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Effect of Yoga on Psychological Aspect and Quality of Life in Premenstrual Syndrome: A Randomized Controlled Trial

Arwa M. Ibrahim[1], Khadiga S. Abdelaziz[2], Hossam A. Kamel[3], Afaf M. Botla[4]
[1]M. Sc. of Physical Therapy for Women's Health, Faculty of Physical Therapy, Cairo University.
[2]Professor of Physical Therapy for Women's Health, Faculty of Physical Therapy, Cairo University,
[3]Professor of Gynecology and Obstetrics, Faculty of Medicine, Al-Azhar University.
[4]Assistant Professor of Physical Therapy for Women's Health, Faculty of Physical Therapy, Cairo University

ABSTRACT

Background: *Premenstrual syndrome (PMS) is identified by physical, psychological, and behavioral manifestations that severely disrupt women's daily lives during the luteal phase. Yoga emphasizes integration and connection, which enhances spiritual and biopsychosocial well-being.* ***Purpose:*** *To explore the effectiveness of yoga on psychological aspects and quality of life (QoL) in PMS.* ***Subjects and methods:*** *Forty-six females with PMS were involved; they aged from 18 to 25 years, and their body mass index wasn't greater than 30 kg/m². They were allocated from Al Sharquia's Abu-Kabir Central Hospital. They were randomized and split into two equal groups. Control: (n = 23) who practiced progressive muscle relaxation (PMR), three sessions weekly for eight weeks. Study group: (n = 23) who practiced the same PMR plus yoga three times weekly for eight weeks. All females in the two groups were assessed before and after intervention via the Spielberger State-Trait Anxiety Inventory, cortisol level, SF-36 Questionnaire, Beck Depression Inventory, Visual Analogue Scale, and Daily Record of Severity of Problems.* ***Results:*** *Between-groups comparison indicated a significant improvement in all assessed outcomes after treatment ($p < 0.05$), favoring the study group. However, a non-significant difference was detected in the vitality of the SF-36 questionnaire ($P>0.05$).*
Conclusion*: As yoga is a secure and non-invasive treatment approach, it may be utilized as a successful therapy to improve QoL and lessen psychological aspects of PMS.*
Key words*: Yoga - Premenstrual syndrome - Progressive muscle relaxation - ST36*

INTRODUCTION

Premenstrual syndrome (PMS) is identified as a menstrual condition with an assortment of physical and emotional manifestations that occur in the menstrual luteal phase and interfere with a female's everyday activities for numerous days (Begum et al., 2016).

The correlation between progesterone and neurotransmitters involving opioids, serotonin, and catecholamines is believed to have a role in the intricate and unclear pathophysiology of PMS. Increased prolactin, altered glucose metabolism, abnormal hypothalamic-pituitary-adrenal (HPA) axis action, insulin resistance, a specific deficiency in dietary electrolytes, and inheritance are the causes of PMS (Vaghela et al., 2019; Alrashedi et al., 2024; Dube et al., 2024).

An epidemiology survey found that 75% of females had PMS manifestations, with 3–8% experiencing severe symptoms (Upadhyay et al., 2023; Shariati et al., 2013). Mood swings, despair, irritation, headaches, cramping and bloating in the abdomen, breast discomfort and swelling, and alterations in appetite are all common manifestations of PMS (Abu Alwafa et al., 2021; Htet et al., 2024).

It should be noted that a woman's interactions, everyday functioning, and quality of life (QoL) may all be considerably affected by PMS. Social relationships, emotional health, and work efficiency can all be compromised by the symptoms (Sahoo et al., 2024; Nie & Rezvani, 2025; Ibrahim et al., 2025)

Relieving symptoms and lessening the impact of PMS on routine activities are the primary objectives of treatment. The mainstay of management for PMS has always been pharmacotherapy, but new evidence indicates that combined therapy may offer greater benefits. For the treatment of PMS, pharmacotherapies like non-steroidal anti-inflammatory medications are proven to be effective when combined with non-pharmacological therapies, primarily cognitive and behavioral approaches, exercises, massage, light therapy, and nutritional changes (Vaghela et al., 2019; Pašić et al., 2023).

Yoga is a body-mind training that integrates respiratory exercises and meditation to induce self-consciousness while combining physical exercise with inner-directed attention. Asana (postures), dhyana (meditation), and pranayama (breath control) are the three fundamental components of yoga practice (Ciezar-Andersen et al., 2021).

