model, seven impacting factors were identified:

(1) For southern participants, the total score of SMS was significantly higher (4.25 units) than that of northern participants ($p = .002$); (2) For every year increase in participants' age, the total score of SMS significantly decreased 0.418 units ($B = -0.418, p = .049$); (3) For every unit increase in BMI, participants' total score of SMS significantly increased 0.273 units ($B = 0.273, p = .019$); (4) For participants with excellent health status, their total score of SMS was significantly lower than that of those in good health ($B = 5.350, p < .001$), and those in average health ($B = 7.456, p < .001$); (5) After adjusting for other factors, participants whose mothers had a history of dysmenorrhea had significantly lower total scores of SMS compared to participants whose family history of dysmenorrhea was unknown ($B = -7.493, p < .001$); (6) For every unit increase in the total FSCS score of participants, their total score of SMS significantly decreased 1.797 units ($p < .001$); (7) For every unit increase in the total ESCS score of participants, total score of SMS significantly decreased 0.506 units ($p = .014$).

Research hypotheses verification and construction of a mediation model

To verify the research hypotheses, we subsequently applied GSEM to explore the impact of FSCS and ESCS on the odds of SMS. Four results were found, as follows:

(1) The results of GSEM, originally indicated a positive causal relationship between ESCS and SMS while ignoring the influence of other impacting factors (Table 3, $B = 0.031, p < .001$). However, this became a negatively causal relationship after adjusting for the influence of other impacting factors (Table 2, $B = -0.506, p = .014$). Especially, when considering the mediating effect of FSCS, ESCS would negatively reduce the odds of SMS occurrence (Table 3, 4 and Figure 1; $B = -0.052, p < .001$); (2) Ignoring the impacts of other factors, for every 1 unit increase in ESCS, FSCS significantly decreased by 0.568 units ($p < .001$); (3) After adjusting for the effects of ESCS, the odds of SMS significantly decreased 0.147 units ($p < .001$), with an increase of one unit in FSCS. In other words, after adjusting for the impact of ESCS, each unit increase in FSCS significantly reduced the odds of SMS by 13.7% ($=1-0.863$); (4) After adjusting for the effects of FSCS, for every 1 unit increase in ESCS, the odds of SMS significantly decreased 0.052

units ($p < .001$). In other words, after adjusting for the impact of FSCS, the odds of SMS significantly decreased by 5.1% ($= 1 - 0.949$) for every unit increase in ESCS.

Based on the above results, the three research hypotheses were accepted and the hypothesized mediation model was well fitted to illuminate all the verified research variable relationships (Figure 1). Figure 1 demonstrated the research mediation model analysis.

DISCUSSION

Research focused on investigating the impact of using non-pharmacological self-care strategies on severe menstrual symptoms in unmarried women with no childbirth experience. Although most complained of experiencing mild or moderate menstrual pain, only a small percentage of participants routinely used painkillers to alleviate menstrual pain (Table 1). The result indicates that most young Chinese women tend to tolerate their monthly menstrual symptoms.^{4,5,12} These findings highlight the importance of exploring non-pharmacological self-care strategies for alleviating menstrual symptoms in unmarried women.

Impact factors on severe menstrual symptoms

Research findings indicated that the higher the participants' BMI, the higher the odds of severe menstrual symptoms. Conversely, the younger or healthier the participants were, the lower the odds of experiencing severe menstrual symptoms. The above research findings were likely consistent with previous studies.^{11, 20, 22} While literature suggests that cold weather may trigger more severe menstrual symptoms,²³ this study represents participants from northern regions, most of whom lived in areas surrounding Henan Province, China, where indoor heating is typically adequate during winter. Conversely, the participants from the south mostly lived in areas surrounding Fujian Province, where the weather is often damp and cold in winter without indoor heating. Furthermore, in Northern China, common self-care strategies for primary dysmenorrhea among young women focus on non-pharmacological methods rooted in traditional beliefs, following a culturally specific approach of keeping the body warm, to alleviate menstrual discomfort rather than seeking medical advice.^{5, 20, 24} Thus, cultural differences and living environments may explain why participants from the north experienced less severe menstrual symptoms than participants from the south in this study.

