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Bridging the gap between sexual excitation/inhibition and female sexual function: The cognitive schema perspective

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ABSTRACT

Background: Female sexual functioning is shaped by a complex interplay of biological, psychological, and cognitive factors. While the Dual Control Model highlights the roles of sexual inhibition (SI) and sexual excitation (SE) in regulating sexual responses, little is known about the cognitive mechanisms underlying these processes.

Aims: This study investigates whether cognitive schemas activated in sexual contexts mediate the association between SI, SE, and female sexual function.

Methods: A cross-sectional study was conducted with 665 adult women recruited from administrative departments of universities in Tehran and Tabriz. Participants completed the Sexual Excitation/Inhibition Inventory for Women (Graham, 2006), the Questionnaire of Cognitive Schemas Activated in Sexual Context (Nober, 2013), and the Female Sexual Function Index (Rosen, 2000). Structural equation modeling (SEM) was used to test the hypothesized mediation model.

Results: Findings indicated that both SI ($\beta = -0.32$, $p < 0.001$) and SE ($\beta = 0.27$, $p < 0.001$) had significant direct effects on female sexual function. Importantly, cognitive schemas partially mediated the relationship between SI and sexual function (indirect effect: $\beta = -0.12$, 95% CI [−0.18, −0.07]), suggesting that maladaptive cognitive patterns contribute to sexual difficulties. The overall model demonstrated good fit indices ($\chi^2/df = 2.35$, CFI= 0.95, RMSEA= 0.05).

Conclusion: This study supports the dual control model, with sexual inhibition and excitation affecting female sexual functioning, and cognitive model, with cognitive schemas influencing sexual functioning.

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Extended Abstract

Introduction

Human sexual response and its expression develop through a complex interaction of genetic predispositions and early life experiences. (Eskandar et al., 2025; Oginni et al., 2023). Biological, psychological, and social models are required for interpreting how the various stages of sexual response (desire, arousal, orgasm, and suppression) are interrelated in social contexts and interpersonal relationships (Stulhofer & Brotto, 2023). The extent to which a sexual stimulus leads to a sexual response depends on the psychological and neurophysiological characteristics of the individual. And this sexual response often occurs without difficulty (Sánchez-Fuentes et al., 2024). In a study in Karaj, Urmia and Sabzevar, the prevalence of sexual disorders was reported to be 0.51%, 70.5% and 98.5%, respectively (Bolurian & Ganjloo, 2007; Mojdeh & Mohamadi, 2013; Sepehrian, 2012). Variation in the degree to which individuals are prone to sexual inhibition (SI) and sexual excitation (SE) could potentially explain why people differ in terms of their sexual responses and the extent to which sexual problems may occur (Janssen & Bancroft, 2023).

The "Dual Control Model of Sexual Response" proposed by Bancroft and Janssen (2009) presents a valuable theoretical framework that allows examining sexual arousal and consistency in a theory-based approach (Janssen & Bancroft, 2023). The main idea of this model is that there are separate and relatively independent sexual inhibition and excitation systems in the brain (Kurpisz et al., 2015; Schmidt et al., 2024), and the development of the sexual response depends on the relative activity of the respective inhibition and excitation processes (Sánchez-Fuentes et al., 2024). In other words, the balance between the two systems resolves whether a sexual response occurs in a sexual situation or not (Kurpisz et al., 2015).

Despite the fact that many biological factors underlie women's sexual dysfunction, Research trends in this area have revealed that there is little correlation between biological phenomena and sexual problems in women, and the impact of psychiatric factors as mediating variables is more pronounced (Abdolpour et al., 2023; Yeoh et al., 2014). Also, Bijtiber, Beck, Kels, and Vanderichen (2009) believe that direct relationships between inhibition and activation systems of behavior and psychological disorders can only partially explain this relationship, and instead complex interaction models can clarify the pattern of relationships between these variables (Bijttebier et al., 2009; Brotto et al., 2025).

