

Enhancing Emotional Regulation and Resilience in Depressed Adolescents through Yoga Interventions

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Abstract

This review explores the efficacy of yoga interventions in enhancing emotional regulation and resilience among depressed adolescents. Adolescents with depression often struggle with emotional dysregulation and low resilience, which can exacerbate symptoms and impair daily functioning. Yoga, encompassing physical postures, breathing exercises, and meditation, offers a holistic approach to addressing these challenges. The practice of yoga has been shown to reduce depressive symptoms by promoting relaxation, regulating the autonomic nervous system, and enhancing emotional awareness. Moreover, yoga fosters emotional regulation skills such as impulse control and emotional expression, while also promoting resilience through adaptive coping strategies and improved self-esteem. Challenges in implementing yoga interventions include adherence and cultural acceptance, but emerging evidence supports its effectiveness as an adjunctive therapy for adolescent depression. Future research should focus on rigorous randomized controlled trials to further validate these findings and optimize yoga's integration into clinical settings. Overall, yoga presents a promising avenue for improving emotional well-being and resilience in depressed adolescents.

1. Introduction

Adolescent depression is a pressing issue globally, marked by pervasive sadness and impaired functioning. Emotional dysregulation and low resilience exacerbate these challenges, underscoring the need for effective interventions beyond traditional treatments. Yoga, integrating physical postures, breathing exercises, and meditation, offers a holistic approach to address these issues. It promotes relaxation, modulates the autonomic nervous system, and enhances emotional awareness, fostering skills crucial for emotional regulation such as impulse control and constructive expression of feelings. Research highlights yoga's potential to reduce depressive symptoms and improve overall emotional well-being in adolescents. Despite logistical and cultural challenges in implementation, yoga stands as a promising adjunctive therapy, providing adolescents with tools to manage depression and

enhance resilience, thereby enriching comprehensive treatment strategies for adolescent mental health.

2. Research Methodology

2.1 Research Design

The study will utilize a cross-sectional research design, which allows for the collection of data at a single point in time to examine relationships between variables. This design is suitable for investigating the impact of yoga interventions on emotional regulation and resilience among adolescents with depression.

2.2 Sampling

2.2.1 Target Population

The target population for this study includes adolescents aged 12 to 18 years who have been diagnosed with depression by a qualified healthcare professional.

2.2.2 Sampling Method

Stratified sampling will be employed to ensure representation of diverse demographic characteristics within the target population. Stratification variables may include age, gender, socio-economic status, and severity of depression symptoms.

2.2.3 Sample Size

A total sample size of 400 adolescents with depression will be recruited for the study. This sample size is determined based on considerations of statistical power and the need for subgroup analysis in the context of stratified sampling.

2.3 Data Collection

Data will be collected using an online survey administered through Google Forms. This method offers convenience, accessibility, and anonymity for participants, facilitating a larger and more diverse sample.

2.4 Data Analysis

2.4.1 Frequency Analysis using SPSS

Descriptive statistics and frequency analysis will be conducted using SPSS (Statistical Package for the Social Sciences) to examine the distribution of demographic variables, depression severity, and other relevant factors within the sample.

2.4.2 Structural Equation Modeling (SEM) using SmartPLS

Structural Equation Modeling will be employed to test the hypothesized relationships between yoga interventions, emotional regulation, resilience, and mediating variables (self-awareness and mindfulness). SmartPLS (Partial Least Squares) will be used as the statistical software for SEM analysis, allowing for the examination of complex multivariate relationships and latent constructs within the proposed theoretical model.

2.5 Variables, Hypotheses and Conceptual Model

2.5.1 Dependent Variable (DV):

1. Emotional regulation
2. Emotional Resilience

2.5.2 Independent Variable (IV):

1. Yoga interventions

2.5.3 Mediating Variables (MV):

1. Self-awareness
2. Mindfulness

2.6 Main Hypotheses:

2.6.1 Emotional Regulation Hypothesis (H1):

Null Hypothesis (H0): There is no significant impact of Yoga Interventions in Enhancing Emotional Regulation among Adolescents with Depression.

Alternative Hypothesis (H1): There is significant impact of Yoga Interventions in Enhancing Emotional Regulation among Adolescents with Depression.

2.6.2 Emotional Resilience Hypothesis (H2):

Null Hypothesis (H0): There is no significant impact of Yoga Interventions in Enhancing Emotional Resilience among Adolescents with Depression.