Progressive muscle relaxation (PMR) is a body-mind relaxation approach that entails gradually contracting and releasing skeletal muscles using cognitive attention to the sense of muscular tightness and relaxation (Alhawatmeh et al., 2022). The central and peripheral nervous systems are efficiently regulated by this mind-body relaxation technique, which lowers stress, anxiety, and depression and has been indicated to be successful in treating various medical problems (Loh et al., 2022; Razmara et al., 2022; Inomjon et al., 2025).

There is little research demonstrating that yoga has been used to improve psychological aspects in PMS (Ranga and Dev, 2024; Chang et al., 2023). Nevertheless, no prior research indicated how yoga affects PMS patients' psychological well-being and QoL. As a result, this research will contribute to the wealth of information that physical therapists possess within the scientific field.

Hypothesis: It was hypothesized that yoga had a beneficial impact on psychological aspects and QoL in PMS.

MATERIALS AND METHODS

Participants

Initially, 50 participants suffering from PMS were randomly assigned from the gynecological department at Abo Kabir General Hospital, Al-Sharqia, from November 2024 to June 2025. However, after being evaluated for eligibility, four of them were not included; three of them met the exclusion criteria, while the other one declined to take part in the study for private reasons. As a result, 46 out of 50 patients fulfilled the inclusion criteria and were randomized using a computer-based randomization method into two groups with equal numbers (A and B) (Figure 1). They were between the ages of 18 and 25, and their BMI was no higher than 30 kg/m². All were virgins and had regular menstrual cycles. Patients with endocrine disturbance, endometriosis, pelvic inflammatory disease, any pelvic pathology conditions, hysterectomy, or ovariectomy, or those using medications like contraceptive pills, pain relief drugs, and antidepressant drugs weren't included in the study.