pathology—paralleling sexual inhibition and arousal—recent studies suggest that these connections are often only moderate in strength. More recent work has shifted the focus toward the role of cognitive schemas and core beliefs in shaping sexual difficulties, especially when emotions such as sexual anxiety are considered. For example, Yousefi Afrashteh, Blouri, and Morovati (2024) showed that sexual anxiety can act as a bridge between sexual schemas, body image, and female sexual function. Similarly, Alimoradi et al. (2022) found that early maladaptive schemas and schemas triggered in sexual situations are closely linked to women's sexual functioning. Building on this evidence, Işık, Turhan, and Turhan (2025) reported that women with higher cognitive flexibility and greater perceived partner responsiveness tend to experience greater sexual satisfaction, highlighting the importance of cognitive and relational factors in sexual well-being. Despite the rise of information and data highlighting the significance of cognitive variables on sexual function, few studies have been conducted the role of cognitive schemas on sexual functioning in men and women (Bahrami et al., 2021; Peixoto & Nobre, 2015). In this regard, schematic vulnerabilities are the key components for psychotherapy for sexual dysfunction, as early maladaptive schemas have been shown to correlate strongly with important relational and sexual outcomes in both men and women (Kover, Lempers, & Pługel, 2024).

Cognitive schemas increase spontaneous thoughts reflecting the content of the cognitive system. These spontaneous thoughts reveal the meaning of a particular situation and are associated with the emotional and behavioral responses given to the circumstances. Studies have confirmed the impact of cognitive variables on sexual responses, particularly

sexual dysfunction (Yahagh et al., 2024; Abdolpour et al., 2023; Tavares et al., 2020; Azizi et al., 2023). Barlow's model (Barlow, 1986) is the outset for several studies on the impact of cognitive factors on sexual responses. This model hypothesizes that individuals with sexual dysfunction maintain some sexual beliefs that are unrealistic and incorrect. Also, it assumes that they have characters with inflexible and rigorous traits. Moreira et al. (2021) found that dysfunctional sexual beliefs are strongly linked with lower sexual self-efficacy, while Jobim Fischer et al. (2024) demonstrated that emotion regulation trainings targeting these beliefs and schemas contribute to improvements in sexual health. Several researchers suggest that individuals with sexual dysfunction face negative cognitive schemas and errors in information processing (Peixoto & Nobre., 2020; Wyatt & Brandon, 2025). In this regard, Peixoto and Lopes (2023) observed that Negative beliefs about sexual functioning in women are associated with poor sexual functioning and lack of sexual satisfaction.

The emotional-cognitive model for sexual dysfunction proposed by Nobre (Nobre, 2013; Nobre, 2009, 2010) assumes that dysfunctional sexual beliefs serve as a vulnerability factor to sexual dysfunction in both men and women alike. Additionally, negative cognitive schemas may be activated when an adverse sexual experience occurs. Theoretically, women with certain dysfunctional sexual beliefs may be more prone to trigger inadequacy schemas when facing adverse sexual periods (Nobre, 2013). Empirical research on women's cognitive schemas and sexual orientation has shown that the fundamental cognitive schemas under women's sexual dysfunction are those about the incompetence schemas (Peixoto & Nobre, 2015). When faced with adverse sexual events, women with sexual dysfunctions activate incompetence schemas. Activation of incompetence schemas is highly dependent on the frequency of failed and adverse sexual episodes (Nobre & Pinto-Gouveia, 2009; Oliveira & Nobre, 2013). Regarding the discussed points, this study aims to determine whether cognitive schemas activated in sexual context mediate sexual inhibition and sexual excitation in women's sexual dysfunction.

Method

The current study was a cross-sectional study examining the direct and indirect effects (intermediate effects) of a set of variables. The sample size should be between 440 and 880 individual participants as the minimum required number for when the model parameters (in the case of the present study's hypothetical model, 44 Parameters) are 10 to 20 variables (Kline, 2015). Accordingly, the total sample number selected in this study is 695 individuals. The participants, who were from different districts of Tehran and Tabriz, were employed in the administrative departments of universities. Inclusion criteria were being a woman, over 18 years of age, and heterosexuality. The researcher provided the participants with a briefing session about the research, and the volunteering participants were then invited to participate in the research. The participants were asked to answer some questionnaires after signing the written consent form. After eliminating incomplete inventories, 665 inventories entered the final analysis.

