

# The Effects of Psychological Interventions on Menstrual Health in Exercising Women: A Comprehensive Experimental Study

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## Abstract

**Purpose.** This comprehensive experimental study explores the effects of psychological interventions on menstrual health in physically active women. The research aims to investigate the influence of stress reduction techniques, body image enhancement programs, and counseling on menstrual irregularities, stress levels, body image perceptions, and psychological well-being. It also examines the interplay between psychological factors and menstrual health, contributing to women's reproductive well-being.

**Material & Methods.** The study employs a rigorous randomized controlled trial design with 40 physically active women aged 18-23. Participants are divided into an intervention group receiving psychological interventions and a control group without interventions. The interventions include mindfulness meditation, deep breathing exercises, mirror affirmations, media literacy workshops, and gratitude journaling. Data is collected over six months through menstrual calendars, the Perceived Stress Scale, the Body Image Assessment Scale, and the Psychological Well-being Scale. Statistical analyses involve repeated measures ANOVA and regression analyses.

**Results.** The intervention group experiences significant improvements in menstrual regularity, stress reduction, body image perception, and psychological well-being. Menstrual regularity significantly improves ( $p < 0.001$ ), stress levels decrease ( $p < 0.001$ ), body image perception improves ( $p < 0.001$ ), and psychological well-being enhances ( $p < 0.001$ ). Correlations indicate positive relationships between psychological well-being and menstrual regularity ( $r = 0.31$ ,  $p = 0.021$ ) and negative relationships with stress levels ( $r = -0.42$ ,  $p < 0.001$ ) and body image perception ( $r = 0.28$ ,  $p = 0.031$ ).

**Conclusion.** This study demonstrates the positive impact of psychological interventions on menstrual health, stress reduction, body image perception, and psychological well-being in physically active women. The findings underscore the potential of integrating psychological strategies into women's healthcare, offering holistic approaches to address both menstrual irregularities and related psychological concerns.

**Keywords:** Menstrual health, psychological interventions, stress reduction, body image perception, psychological well-being, reproductive health, physically active women.

## Introduction

The significance of investigating menstrual health within the context of physically active women cannot be overstated. This group represents a demographic that necessitates focused attention

due to the intricate relationship between exercise and reproductive well-being. Understanding the multifaceted connections between physical activity, psychological states, and menstrual health is paramount, given the far-reaching implications on women's overall health and quality of life. Exten-

sive research has illuminated the notable prevalence of menstrual irregularities among women who engage in consistent exercise routines (Armour et al., 2022). The intricate interplay of biological stressors linked to intensive training, low body fat ratios, and energy imbalances can disrupt the menstrual cycle. The widespread occurrence of irregular cycles, and in some cases, amenorrhea, raises red flags concerning potential hormonal imbalances and long-term health repercussions. Beyond the well-documented physical triggers for menstrual irregularities, the role of psychological components must not be overlooked (Hardy & Hardie, 2017; Johnson et al., 2017). The intricate relationship between stress levels, body image perceptions, and overall psychological well-being can profoundly influence the intricate hormonal balance within the hypothalamic-pituitary-ovarian axis. This nexus underscores the need to explore the potential impact of psychological interventions on menstrual health outcomes (Li et al., 2019; Nomamesi et al., 2023).

This research endeavor aims to bridge the knowledge gap by meticulously investigating the potential outcomes of psychological interventions on menstrual irregularities among physically active women. Through a strategic examination of stress reduction techniques, programs designed to enhance body image perception, and targeted counseling, this study aspires to uncover valuable insights that could inform the development of effective interventions. Employing a rigorous randomized controlled trial, the investigation endeavors to contribute substantively to the enhancement of menstrual health and overall well-being among active women (Noyan et al., 2022; Steward et al., 2018).

#### *Purpose of the study*

This study aims to investigate the impact of psychological interventions on menstrual health among physically active women. The primary objective is to assess how diverse interventions, including stress reduction techniques, body image enhancement programs, and counseling, may contribute to restoring normal menstrual patterns. Additionally, the research seeks to understand the intricate relationship between psychological well-being and menstrual health by examining stress levels, body image perceptions, and overall psychological states in relation to menstrual regularity. Through these objectives, the study aims to provide insights into the potential synergies between psychological factors and reproductive health in active women.

Through rigorous data collection, thorough analytical processes, and insightful interpretation, this research endeavor aims to yield a profound comprehension of the nuanced interconnection between psychological interventions, psychological well-being, and menstrual health (Abdollahi et al., 2019). Through these objectives, this study aspires to contribute substantively to the formulation of precisely targeted interventions capable of fostering

reproductive health and holistic well-being among physically active women.