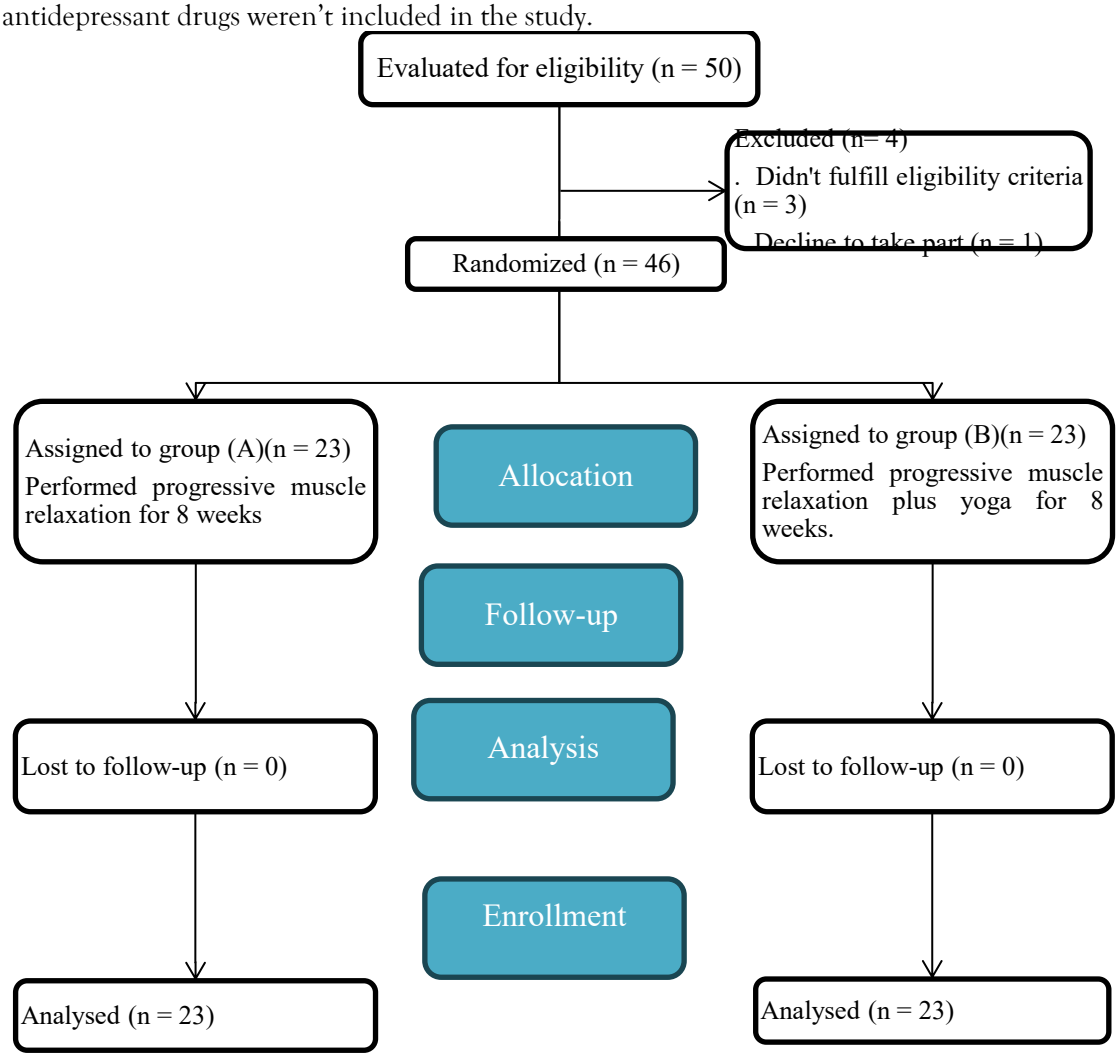

Fig. 1. Flow chart indicating numbers of participants

Ethics

The Institutional Review Board of Cairo University's Faculty of Physical Therapy accepted ethical authorization for the study (No: P.T.REC/012/004757). The study also had a ClinicalTrials.gov registration (NCT06665347). Every participant obtained a complete clarification of the research procedures and gave their informed consent prior to the study's commencement. The Declaration of Helsinki's ethical guidelines for studies relating to human subjects were closely followed in this study.

Sample size calculation

According to **Jasuja et al. (2014b)**, the Beck Depression Inventory was utilized to calculate the sample size via the G*Power software (version 3.0.10), with 80% power at $\alpha = 0.05$ level, two measures for both groups, and an effect size of 0.45 utilizing the F-test for within and between interaction effects. At least 41 subjects, plus 5 (12%) dropout subjects, were required, for a total of 46 subjects (23 subjects for each).

Outcome measures:

All evaluated variables were measured for both groups before and after treatment programs.

Spielberger State Trait Anxiety Inventory (STAI)

Anxiety levels were determined using STAI. Each item on the 40-item STAI self-reported anxiety test has a 4-point Likert scale. State anxiety, or how one senses immediately, and trait anxiety, or how one feels generally, are its two measures. Each scale has twenty items. On its two sections, its score ranges from 20 to 80. A score of 20–37 defines no or mild anxiety, a score of 38–44 defines moderate anxiety, and a score of 45–80 defines severe anxiety (Zsido et al., 2020; Violet & Hazarika, 2024).

Beck depression inventory (BDI)

Depression levels were evaluated using BDI. The 21-item, self-rated BDI measures mood, sense of failure, self-dissatisfaction, pessimism, self-dislike, self-accusation, guilt, punishment, suicidal thoughts, irritation, social disengagement, crying, indecision, altered body image, job problems, sleeplessness, fatigability, appetite loss, weight loss, physical preoccupation, and loss of sexual desire, among other important symptoms of depression. Its score varies from 0 to 63, with zero being the lowest (Sajatovic et al., 2015).

Cortisol level

A blood sample was taken from each woman to assess cortisol levels. All blood samples were drawn at 8 AM before breakfast for all cases. Its typical levels are 5 to 25 mcg/dL or 140-690 nmol/L.

Cortisol is a valuable indicator of stress and chronic pain and can be associated with anxiety. Elevated cortisol levels are often observed in individuals with anxiety disorders, suggesting a potential link between the hormones and anxiety symptoms (Dziurkowska and Wesolowski, 2021; Ciubotariu et al., 2025).

Short Form 36 Health Survey Questionnaire (SF-36)

The health-related quality of life (HRQoL) was evaluated by the SF-36 questionnaire. Physical function, role limitations owing to physical health and emotional problems, vitality, emotional wellness, pain, social function, and general health are among the eight variables that are evaluated by the SF-36. The average of each score across all domains was computed to determine the questionnaire's overall score. The scores were converted so that they ranged from 0 for the worst health to 100 for optimal health (Latas et al., 2014).