Instruments

The Sexual Excitation/Inhibition Inventory for Women: The Sexual AExcitation/Inhibition Inventory for Women was devised by Graham et al. (Graham et al., 2006) to assess women's provocative and inhibitory responses. This tool is an extensively used and credible questionnaire comprising 36-Likert scale items. The questions were rated on a 4-point Likert scale from 1 (strongly agree) to 4 (strongly disagree), with lower scores indicating greater response inhibition and arousal. The results of factor analysis show that the questionnaire consists of two higher-level "sexual inhibition and arousal" factors along with eight lower-level factors. Five of these lower-level factors, namely arousal factors (questions 15, 17, 19, 20, 24, 25, 26, 30, and 32), sexual dynamics (questions 2, 6, 27, 28), olfactory (questions 22, and 23), sexual partner characteristics (questions 5, 8, 10, 12), and situation (questions 3, 4, 7, 13) are associated with sexual arousal factors. Meanwhile, three respective factors pertaining to the communication importance (questions 1, 11, 14, 16, 21, 33) concerning sexual function (questions 9, 18,

29, 31) and potential arousal (questions 34, 35, 36) are linked to the sexual inhibition. The internal homogeneity for sexual arousal factor is 0.70, while sexual inhibition maintains a moderate internal homogeneity of 0.55, both via Cronbach's alpha (Graham et al., 2006). According to normative data of the Sexual Excitation/Inhibition Inventory for Women, moderate scores on all factors denote normal performance whereas very high scores indicate potentially problematic performance.

The Questionnaire of Cognitive Schemas Activated in Sexual Context: In this study, the Questionnaire of Cognitive Schemas Activated in Sexual Context (QCSASC) was employed to assess the variables of women's sexual schemas. This 28-item questionnaire, which evaluates the cognitive schemas described by individuals under sexual context and situations, was originally devised in two particular versions for men and women. The QCSASC has three sections, the first of which includes four sexual situations linked to the most common sexual dysfunctions in women (libido, arousal, orgasm, and vaginismus disorders, respectively). These four situations are presented in the form of four short stories written by sex therapists based on their clinical experiences. Participants are asked to determine the frequency of these sexual situations from (0 = never occurs to 5 = often). In the second part of this tool (i.e., QCSASC), 10 emotions (anxiety, sadness, frustration, fear, guilt, embarrassment, anger, hurt, pleasure, and satisfaction) are presented in a box, and participants are asked to circle the emotion they would encounter if one of the first section's four sexual situations occurs. Finally, after identifying the sexual situations associated with sexual dysfunction and the emotions stimulated in these situations, the last section of the questionnaire refers to Beck's core schemas or beliefs (1995) in 28 items. The core schemas or beliefs in the final section of the questionnaire include five subscales namely as Undesirability/Rejection, Incompetence, Self-depreciation, Difference/ Loneliness, and Helplessness. Participants are asked to express their degree of agreement with the schemas on the Likert scale from (1 = completely wrong to 5 = completely correct). All items are scored directly from 1 to 5. Higher scores denote more negative schemas. Nobre and Pinto-Gouveia (Nobre & Pinto-Gouveia, 2009), reported an internal homogeneity of 0.94 for the QCSASC questionnaire using Cronbach's alpha coefficient.

The Female Sexual Function Index: The Female Sexual Function Index (FSFI) is an instrument with 19 questions to assess female sexual function in six aspects of libido, psychosexual arousal, lubrication or moisture, orgasm, sexual satisfaction, and pain (Rosen et al, 2000). The items in this questionnaire are scored from 0 to 5. The scores of each aspect are obtained by adding the scores of each aspect's questions and multiplying it by the invoice number in parallel with the instructions of the questionnaire designer. The scores obtained for questions of each aspect are summed and then multiplied by the number of factors to set them all even since the number of questions for each aspect is not equal in the questionnaire. Adding the scores of the six aspects together renders the total score of the scale. In this approach, a higher score indicates better sexual function. A zero score designates that the individual has not had sexual activity during the last four weeks. The cut-off point for the entire scale is 28, while the subscales are reported as libido 3.3, psychosexual arousal 3.4, lubrication 3.4, orgasms 3.4, satisfaction 3.8, and sexual pain 3.8. This questionnaire is a standard general questionnaire, with its reliability and validity being confirmed by Rosen et al (Rosen et al., 2000). Fakhri et al (Fakhri et al., 2014) reported the reliability coefficients of this scale between 0.72 and 0.90 after translation and retranslation of this questionnaire by English and Persian language experts for psychometric tests. The appropriate fit was estimated using Varimax rotation, and the six factors were verified using confirmatory factor analysis.