Additionally, results showed that participants whose mother had a history of dysmenorrhea were less likely to experience severe menstrual symptoms than those with no known family history of dysmenorrhea (Table 2). To explain this result, participants with a family history of dysmenorrhea may have had a greater opportunity to learn self-care strategies from their mother or sisters than those without such background. This finding highlights the crucial role of intergenerational health education in managing young women's reproductive health.^{5,25} It suggests that future research should explore integrating family education into school health education to improve reproductive health awareness among adolescent girls of reproductive age.

Explanation of research mediation model and hypotheses

Based on the results of GSEM approach, a mediation model was constructed to describe the relationships among these research variables (ESCS, FSCS, and SMS; Fig. 1). Firstly, ESCS directly decreased the odds of SMS. Secondly, FSCS acted as a mediator, indirectly enhancing the causal effect of ESCS on SMS, thereby reducing the odds of SMS. To explain these results, when participants perceived the non-pharmacological self-care strategies as effective, these strategies typically did not need to be used frequently during menstruation. In other words, based on the perceived safety of non-pharmacological self-care strategies, participants may use these strategies more frequently to enhance their effectiveness in relieving menstrual symptoms when these strategies are perceived to be less effective.

In summary, unmarried young women who employ various self-care strategies can significantly alleviate severe menstrual symptoms, with positive contributing factors being frequency of use and the probability of perceived effectiveness.

Strength and Limitation

As far as we know, this may be the first study aimed at improving the reproductive health of unmarried young women. However, this study was limited by its small sample size, as well as by selection bias in the study location and the research methodology, which restricted the interpretation and generalization of the results. Further studies should enlarge the number of participants and use the compound research design to determine the causative relationships among these research variables.

CONCLUSION

This research demonstrated the value of non-pharmacological self-care strategies and revealed seven factors impacting the odds of severe menstrual symptoms in unmarried women. Findings highlight the importance of developing holistic self-care interventions and educational programs to improve the reproductive health of young women.

Declarations

Conflicts of Interest:

The authors declare that they have no competing interests in this study.

Ethical approval and consent to participate

This study has been reviewed and approved by the Human Research Ethics

Clinical trial registration number

no applicable

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Author Contribution

Zhen-Zhen Li: Writing – original draft, writing - review & editing, methodology and conceptualization, investigation, formal analysis, and data curation. XiaoXian Zheng: Writing - review & editing, methodology, investigation, and data curation. Cui Hou : Writing – review & editing, data curation. Yue-Cune Chang: Writing – review & editing, formal analysis and conceptualization. ShuQiong Wu: Writing – review & editing, data curation. All authors read and approved the final manuscript.

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Data Availability

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

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Tables

Table 1 Distribution of Research Data (N=380)

Demographic Characteristics				
Variables		Mean± SD	Variables	Mean± SD
Age (range: 16-30 y/o)		22.8 ± 3.076	Height (cm)	163.5± 8.142
Body Weight (Kg)		55.5± 12.385		
Educational Attainment (Numbers/ Percentage)				
Junior High School or Lower		5 /1.3%	High School	58/ 15.3%
Undergraduate		275 /72.4%	Postgraduate	42/ 11.1%
Occupation (Numbers/ Percentage)				
Student		180/ 47.4%	Office Staff	130/ 34.2%
Teacher		18/ 4.7%	Sales, Clerks	21 /5.5%
Other		31/8.2%		
Financial Status (Numbers/ Percentage)				
Rich		16/ 4.2%	Well-off	112/ 29.5%
Fair		230/60.5%	Poor	22/ 5.8%
Health Status (Numbers/ Percentage)				
Excellent		193 / 50.8%	Good	138/ 36.3%
Average		42/ 11.8%	Poor	4 / 1.1%
Family History of Dysmenorrhea (Numbers/ Percentage)				
Mother		89/ 23.4%	Sister(s)	121/ 31.8%
Other Female Relatives		12/ 3.2%	Unknown	158/ 41.6%
Self-Care Strategies (SCS): Mean ± SD		Frequency of application		Perceived Effectiveness
Food Therapy		2.29 ± 0.98		2.49 ±1.329
Exercise Therapy		2.65 ±1.103		2.11±1.510
Traditional Chinese Therapy		2.94±1.130		1.73±1.62
Aromatherapy		3.29 ±1.018		1.28±1.550
Heat therapy		2.43±1.172		2.32±1.631
Intensity of Menstrual Pain (Numbers/ Percentage)				
No Significant Pain		28/ 7.4%	Mild	155 / 40.8%
Moderate		165/ 43.4%	Severe	32/ 8.4%