Daily record of severity of problems (DRSP):

It was utilized to record PMS manifestations. The DRSP was divided into two sections: menstrual-associated symptoms (21 items) and how they impair daily functioning (3 items). The ratings ranged from 1 (not at all) to 6 (extreme) for every item. With a higher score, the premenstrual symptoms are more severe (Borenstein et al., 2007).

Visual analogue scale (VAS):

It was employed to determine pain severity. The VAS is a simple and widely used technique for evaluating differences in pain severity. It is a subjective, validated tool for pain measurement. Scores are documented utilizing a written sign on a 10-cm line that displays the range from "no pain" to "worst pain" (Delgado et al., 2018).

Interventions

Progressive muscle relaxation (PMR) training

For eight weeks, all participants in the two groups engaged in PMR exercises three sessions weekly, completing 3 sets of 5 repetitions for every group of muscles. It was recommended that the patient lie comfortably in a supine position in a quiet area, take a deep, steady breath, and firmly contract the affected muscle region to the greatest extent possible without straining it. After holding this tension for five seconds, the patient released their breath while letting their muscles relax for 10 seconds, then she continued to the subsequent muscle groups.

- The following muscles had been trained:
Hands and arms (for both sides: by one hand, with a tightly fist, the forearm was drawn to the shoulder, and the upper arm was tensed); forehead (brows elevated to the highest possible level); mouth and jaw (opened mouth held); neck (head dragged back gradually and held); shoulder (shoulders elevated to the ears, the blades were then brought back, and the chest was pushed anteriorly and held); stomach (chest and the belly were expanded); leg (thighs tensed up, then the toes were pulled up to the shin, contracting the calf muscle); and toes (the toes pointed downward and held in place) (Safyeldeen et al., 2024).

Yoga

All women of group B performed yoga for half an hour per session, three sessions weekly for eight weeks. The session began with 5 minutes for warming up (slow anterior and posterior and side-to-side neck tilting, gradual neck rotations, alternating chest expansions, and backward and side leg raising). Twenty minutes of wind-relieving position (pavanmuktasana), corpse position (savasana), standing side stretch position, seated forward bend (paschimothanasana), locust position (salabhasana), cobra position (bhujangasana), and chair position (utkatasana). Five minutes of cooling down (the same warm-up exercise).

Data analysis:

The data's normality was determined utilizing the Shapiro-Wilk test. Mahalanobis distance and a boxplot are used to evaluate univariate or multivariate outliers. To evaluate linear relationships, a scatterplot was employed. The homogeneity of variances and covariances was evaluated using Box's M test and Levene's test of homogeneity of variances. Therefore, the STAI Y-1, STAI Y-2, BDI, pain, cortisol level, VAS, DRSP, physical function, vitality, emotional well-being, general health, and total score of the SF-36 questionnaire at various measuring times in both groups were compared utilizing the MANOVA. Significance was determined at an alpha level of 0.05.

Wilcoxon Signed Rank tests were utilized for comparing each group's before and after treatment, and the Mann-Whitney U test was employed for comparing both groups for not normally distributed data (the SF-36 questionnaire's social function, role limitations owing to physical health and emotional problems). SPSS for Windows, version 18 (SPSS, Inc., Chicago, IL), was employed for statistical analysis.

Results:

The age, height, body mass, and BMI mean values were not significantly different ($p>0.05$) across both groups (Table 1).

Following treatment, there was a significant change across both groups, with group B experiencing further significant reduction in STAI Y-1, STAI Y-2, BDI, cortisol level, VAS, and DRSP scores ($p<0.05$). Following treatment, a statistically significant variation was detected among both groups, with group B exhibiting a more notable improvement in pain, general health, emotional well-being, physical function, and the overall SF-36 questionnaire score. However, the vitality of the SF-36 questionnaire wasn't significantly changed across both groups following treatment ($p>0.05$) (Table 2).

After the treatment, a statistically significant change was detected across both groups. Group B demonstrated a greater increase in the SF-36 questionnaire's role of limitations owing to physical health, and emotional problems, and social function ($p<0.05$) (Table 3).