Data analysis

SPSS22 and LISREL 8.85 statistical software packages were employed to classify, process, and analyze the data and examine the research hypotheses. Fitting of the hypothetical model was tested via structural equation modeling (SEM). Before the analysis, the assumptions linked to the SEM statistical method were tested to ensure the

ability to conduct data analysis. Data analysis was completed through a two-step approach (Anderson & Gerbing, 1988). In the first step, the confirmatory factor analysis (CFA) was applied to evaluate the measurement model's fit. In the second step, the hypothetical structural model was tested via the structural equation modeling method.

Results

A total of 665 subjects participated in this study. The mean and standard deviation of the age criterion in the present study are 34.39 and 6.58, respectively. Also, the age range is 18-55 years. The mean and standard deviation of research variables are presented in Table 1. The correlations between SI, SE and sexual function and Cognitive Schema Activation in Sexual Context were significant (P< 0.001).

Table1. Means, standard deviations, variables modeled

Variables	Mean	Std.Deviation	Kurtosis	Skewness
Dynamic	11.62	2.40	-0.148	-0.708
Partner	11.80	2.17	-0.183	-0.193
Situation	12.67	2.31	-0.229	-0.377
Arousability	25.73	4.93	-0.245	-0.592
Smell	5.41	1.51	-0.136	-0.559
Relationship	15.71	4.51	0.253	-1.256
Contingency	7.03	2.62	0.701	-0.154
Concern	9.36	3.37	-0.086	-1.256
Powerless	9.21	4.12	1.081	0.894
Abandon	8.62	4.41	1.209	1.395
Incompetent	14.38	5.15	1.251	1.268
Undesired	11.19	3.52	0.080	-0.882
Different	7.36	3.02	0.201	-0.727
pain	4.58	1.03	-0.437	-0.427
Lubrication	4.50	0.99	-0.200	-0.543
Satisfaction	4.54	1.02	-0.524	-0.036
Orgasm	4.43	0.99	-0.177	-0.592
Desire	4.34	1.03	-0.144	-0.655
Arousal	4.30	0.99	-0.140	-0.758

The assumptions for modeling structural equations, including the normality of univariate and multivariate along with the absence of multiple alignments, were examined before evaluating the measurement model and the structural model. Calculating the skewness and elongation of each observable variable is a standard technique to evaluate the normality of a single variable. In this study, the skewness of the observable variables ranged between -0.524 and 1.25, and their Kurtosis was between -1.25 and 1.39. Chou and Bentler consider a ±3 cut-off point to be appropriate for the skewness (Chou & Bentler, 1995). Although there is little agreement concerning the cut-off point, values greater than ±10 are generally problematic for this index, and values greater than ±20 invalidate the obtained results (Kline, 2015).

In this research, the multivariate normality hypothesis was examined by calculating the relative multivariate elongation index, the value of which was estimated to be 1.022. Bentler maintains that multivariate normality is obtained if the value of this index is not more than 3. Hence, the distribution of all variable combinations is normal. The default check for the absence of multiple alignments was administered by checking the correlation matrix between the observable variables. The examination of this matrix indicates the lack of any multiple alignments between them. Correlation coefficients range between 0.575 and -0.40. Correlation coefficients above 0.85 make it challenging to accurately estimate the model. In such cases, one of the two variables must be excluded from the analysis (Kline, 2015).

Table 2. Fitting indices of the measurement and structural model

Fit indices	Chi-Square	df	χ^2/df^2	RMSEA	SRMR	GFI	CFI	NFI
Measurement model	552.02	146	3.78	0.065	0.045	0.92	0.97	0.96
Structural model	552.02	146	3.78	0.065	0.045	0.92	0.97	0.96

SEM employing the maximum likelihood estimation method was performed to evaluate the measurement model and the structural model. The measurement model identifies the correlation between observable variables and latent variables. Evaluation of this model is completed using the confirmatory factor analysis. The fitting indices of the measurement model (Table 2) present the optimal fit of this model. Consequently, observable variables can operate latent variables.