Regularly Taking Medicine to Relieve Discomfort (Numbers/ Percentage)			
Yes	76 (20%)	No	304 (80%)
Distribution of 20 Menstrual Symptoms [†] (Mean ± SD)			
1. Lower abdominal pain ^{††}	2.84± 0.819	2. Leg pain	2.12± 1.096
3. Low back pain ^{††}	2.66± 0.946	4. Headaches	2.09± 1.088
5. Stomachache	1.91± 1.071	6. Breast tenderness ^{††}	2.22± 1.030
7. Nausea	2.15± 1.105	8. Vomiting	1.96± 1.104
9. Diarrhea ^{††}	2.32± 1.1	10. Facial flushing	1.19± 1.045
11. Period acne ^{††}	2.56± 1.092	12. Sweatiness/ oily scalp ^{††}	2.46± 1.068
13. Edema	2.12± 1.131	14. Anxiety ^{††}	2.52± 1.082
15. Mood swings ^{††}	2.77± 0.943	16. Irritability ^{††}	2.68± 0.997
17. Insomnia ^{††}	2.24± 1.126	18. Fatigue ^{††}	2.6± 0.989
19. Impaired concentration ^{††}	2.41± 1.052	20. Nightmares	2.07± 1.17

Note:[†] response code of 20 menstrual symptoms as follows: 1 = this symptom is not obvious, 2= mild, 3 = moderate, 4= severe. ^{††}: 12 severe menstrual symptoms

Table 2. Impacting Factors on Total Severe Symptom Score by Multiple Linear Regression (N= 380)

Variables	B [†]	SE ^{††}	95% CI	Wald Chi-Square	p
(Intercept)	78.398	7.688	(63.330,93.466)	103.987	< .001*
Southern vs. Northern	4.250	1.366	(1.573, 6.927)	9.683	.002*
Age	-0.418	0.213	(-0.835, -0.002)	3.872	.049*
BMI	0.273	0.117	(0.045, 0.501)	5.497	.019*
Health Status					
Poor vs. Excellent	4.579	6.360	(-7.886, 17.044)	0.518	.472
General vs. Excellent	7.456	2.113	(3.315, 11.598)	12.450	< .001**
Good vs. Excellent	5.350	1.410	(2.588, 8.113)	14.408	< .001**
Family History of Dysmenorrhea					
Mother vs. Unknown	-7.493	1.718	(-10.860, -4.127)	19.036	< .001**
Sister vs. Unknown	-6.744	3.870	(-14.328, 0.841)	3.037	.081
Other Direct relatives vs. Unknown	-1.633	1.764	(-5.091, 1.825)	0.857	.355
FSCS	-1.797	0.291	(-2.368, -1.226)	38.067	< .001**
ESCS	-0.506	0.205	(-0.908, -0.104)	6.079	.014*

Note. Dependent Variable: Total symptom score; B[†]: Estimate, SE^{††}: Standard Error, 95% CI: confidence interval.

BMI: body mass index; ESCS: Total score for effectiveness of non-pharmacological self-care strategies; FSCS: Total score for the frequency of application of non-pharmacological self-care strategies. *: p < 0.05, **: p < 0.001

Table 3 Parameter Estimates of Variables for the Mediation Model of GSEM (N= 380)

Dependent variable	Independent variables	B	S.E.	Beta	Odds Ratio	95% CI of OR	p-value
SMS	ESCS	0.031	0.006		1.032	(1.021, 1.043)	< .001*
FSCS	ESCS	-0.568	0.021	-0.810			< .001*
SMS	FSCS	-0.147	0.014		0.863	(0.840, 0.877)	< .001*
	ESCS	-0.052	0.010		0.949	(0.932, 0.967)	< .001*