#### **Material and methods of research**

This randomized experimental study involved 40 physically active women (18-23 years). Interventions targeted stress reduction and body image enhancement (Balsom & Gordon, 2021). Data on menstrual cycles, stress, body image, and well-being were collected over six months for analysis. Replication necessitates strict adherence to the study's design and procedures.

#### *Participants*

The study will focus on recruiting a sample of physically active women aged 18-23 years. Inclusion criteria will encompass individuals engaging in regular exercise, defined as a minimum of three weekly sessions. Participants with a history of menstrual irregularities and who provide informed consent will be eligible. Exclusion criteria will include preexisting medical conditions affecting menstrual health or psychological well-being, ongoing participation in psychological interventions, and pregnancy. Recruitment will occur through diverse channels such as university campus of SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu.

The study will involve a total of 40 participants, evenly divided into two distinct groups:

**Control Group (n=20):** This group will encompass physically active women aged 18-23 years who fulfill the specified inclusion criteria. However, these participants will not be exposed to the psychological interventions that are the subject of the investigation.

**Experimental Group (n=20):** Similarly, this group will comprise physically active women aged 18-23 years who meet the outlined inclusion criteria. Unlike the control group, participants assigned to this group will be subjected to the psychological interventions under study.

Physically active women pertains to females who engage in regular physical exercise or activity. In the context of this research, it refers to women who consistently participate in physical workouts or sports-related activities. This partition of participants ensures a balanced distribution and equal representation in both groups. The choice of a sample size of 40 individuals was meticulously considered to balance statistical power, available resources, and the practical feasibility of the study. This arrangement will enable a comparative examination of the effects of the psychological interventions on menstrual health in the context of exercising women.

#### *Methods*

An experimental study design will constitute the core structure of this study. The participants will be randomly assigned to either the intervention group, which will receive the psychological interventions, or the control group, which will not receive inter-

ventions. Employing this design is pivotal for minimizing selection bias and fostering causal inferences about the potential effects of interventions. The intervention group will experience a comprehensive intervention regimen encompassing multiple dimensions. Stress reduction techniques will involve mindfulness meditation and deep breathing exercises aimed at alleviating stress levels. The body image enhancement programs will consist of structured cognitive-behavioral activities designed to nurture positive body image perceptions.

#### Stress Reduction Techniques

**Mindfulness meditation:** Involves developing present-moment awareness through focused attention.

**Deep breathing:** Exercises consist of deliberate, slow breaths that promote relaxation and stress reduction.

#### Cognitive-Behavioral Activities

**Mirror Affirmations:** Participants can engage in daily mirror exercises where they express self-affirmations, emphasizing self-acceptance and appreciation for their bodies. This practice redirects their focus away from perceived flaws and promotes self-love.

**Media Literacy Workshops:** These workshops teach individuals to critically analyze media representations of body images. This helps them deconstruct unrealistic beauty standards and understand the influence of media on their body image.

**Gratitude Journaling:** Participants are encouraged to keep daily journals in which they note aspects of their bodies for which they feel grateful. This activity fosters a shift toward appreciating their bodies and recognizing their unique qualities, contributing to a more positive self-image.

#### Procedure

The research will employ established measurement tools to capture critical outcomes. Menstrual irregularity will be evaluated through participant-reported menstrual calendars, potentially complemented by hormonal assessments for verification. The Perceived Stress Scale (PSS) will assess stress levels. Body image perceptions will be gauged via

the Body Image Assessment Scale (BIAS). Meanwhile, psychological well-being will be measured using the Psychological Well-being Scale (PWS). Data collection will unfold over a span of six months. Participants will provide information about menstrual cycles, stress levels, body image perceptions, and psychological well-being at baseline and post-intervention. Menstrual cycle data will be collected on a monthly basis, while the remaining measurements will be captured at both the beginning and the conclusion of the intervention (Cherenack & Sikkema, 2022).

#### Statistical Analysis

The analysis phase will commence with descriptive statistics to summarize participant characteristics. Assessing the impact of psychological interventions will involve repeated measures ANOVA to scrutinize changes in menstrual regularity, stress levels, body image perceptions, and psychological well-being scores over time, both within and between groups (Weiss et al., 2021). Additionally, regression analyses will delve into potential mediation effects of psychological well-being on menstrual health outcomes. The significance threshold will be set at  $p < 0.05$ .

#### Results of the study

This section provides a comprehensive analysis of the impact of psychological interventions on menstrual health, stress levels, body image perception, and psychological well-being among physically active women. We present the pre- and post-intervention scores for both control and experimental groups, focusing on mean differences and p-values. This structured approach highlights significant findings and patterns, offering valuable insights into the effects of the interventions. By examining the statistical data, we gain a deeper understanding of how these interventions influence the various aspects of women's health.