Additionally, evaluation of the structural model using the SEM method revealed that all the fit indices of this hypothetical model are placed within the desired fit range. Fitting indices for this model are presented in Table 2. Fig. 1 illustrates a conceptual structural model with standard coefficients. Evidently, SE as exogenous variable, with standard coefficients of -0.31 (T-values= -3.92), 0.24 (T-values= 3.26) and SI with standard coefficients of 0.42 (T-values= 5.19), -0.26 (T-values= -3.22) affects Cognitive Schema, sexual function, respectively. Also, Cognitive schemas with standard coefficients of -0.40 (T-values= -6.54) affect women's sexual function. All parameters were statistically significant.

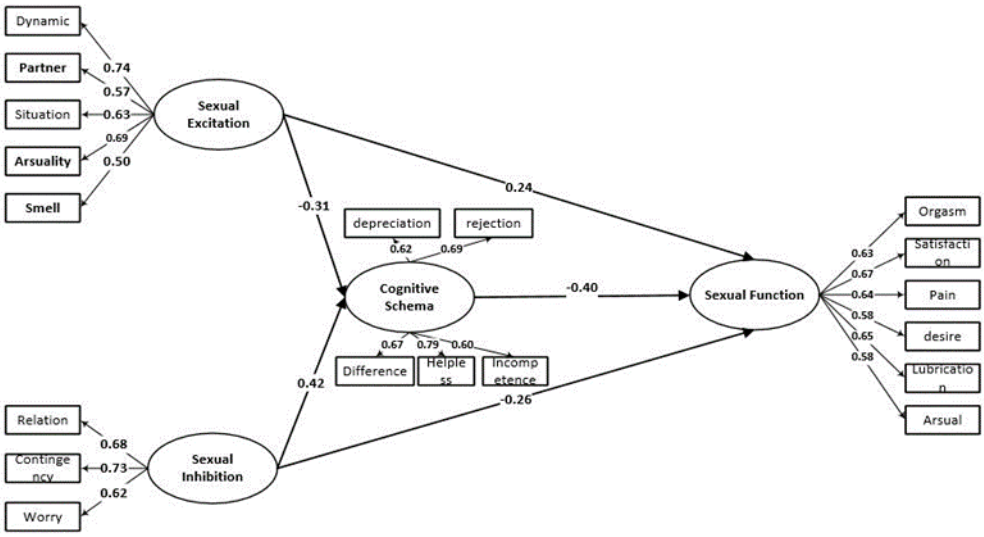

Figure 1. The conceptual structural model with standard coefficients

In the present study, the Bootstrap test was applied to evaluate the mediating interrelations. Bootstrap grants the most compelling and logical alternatives to achieve indirect effects in cases where the number of samples is not extensive enough. In this method, if the upper and lower limits of this test are either both positive and both negative and the value of 0 is not between these two limits, then the indirect causal path will be significant. Table 3 presents the results of this test. In the hypothetical model, indirect effects were considered for the sexual inhibition and sexual excitation variables while direct effects were considered for the cognitive schemas variable. According to Table 3, the sexual inhibition path to sexual function is mediated by cognitive schemas with a standard coefficient of -0.168 at the $p< 0.05$ level. The sexual excitation path to sexual function is mediated by cognitive schemas with a standard coefficient of 0.124 at the $p> 0.05$ level.

Table 3. Results Bootstrap test for mediating relations

independent variable	Mediator variable	dependent variable	bias-corrected bootstrap		Bootstrap standard errors	Effect size	significance level
			Lower bounds	upper bounds			
Sexual excitation	schema	Sexual function	0.038	0.213	0.040	0.124	0.014
Sexual inhibition	schema	Sexual function	-0.283	-0.082	0.052	-0.168	0.010

Conclusion

This study examined the relationship between sexual inhibition, sexual excitation, and female sexual functioning along with assessing the mediating role of cognitive schemas in the sexual context. The findings of the present study, consistent with the dual control model of sexual function (Janssen & Bancroft, 2023), and the findings of previous studies (Yahagh et al., 2024; Velten et al., 2017), confirmed the relation between sexual inhibition, sexual excitation, and sexual function in women. The results of this study suggest that sexual inhibition is associated with women's sexual function, and this relation is mediated by cognitive schemas activated in the sexual context.