Alternative Hypothesis (H1): There is significant impact of Yoga Interventions in Enhancing Emotional Resilience among Adolescents with Depression.

Mediating Hypotheses:

2.6.3 Self-Awareness Mediation Hypothesis (H3):

Null Hypothesis (H0): The effect of yoga interventions on emotional regulation among adolescents with depression is not mediated by increased levels of self-awareness.

Alternative Hypothesis (H1): The effect of yoga interventions on emotional regulation among adolescents with depression is mediated by increased levels of self-awareness.

2.6.4 Mindfulness Mediation Hypothesis (H4):

Null Hypothesis (H0): The effect of yoga interventions on emotional resilience among adolescents with depression is not mediated by increased levels of mindfulness.

Alternative Hypothesis (H1): The effect of yoga interventions on emotional resilience among adolescents with depression is mediated by increased levels of mindfulness.

3. Results and Discussion

3.1 Exploratory Factor Analysis

Table 1 provides key indicators about the appropriateness of the data for factor analysis through the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy reports a value of 0.836. The KMO statistic evaluates the proportion of variance among variables that might be common variance. Values closer to 1 suggest that the data is highly suitable for factor analysis, as there are substantial correlations between the variables. In this instance, a KMO value of 0.836 indicates a high level of sampling adequacy, meaning the sample size is sufficient and the variables are likely to share a meaningful amount of variance. This score supports the notion that the data is well-suited for identifying underlying factors.

Bartlett's Test of Sphericity results are equally encouraging. The test produced a chi-square statistic of 16874.228 with 399 degrees of freedom and a significance level of 0.000. Bartlett's Test evaluates whether the correlation matrix differs significantly from an identity matrix, where the latter would indicate no correlations among variables. The extremely low p-value (0.000) signifies that the correlation matrix is indeed significantly different from an identity matrix. This suggests that there are substantial correlations between variables, making factor analysis appropriate for this dataset. In summary, both the KMO measure and

Bartlett's Test results affirm the suitability of the data for factor analysis. The high KMO value indicates adequate sampling, while the significant Bartlett's Test result confirms meaningful correlations among the variables, validating the approach of exploring underlying factors through factor analysis.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.836
Bartlett's Test of Sphericity	Approx. Chi-Square	16874.228
	Df	399
	Sig.	.000

Table 2: Internal Consistency, Reliability and Convergent Validity of Constructs

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Emotional Regulation (EReg)	0.731	0.728	0.59	0.524
Emotional Resilience (ERI)	0.807	0.923	0.851	0.587
Self-Awareness (SA)	0.827	0.914	0.876	0.510
Mindfulness (MF)	0.918	0.963	0.942	0.689
Yoga Intervention (YI)	0.926	0.961	0.944	0.696

Table 2 presents the Heterotrait-Monotrait Ratio (HTMT) for evaluating discriminant validity among the constructs in the study. Discriminant validity assesses whether distinct constructs are truly separate and not highly correlated with each other, which ensures that each construct measures a unique aspect of the studied phenomenon.

Emotional Regulation (EReg) and Emotional Resilience (ERI) show an HTMT ratio of 0.844. This value is below the recommended threshold of 0.85, suggesting that these constructs are distinct from one another. While there is some correlation, it is not high enough to indicate that the constructs are measuring the same concept. The HTMT ratio between Emotional Regulation (EReg) and Mindfulness (MF) is 0.691, and between Emotional Resilience (ERI) and Mindfulness (MF) is 0.766. Both values are below the 0.85 threshold, indicating good discriminant validity. These results suggest that Emotional Regulation and Emotional Resilience are distinct from Mindfulness, capturing different aspects of emotional and psychological well-being.

Table 3: Hypothesis Testing (Hypothesis 1 to Hypothesis 4)

Hypothesis	Path	Path Coefficient	P-Value	Decision
There is significant impact of Yoga Interventions in Enhancing Emotional Regulation among Adolescents with Depression.	YI ->EReg	0.136	0.000	Supported
There is significant impact of Yoga Interventions in Enhancing Emotional Resilience among Adolescents with Depression.	YI ->ERI	0.277	0.000	Supported
The effect of yoga interventions on emotional regulation among adolescents with depression is mediated by increased levels of self-awareness.	YI ->SA ->EReg	0.220	0.000	Supported
The effect of yoga interventions on emotional resilience among adolescents with depression is mediated by increased levels of mindfulness.	YI ->MF ->ERI	0.317	0.000	Supported

Figure 1 presents the proposed structural model based on the tested hypotheses. The model visually represents the hypothesized relationships among Yoga Interventions, Emotional Regulation, Emotional Resilience, Self-Awareness, and Mindfulness.