The outcomes unveiled a substantial main effect of time ( $F=12.45$ ,  $p < 0.001$ ) and a noteworthy interaction effect between time and group ( $F=5.76$ ,  $p=0.004$ ). The intervention group exhibited a significant enhancement in menstrual regularity subsequent to the intervention period in comparison

**Table 1.** Analysis of Changes in Menstrual Regularity

Group	Baseline Regularity (days)	Post-intervention Regularity (days)	Mean Difference (days)	p-value
Intervention	Irregular	Improved	2.35	<0.001*
Control	Irregular	No Significant Change	0.12	0.256

\*Significant at  $p < 0.05$ .

**Table 2.** Analysis of Changes in Stress Levels

Group	Baseline Stress (Scale)	Post-intervention Stress (Scale)	Mean Difference (Scale)	p-value
Intervention	High	Decreased	-12.56	<0.001*
Control	High	Slight Change	-1.34	0.102

\*Significant at  $p < 0.05$ .

to baseline measurements. In contrast, the control group experienced negligible changes in menstrual regularity. The transformations observed within the intervention group were statistically significant ( $p < 0.001$ ), underscoring the positive impact of psychological interventions on fostering improved menstrual regularity. The analysis revealed a significant improvement in menstrual regularity among participants in the intervention group compared to the control group (see Table 1).

The findings illuminated a significant main effect of time ( $F = 8.76$ ,  $p < 0.001$ ) and a substantial interaction effect between time and group ( $F = 4.82$ ,  $p = 0.009$ ). The intervention group exhibited a substantial reduction in stress levels following the intervention period in contrast to their baseline levels. In comparison, the control group displayed only a slight alteration in stress levels. The observed shifts within the intervention group were statistically significant ( $p < 0.001$ ), underscoring the potential efficacy of psychological interventions in mitigating stress. After the intervention, individuals in the intervention group experienced a substantial decrease in stress levels, as indicated in Table 2.

The intervention group displayed a significant improvement in body image perception subsequent to the intervention period, in contrast to their baseline perceptions. Conversely, the control group exhibited no substantial alterations in body image perception. The observed alterations within

the intervention group were statistically significant ( $p < 0.001$ ), underscoring the potential effectiveness of psychological interventions in fostering positive body image perceptions. Participants body image perception significantly improved following the psychological interventions, as shown in Table 3.

The intervention group demonstrated a substantial enhancement in psychological well-being following the intervention period, as opposed to their baseline well-being. In contrast, the control group exhibited only a marginal shift in psychological well-being. The observed alterations within the intervention group were statistically significant ( $p < 0.001$ ), underlining the potential efficacy of psychological interventions in nurturing an improved psychological state. The intervention group demonstrated significantly enhanced psychological well-being post-intervention, while the control group showed only slight changes (refer to Table 4).

The table showcases correlation coefficients and associated p-values to provide insights into potential relationships. Notably, psychological well-being exhibited positive correlations with menstrual regularity ( $r = 0.31$ ,  $p = 0.021$ ), while displaying negative correlations with stress levels ( $r = -0.42$ ,  $p < 0.001$ ) and body image perception ( $r = 0.28$ ,  $p = 0.031$ ). However, no significant correlations were observed between menstrual regularity, stress, and body image perception. Cross-analysis presented in Table 5 indicates significant correlations between men-

**Table 3.** Analysis of Changes in Body Image Perception

Group	Baseline Perception (Scale)	Post-intervention Perception (Scale)	Mean Difference (Scale)	p-value
Intervention	Negative	Improved	1.92	$< 0.001^*$
Control	Negative	No Significant Change	0.05	0.315

\*Significant at  $p < 0.05$ .

**Table 4.** Analysis of Changes in Psychological Well-being

Group	Baseline Well-being (Scale)	Post-intervention Well-being (Scale)	Mean Difference (Scale)	p-value
Intervention	Moderate	Enhanced	4.63	$< 0.001^*$
Control	Moderate	Slight Change	0.89	0.043*

\*Significant at  $p < 0.05$ .

**Table 5.** Cross-Analysis of Menstrual Regularity, Stress, Body Image Perception, and Psychological Well-being

Variable	Menstrual Regularity (days)	Stress Levels (Scale)	Body Image Perception (Scale)	Psychological Well-being (Scale)
Menstrual Regularity	NA	-0.25 ( $p = 0.128$ )	0.12 ( $p = 0.456$ )	0.31 ( $p = 0.021$ )*
Stress Levels	-0.25 ( $p = 0.128$ )	NA	-0.14 ( $p = 0.365$ )	-0.42 ( $p < 0.001$ )*
Body Image Perception	0.12 ( $p = 0.456$ )	-0.14 ( $p = 0.365$ )	NA	0.28 ( $p = 0.031$ )*
Psychological Well-being	0.31 ( $p = 0.021$ )*	-0.42 ( $p < 0.001$ )*	0.28 ( $p = 0.031$ )*	NA

\* $p < 0.05$ .

strual regularity, stress levels, body image perception, and psychological well-being among the study participants.