Table (1): Participant's demographic data in both groups

Items	Group (A) (n = 23)	Group B (n = 23)	Comparison		S
	Mean ± SD	Mean ± SD	t-value	P-value	
Age (years)	20.86±2.34	20.60±2.14	0.394	0.696	NS
Body mass (Kg)	58.26±6.33	57.17±5.54	0.619	0.539	NS
Height (cm)	161.34±6.71	161.39±5.68	-0.024	0.981	NS
BMI (kg/m^2)	22.33±1.7	21.94±2	0.698	0.489	NS

***SD: standard deviation, P: probability, S: significance, NS: non-significant.**

Table (2): Mean ±SD and p values of STAI Y-1, STAI Y-2, BDI, cortisol level, VAS, DRSP, physical function, vitality, emotional well-being, pain, general health and total score of SF-36 questionnaire before and after intervention in both groups

Variable	Time	Group (A) (n = 23) Mean ± SD	Group B (n = 23) Mean ± SD	P-Value

STAI Y-1	Pre test	46.52±7.22	45.52 ±6.38	0.622
	Post test	42.39 ±6.32	32.04±4.79	0.0001*
	P-Value	0.0001*	0.0001*	
STAI Y-2	Pre test	44.39±5.92	43.34 ±5.01	0.522
	Post test	40.86±4.68	34.21±4.25	0.0001*
	P-Value	0.0001*	0.0001*	
BDI	Pre test	19.21±5.09	18.47±5.34	0.634
	Post test	18.04±5.11	11.95±3.37	0.0001*
	P-Value	0.078	0.0001*	
Cortisol level (mcg/dl)	Pre test	16.47±1.73	16.61±1.77	0.79
	Post test	15.95±1.89	13.55±1.71	0.0001*
	P-Value	0.001*	0.0001*	
VAS	Pre test	6.65±1.02	6.52±1.03	0.671
	Post test	5.04±1.36	2.95±1.22	0.0001*
	P-Value	0.0001*	0.0001*	
DRSP	Pre test	78.04±11.32	73.78±9.38	0.172
	Post test	73.34±8.97	56.60±8.46	0.0001*
	P-Value	0.0001*	0.0001*	
Physical Function of SF-36	Pre test	51.95±12.85	54.56±9.03	0.43
	Post test	55.43±12.33	80.21±9.59	0.0001*
	P-Value	0.102	0.0001*	
Vitality of SF-36	Pre test	42.60±14.76	41.95±12.76	0.873
	Post test	49.13±14.43	57.6±14.68	0.055
	P-Value	0.001*	0.0001*	
Emotional well-being of SF-36	Pre test	48.34±13.74	44.34±11.56	0.291
	Post test	54.26±11.49	64.17±11.08	0.005*
	P-Value	0.001*	0.0001*	
Pain of SF-36	Pre test	45.21±13.37	39.45±16.11	0.194
	Post test	48.36±13.04	60.32±13.76	0.004*
	P-Value	0.087	0.0001*	
General Health of SF-36	Pre test	45.21±13.35	50.65±11.31	0.144
	Post test	49.34±12.99	69.56±12.14	0.0001*
	P-Value	0.017*	0.0001*	
Total score of SF-36	Pre test	40.26±6.48	41.97±7.40	0.41
	Post test	45.99±6.26	65.35±7.41	0.0001*
	P-Value	0.0001*	0.0001*	

*Significance at p-value <0.05 SD: standard deviation
p-value: probability value

Table (3): Median and p values of role of limitations owing to physical health, and owing to emotional problems and social function of SF-36 questionnaire before and after intervention in both groups

Variable	Time	Group (A) (n = 23) Median	Group B (n = 23) Median	P-Value
Role of limitation owing to physical health of SF-36	Pre test	25 (50)	25 (50)	0.638
	Post test	25(25)	75 (25)	0.0001*
	P-Value	0.638	0.0001*	
	Pre test	33.3 (66.7)	33.3 (66.7)	0.666

Role of limitation owing to emotional problems of SF-36	Post test	33.3 (66.7)	66.7 (36.7)	0.002*
	P-Value	0.239	0.0001*	
Social function of SF-36	Pre test	25 (37.5)	37.5 (25)	0.454
	Post test	37.5 (25)	50 (37.5)	0.007*
	P-Value	0.007*	0.0001*	

*Significance at p-value <0.05 p-value probability value

DISCUSSION

PMS is a common cyclic and repeated problem that impacts reproductive-aged females; it is typified by the occurrence of physical and emotional manifestations throughout the menstrual luteal phase (Cheng et al., 2025).