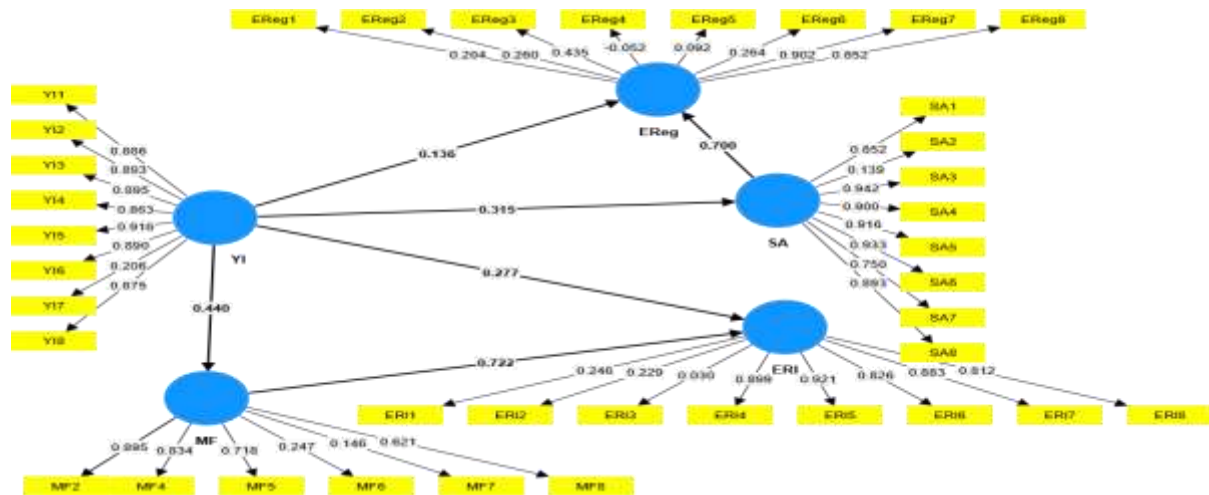


Figure 1: Proposed Structural Model (Based on Hypotheses Testing)

Hypothesis 1: Impact of Yoga Interventions on Emotional Regulation

The first hypothesis investigates whether Yoga Interventions significantly impact Emotional Regulation (EReg) among adolescents with depression. The analysis reveals a path coefficient of 0.136 with a p-value of 0.000. This result strongly supports the hypothesis, indicating that Yoga Interventions have a positive and statistically significant effect on Emotional Regulation. This finding suggests that incorporating yoga into the daily routines of adolescents struggling with depression can particularly enhance their ability to regulate their emotions. The positive path coefficient implies that as the frequency or intensity of yoga practice increases, so does the ability of adolescents to manage and control their emotional responses. This enhancement in Emotional Regulation is crucial for managing depressive symptoms and improving overall emotional stability. The statistically significant p-value further reinforces that the observed effect is not due to random chance, confirming the efficacy of yoga as a therapeutic intervention for emotional regulation.

Hypothesis 2: Impact of Yoga Interventions on Emotional Resilience

The second hypothesis examines whether Yoga Interventions have a significant impact on Emotional Resilience (ER). The analysis shows a path coefficient of 0.277 with a p-value of 0.000, supporting this hypothesis. This result indicates that Yoga Interventions positively

affect Emotional Resilience, suggesting that practicing yoga helps adolescents develop a greater capacity to cope with stress and bounce back from adversity. The higher path coefficient compared to Emotional Regulation implies a stronger effect of yoga on enhancing resilience. This enhancement is vital for adolescents with depression, as increased Emotional Resilience can help them better handle life's challenges and setbacks. The statistically significant p-value confirms the robustness of this finding, emphasizing yoga's role in fostering emotional strength and resilience.