It has been reported that women who have higher sexual inhibition struggle with sexual function and orgasm (Sanders et al., 2008); also, those with higher sexual arousal tend to engage in high-risk sexual behaviors (Rettenberger et al., 2016). Consequently, in this study, sexual inhibition maintains a negative relation with sexual function (e.g. orgasm and sexual pleasure); i.e., the more sexual inhibition, the more problematic reaching orgasm and experiencing sexual pleasure. Nobre and Pinto-Gouveia (2009) propose that women with sexual dysfunction significantly activate patterns of loneliness/ difference and seem to fail in performance. They attribute sex dysfunction to both their shortcomings and self-worth aspects, as well as to interpersonal aspects such as loneliness.

The results also show that sexual arousal is directly related to women's sexual function, and this relationship is partially mediated by cognitive schemas activated in the sexual context. This finding aligns with recent evidence emphasizing the importance of cognitive mechanisms in understanding sexual functioning. For example, Milani, Dawson, and Velten (2021) demonstrated that women's attentional processing of sexual stimuli is linked not only to their level of arousal but also to their ability to integrate cognitive and emotional cues, which predicts sexual satisfaction and orgasmic function. Likewise, Yousefi Afrashteh, Blouri, and Morovati (2024) showed that sexual anxiety and maladaptive sexual schemas can explain part of the variance in women's sexual function, reinforcing the mediating role of cognition. Brotto et al (2025) further found that women who are highly aroused by sexual power dynamics or partner-dependent cues report greater sexual difficulties when such cues are absent, highlighting how cognition and context jointly shape sexual outcomes.

Accordingly, the data of this study reinforce the theoretical assumption of the dual control model (Janssen & Bancroft, 2023) that specific characteristics of sexual excitation and sexual inhibition constitute predisposing aspects or risk factors for the occurrence of low sexual function.

Yet, these findings require thorough and extensive consideration. The most significant finding of this study is confirming the mediating role of cognitive schemas activated in the sexual context. This study is the first to investigate cognitive schemas activated in the sexual context as a mediator between sexual inhibition, arousal, and function in women. Confirming the hypothetical model's fit and the mediating role of cognitive schemas activated in the sexual context in this model, it was revealed that cognitive schemas activated in the sexual context play an important role in the onset and maintenance of female sexual dysfunction. The purpose of evaluating the role of cognitive schemas activated in the sexual context in the proposed model of this study is to assess the cognitive and physiological aspects. Confirming the mediating role of schemas suggests that attention to psychological aspects, particularly cognitive aspects, is as important as paying attention to the physiological counterparts in pathology and treatment of female sexual dysfunction. Overall, it is concluded that evaluating the mediating role of cognitive schemas activated in the sexual context in the dual control model requires more attention.

Although the findings support the hypothetical research model, the results of this study should be interpreted under the light of their constraints. First, the present study was conducted on a comparatively homogeneous population, limiting the results' generalization in the case of other populations. The final constraint is that the cross-sectional nature of this study prevents causal inferences, and the precise recognition of interrelations between the variables is left obscure. The chronological order of variables' formation is presumably in line with the presented hypothetical model. Yet, it is impracticable to reject the other potential substitute cases based on this study. Finally, only a self-assessment tool was employed for assessing each of the variables. Using a variety of assessment methods can serve to better establish the concept of variables.

In conclusion, the results of this study showed that cognitive schemas activated in the sexual context plays a partial mediating role between sexual inhibition, sexual excitation, and female sexual functioning. The results of this study have potentially significant implications for developing prevention and intervention programs for females with sexual dysfunction. Therefore, it may be useful to develop interventions that take into account how both cognitive schemas activated in the sexual context and sexual inhibition and sexual excitation may lead to sexual dysfunction. Although this study found a significant association between cognitive schemas and sexual inhibition and sexual excitation, this work should be replicated. If these findings hold, they could have significant treatment implications for developing a theory-driven conceptualization of sexual dysfunction and associated treatment based on both the cognitive schemas activated in the sexual context model.

Ethical Considerations

Compliance with ethical guidelines: All procedures performed were in accordance with the ethical standards of the institutional ethics committee and with the 1964 Helsinki declaration and its later amendments. The current study is part of a research project approved by University Ethics Committee.

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Authors' contribution: GA, MN, contributed to the design and implementation of the study, analysis of the results, and manuscript writing. MMP contributed to language editing, provided critical reviews of the manuscript, and ensured data presented in tables and text were accurate. All authors approved the final manuscript as submitted and agree to be responsible for all aspects of the work.

Conflict of interest: the authors declare no conflict of interest for this study.

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