This research was carried out to determine the effectiveness of yoga on psychological aspects and quality of life (QoL) in PMS.

The study results indicated that the study group experienced more improvement in all assessed variables ($p<0.05$) than the control group, with no significant difference only in the vitality of SF-36 ($p>0.05$).

The study's findings support those of Saraswati et al. (2025), who proposed that yoga has various beneficial impacts on mental and emotional well-being in addition to physical health, particularly for athletes.

Furthermore, yoga has been demonstrated to improve women's QoL by reducing the emotional, behavioral, and physical manifestations of PMS (Ranga and Dev, 2024).

According to Chang et al. (2023), yoga can successfully alleviate PMS manifestations, such as physical and depressive symptoms and anger/irritability, along with their effects on relationships, everyday tasks, hobbies, and social interactions.

Additionally, Kucukkelepce et al. (2021) discovered that acupressure and yoga helped women with PMS feel better and experience fewer symptoms. Furthermore, yoga has been demonstrated to be more efficient than acupressure at reducing the intensity of PMS and enhancing QoL.

Additionally, research by Vaghela et al. (2019) and Kamalifard et al. (2017) indicated that yoga exercise decreased PMS manifestations. As a result, women with PMS had a significant improvement in their QoL as their symptoms subsided and their pain levels decreased.

The HPA axis's negative modulation in conjunction with the sympathetic nervous system may be the mechanism by which yoga lessens PMS symptoms. Yoga practice negatively affects the release of hormones into the bloodstream that are responsible for bodily functions, such as cortisol, glucose, epinephrine, and norepinephrine, through vagal nerves. Through the positive regulation of immunoglobulin A adjustment, yoga mitigates the adverse effects of generated stress on the immunity (Kamalifard et al., 2017).

According to Naveen et al. (2016), among individuals with depression receiving yoga alone, there was a significant relation between increased serum brain-derived neurotrophic factor levels and decreased serum cortisol concentration. This conclusion is a significant result for understanding the impact of yoga in this population since it implies that yoga may have neuroplastic and stress-reduction benefits in depressed patients.

Our study's findings, however, were in conflict with those of Erdoğan Yüce and Muz (2020), who exercised yoga for an hour weekly for four weeks and discovered no significant variations in the participants' trait anxiety or QoL across the studied groups. The brief study period, which was limited to four weeks, may be the cause of this study's contradiction.

Additionally, our research's findings contradicted those of Vollbehr et al. (2018), who contend that hatha yoga didn't influence short- or long-term and/or treatment-resistant anxiety and mood conditions in comparison to control groups. The discrepancy in this study could be because the participants had significant mood and anxiety concerns unrelated to PMS.

Regarding PMR's ability to alleviate PMS, the findings of this study support those of Çitil and Canbay (2024), who observed that regular application of PMR had a therapeutic impact on PMS symptoms.

Additionally, Thirupathi (2017) and Sudhadevi et al. (2018) demonstrated that PMR exercises were highly efficient in lowering students' levels of PMS.

Furthermore, according to Jasuja et al. (2014a), PMR is a useful strategy for managing stress. Once mastered, it aids in addressing stressors and reduces PMS symptoms while also improving general well-being.

Strengths and limitations:

The randomized design and the determined sample size are two of this study's main strengths. The study does not, however, include long-term patient follow-up. Therefore, more research should be conducted to find out how yoga impacts psychological aspects and QoL in females with PMS over longer durations with follow-up. In addition, the effect of yoga on physical aspects and serotonin levels on PMS was not evaluated, so further large-scale studies are necessary to demonstrate the impacts of yoga on physical aspects and serotonin levels on PMS and to assess its clinical application and results in humans.

CONCLUSION

As yoga is a safe and simple therapeutic approach, it may be utilized as a successful strategy to improve QoL and lessen the psychological aspects of premenstrual syndrome.

Author Contributions

AM-I, KS-A, HA-K, and AM-B carried out the research design, concept, data collection, statistical analysis, and data presentation. The final manuscript was written, reviewed, and approved by them in collaboration before publication.

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Data availability:

The authors can provide unrestricted raw data that confirms the results of this work upon request.

Conflict of Interest:

No conflicts of interest.

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