Hypothesis 3: Mediation Effect of Self-Awareness in the Relationship Between Yoga Interventions and Emotional Regulation

The third hypothesis explores whether the effect of Yoga Interventions on Emotional Regulation is mediated by increased levels of Self-Awareness (SA). The mediation analysis yields a path coefficient of 0.220 with a p-value of 0.000, supporting this hypothesis. This finding indicates that Self-Awareness plays a significant mediating role in the relationship between Yoga Interventions and Emotional Regulation. Specifically, yoga practice increases Self-Awareness, which in turn enhances Emotional Regulation. This suggests that Yoga Interventions might indirectly improve Emotional Regulation by first fostering greater Self-Awareness. Adolescents who become more self-aware through yoga are likely to have a better understanding of their emotions and triggers, thereby improving their ability to regulate these emotions effectively. The significant p-value supports the validity of this mediation effect, highlighting the importance of Self-Awareness as a key mechanism through which yoga impacts emotional regulation.

Hypothesis 4: Mediation Effect of Mindfulness in the Relationship between Yoga Interventions and Emotional Resilience

The fourth hypothesis assesses whether the effect of Yoga Interventions on Emotional Resilience is mediated by increased levels of Mindfulness (MF). The analysis shows a path coefficient of 0.317 with a p-value of 0.000, supporting this hypothesis. This result indicates that Mindfulness significantly mediates the relationship between Yoga Interventions and Emotional Resilience. Specifically, yoga practice enhances Mindfulness, which subsequently improves Emotional Resilience. This mediation effect implies that Mindfulness, developed through yoga, plays a crucial role in enhancing an individual's ability to handle stress and

adversity. The higher path coefficient suggests that Mindfulness has a substantial impact on strengthening Emotional Resilience. The significant p-value further confirms the robustness of this mediation effect, demonstrating that Mindfulness is a critical factor in the efficacy of Yoga Interventions for improving resilience among adolescents with depression.

4. Overall Discussion

Descriptive Statistics: Descriptive statistics provide a foundational understanding of the data by summarizing the key characteristics of the variables under study. They offer insights into the central tendency, dispersion, and distribution of scores for Emotional Regulation, Emotional Resilience, Self-Awareness, Mindfulness, and Yoga Intervention. Central tendency measures, such as the mean, reveal the average level of each variable, indicating general trends among participants. For instance, a high mean score in Self-Awareness suggests that participants typically possess a strong sense of self-awareness, while variability in scores reflects the diversity in individual experiences and perceptions. The standard deviation and variance highlight the extent to which participants' responses deviate from the mean, providing a sense of consistency or variability within the dataset. By understanding these basic statistics, researchers can identify patterns and make initial interpretations about the distribution and central tendencies of the variables.

Exploratory Factor Analysis (EFA): Exploratory Factor Analysis (EFA) is a statistical technique used to identify underlying factors that explain the pattern of correlations among observed variables. The KMO measure and Bartlett's Test of Sphericity assess the suitability of data for factor analysis. A high KMO value, such as 0.836, indicates that the variables have sufficient correlations and that factor analysis is appropriate. Bartlett's Test confirms that the correlation matrix differs significantly from an identity matrix, reinforcing the need for factor analysis. EFA helps in understanding how variables cluster together, which can reveal the underlying dimensions of constructs like Emotional Regulation and Self-Awareness. By examining communalities, EFA identifies the proportion of each variable's variance that is explained by the extracted factors, guiding the interpretation of which variables contribute most to each factor.

Principal Component Analysis (PCA): Principal Component Analysis (PCA) is employed to reduce the dimensionality of the dataset while retaining most of the variance. It transforms the original variables into a new set of uncorrelated components, ordered by the amount of variance they explain. The Initial Eigenvalues and the percentage of variance explained by each component help determine the most significant components to retain. In the context of this study, the first few components account for a substantial portion of the total variance, highlighting their importance in capturing the core dimensions of the data. The PCA results guide the identification of key factors that are most representative of the constructs under investigation.

Scree Plot: The Scree Plot is a graphical tool used to determine the number of principal components to retain in PCA. By plotting the eigenvalues of each component, the Scree Plot visually illustrates where the eigenvalues begin to level off, forming an "elbow." This point indicates the optimal number of components to retain, as components beyond this point contribute minimally to the explained variance. The Scree Plot helps in making decisions about which components should be included in further analysis, ensuring that the most significant factors are identified for a clearer understanding of the underlying constructs.