SMS: Total score of severity of menstrual symptoms; ESCS: Total score for effectiveness of non-pharmacological self-care strategies; FSCS: Total score for the frequency of application of non-pharmacological self-care strategies; B: Estimate; S.E.: Standard Error; Beta: Standardized Estimate; *: p < 0.001

Table 4 Direct and Indirect Effects of the Proposed Mediation Model of GSEM (N= 380)

Dependent variable	Mediator	Independent Variable	Direct Effect (95% CI)	Indirect Effect (95% CI)*
SMS		ESCS	0.031 (0.020, 0.042)	--
FSCS		ESCS	-0.568 (-0.610, -0.527)	--
SMS	FSCS	ESCS	-0.052 (-0.071, -0.033)	-0.083 (-0.100, -0.067)

SMS: Total score of severe menstrual symptoms; ESCS: Total score for effectiveness of non-pharmacological self-care strategies; FSCS: Total score for the frequency of application of non-pharmacological self-care strategies; *: the standard error of the indirect effect was estimated by using the Baron and Kenny method

Figures

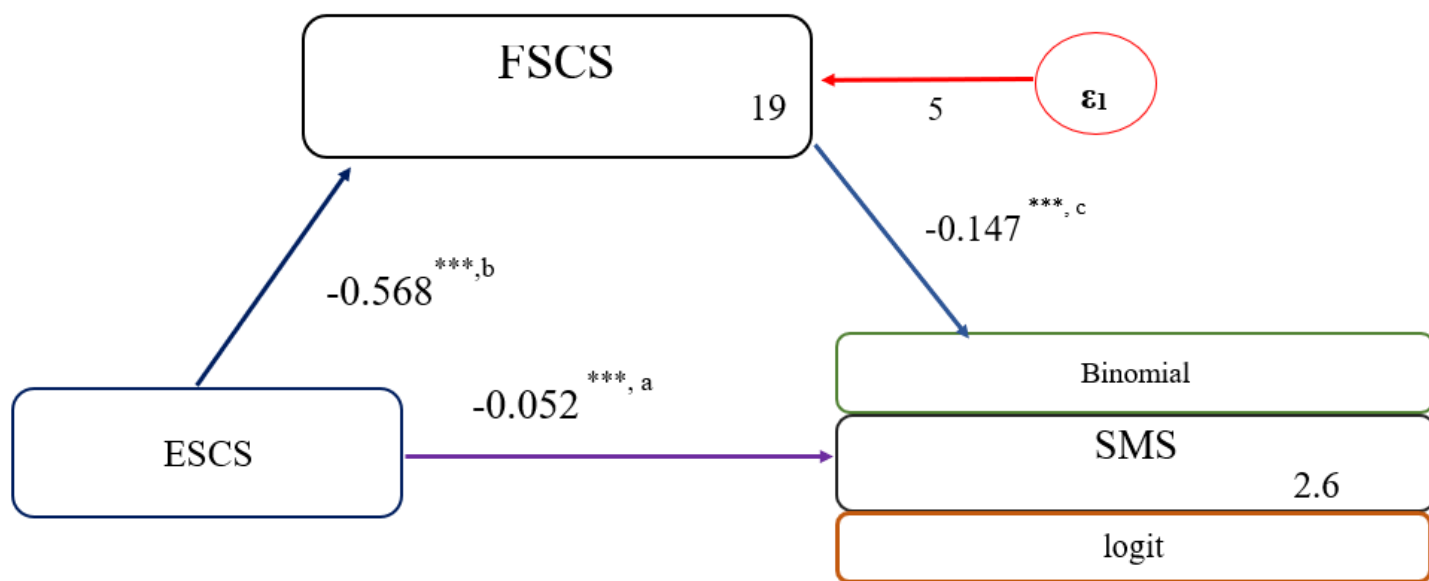


Figure 1

Research Mediation Model by GSEM Approach

Note, ESCS: Total score for effectiveness of non-pharmacological self-care strategies; FSCS: Total score for the frequency of application of non-pharmacological self-care strategies; SMS: Total score of severe menstrual symptoms. a: ESCS → SMS [direct effect]; b and c: ESCS → FSCS → SMS [indirect effect].