## Discussion

Comparing the findings of the current study with existing literature provides an opportunity to contextualize its contributions. While earlier research has explored various facets of psychological interventions and their impact on health outcomes, the uniqueness of this study lies in its concurrent assessment of menstrual regularity, stress, body image perception, and psychological well-being. This holistic approach distinguishes it from studies that have typically examined these factors in isolation (Kato et al., 2021; Pierson et al., 2021). Moreover, the statistically significant correlations discovered between psychological well-being and menstrual regularity, stress, and body image perception are consistent with certain prior investigations, reinforcing the relevance of psychological factors in the realm of women's health (Sanjaykumar et al., 2023). The significant enhancement in menstrual regularity within the intervention group suggests a plausible connection between psychological interventions and hormonal equilibrium (Cowell et al., 2011; Ranganathan et al., 2016). It's conceivable that stress reduction through psychological interventions can potentially alleviate disruptions in the hypothalamic-pituitary-gonadal axis, thereby influencing menstrual regularity. The implications of these findings are noteworthy for women's reproductive health, as they imply that addressing psychological well-being might contribute to more consistent and healthier menstrual cycles (Park & Jung, 2021).

The outcomes of this study shed light on the intricate interplay between psychological factors and menstrual health. The positive changes observed in the intervention group aren't confined to just menstrual regularity; they extend to reduced stress levels, improved body image perception, and enhanced psychological well-being. This suggests a dynamic bidirectional relationship, where enhancements in psychological aspects can potentially positively influence menstrual regularity, and conversely, improvements in menstrual regularity can contribute to better psychological well-being (Chrisler et al., 2015; Smith et al., 2018). The study underscores the potential advantages of incorporating psychological interventions into women's health care strategies. By focusing on stress reduction, bolstering body image perception, and nurturing psychological well-being, interventions could potentially yield positive outcomes across various dimensions (Guvenc et al., 2012; Millar, 2013). The integration of psychological components within the framework of women's health care could potentially lead to more holistic and effective approaches for addressing not only menstrual irregularities but also related psychological concerns (Yi et al., 2023). This study boasts several strengths, including its comprehensive meth-

odology that concurrently evaluates menstrual regularity, stress, body image perception, and psychological well-being. The utilization of repeated measures ANOVA further bolsters the internal validity of the findings (Armour et al., 2022; Balsom & Gordon, 2021). However, it's important to acknowledge certain limitations, such as the absence of a placebo-controlled design, potential biases associated with self-reported stress and psychological well-being data, and the relatively short duration of the intervention. These limitations could influence the generalizability and causal inferences drawn from the study.

Expanding upon this study's groundwork, future research could delve deeper into understanding the mechanisms that underlie the identified relationships. Longitudinal studies might provide insights into establishing causal connections between psychological interventions and menstrual regularity. Further investigation into specific psychological techniques, such as mindfulness or cognitive-behavioral interventions, could uncover their role in influencing hormonal balance. Moreover, considering the potential influence of cultural and socioeconomic factors on these connections could offer a more nuanced perspective.

## Conclusion

This study's comprehensive analysis illuminates the crucial interplay between psychological factors and women's health in the context of exercising individuals. The findings highlight the significant impact of psychological interventions on menstrual regularity, stress reduction, body image enhancement, and psychological well-being. The study's alignment with initial objectives reinforces the potential of psychological interventions to positively influence menstrual health. The observed stress reduction emphasizes the broader implications of these interventions on overall well-being. Moreover, the improvements in body image perception and psychological well-being underscore their potential to contribute to a more holistic health approach. These results carry important implications for healthcare professionals and policymakers, emphasizing the value of incorporating psychological strategies into the care of exercising women. A multidisciplinary approach that integrates psychological interventions could lead to more tailored and effective healthcare strategies. In sum, this study underscores the significance of addressing both physical and psychological aspects for the well-being of exercising women, paving the way for future research and improved healthcare practices.

## Author's Contribution

Conceptualization, S.S. and P.Y.; methodology, S.S.; software, P.Y.; check, S.S. and N.C.J.; formal analysis, S.S. and N.C.J.; investigation, P.Y.; resources, P.Y.; data curation, S.S. and P.Y.; writing – rough preparation, S.S.; writing – review and editing, S.S. and N.C.J.; visualization, S.S.; supervision, N.C.J.; project administration, S.S. and P.Y.

All authors have read and agreed with the published version of the manuscript.

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