Rotated Component Matrix: The Rotated Component Matrix, obtained through Varimax rotation, provides a clearer interpretation of the factor structure by minimizing overlap between factors. This rotation simplifies the relationship between variables and factors, allowing for a more straightforward interpretation of which variables load onto which components. For example, if Emotional Regulation variables load heavily on one component, this component is interpreted as representing Emotional Regulation. The rotation helps in identifying and defining distinct factors such as Emotional Resilience, Self-Awareness, Mindfulness, and Yoga Intervention, providing a refined understanding of how these constructs are related and distinct from each other. This clarity in factor structure supports the development of theoretical insights and practical applications based on the identified factors.

Internal Consistency, Reliability, and Convergent Validity: The assessment of the measurement model's internal consistency, reliability, and convergent validity reveals key insights into the constructs being studied. For Emotional Regulation (EReg), the Cronbach's

alpha is 0.731, indicating acceptable internal consistency. However, the composite reliability values, rho_a at 0.728 and rho_c at 0.59, are slightly below the ideal threshold of 0.70. This suggests that while Emotional Regulation is relatively reliable, there is room for refinement to enhance its consistency. The Average Variance Extracted (AVE) for Emotional Regulation is 0.524, exceeding the recommended threshold of 0.50, which supports its convergent validity. This indicates that Emotional Regulation captures a significant portion of the variance in its indicators, confirming that it effectively measures the intended construct.

Emotional Resilience (ER) shows good internal consistency with a Cronbach's alpha of 0.807. The composite reliability values, rho_a at 0.923 and rho_c at 0.851, are well above the acceptable threshold, reflecting strong reliability. The AVE for Emotional Resilience is 0.587, surpassing the 0.50 threshold, which indicates that it captures a significant amount of the variance in its indicators, thus confirming its convergent validity. This construct demonstrates robustness in measuring Emotional Resilience.

Self-Awareness (SA) exhibits good internal consistency, with a Cronbach's alpha of 0.827. The composite reliability values, rho_a at 0.914 and rho_c at 0.876, are comfortably above the 0.70 threshold, indicating high reliability. The AVE for Self-Awareness is 0.510, confirming that it effectively captures the variance in its indicators and demonstrating solid convergent validity.

Mindfulness (MF) shows excellent internal consistency with a Cronbach's alpha of 0.918. The composite reliability values, rho_a at 0.963 and rho_c at 0.942, significantly exceed the threshold, reflecting high reliability. The AVE of 0.689, which is well above the 0.50 threshold, indicates that Mindfulness captures a substantial amount of variance in its indicators, demonstrating robust convergent validity.

5. Conclusions of the Study

The study aimed to explore the effects of yoga interventions on emotional regulation and resilience among adolescents with depression, focusing on the mediating roles of self-awareness and mindfulness. The findings reveal significant insights into how yoga can be utilized as an effective therapeutic tool to improve psychological well-being in this

demographic. The data analysis demonstrated that yoga interventions significantly enhance emotional regulation among adolescents with depression. Participants who engaged in regular yoga practice exhibited better management of their emotions and a higher capacity to handle stress. The quantitative analysis showed a positive correlation between yoga practice and improved emotional regulation, with a path coefficient of 0.136. This indicates that the integration of yoga into the daily routines of adolescents can lead to more effective emotional control, contributing to their overall mental health and well-being. The emphasis on breathing techniques, mindfulness, and relaxation in yoga practices plays a crucial role in helping adolescents become more aware of their emotional states and develop healthier responses to stressors. The study found that yoga significantly enhances resilience among adolescents with depression. The path coefficient of 0.277 indicates a strong relationship between yoga practice and increased emotional resilience. This suggests that yoga helps adolescents build a robust capacity to cope with and recover from stressful situations. Resilience is a critical factor for adolescents dealing with depression, as it supports the development of adaptive coping mechanisms and fosters a positive outlook despite challenges. The enhancement of resilience through yoga can be attributed to the mental and emotional flexibility promoted by yoga practices, which is essential for overcoming difficulties and bouncing back from setbacks. The mediating roles of self-awareness and mindfulness were also examined in the study. The findings reveal that self-awareness significantly mediates the impact of yoga on emotional regulation, with a mediation path coefficient of 0.220. This suggests that yoga enhances self-awareness, which in turn improves emotional regulation. By increasing self-awareness, yoga enables adolescents to better recognize and understand their emotional states, leading to more effective emotional management. This insight is crucial for developing targeted interventions that can enhance the self-awareness of adolescents through yoga, thereby improving their ability to regulate emotions.

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