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RELIGIOSITY AS A MODERATOR IN THE RELATIONSHIP BETWEEN EMOTIONAL DYSREGULATION AND NON-SUICIDAL SELF-INJURY: A STRUCTURAL EQUATION MODELING APPROACH

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ABSTRACT

Purpose: This study investigates the role of religiosity as a moderating factor in the relationship between emotional dysregulation and non-suicidal self-injury (NSSI) among individuals experiencing psychological distress.

Design: A cross-sectional design was employed with a sample of 250 participants from Pakistan. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS.

Findings: Measurement model demonstrated satisfactory reliability and validity ($\alpha = 0.84–0.92$; CR = 0.88–0.93; AVE = 0.52–0.59), and discriminant validity (HTMT < 0.90). Structural model revealed that emotional dysregulation significantly predicted NSSI ($\beta = 0.55$, $p < .001$). Moderation analysis indicated that religiosity significantly moderates the relationship between emotional dysregulation and NSSI ($\beta = -0.18$, $p = .004$). The model demonstrated good explanatory power ($R^2 = 0.49$) and strong predictive relevance ($Q^2 = 0.31$). Effect size confirmed emotional dysregulation as the strongest predictor ($f^2 = 0.38$), with religiosity contributing both directly and interactively.

Implications: Integrating religiosity into assessment may enhance therapeutic outcomes and reduce maladaptive coping behaviors.

Originality: This study offers a nuanced understanding of NSSI through conceptualizing religiosity as a moderator that attenuates the impact of emotional dysregulation on non-suicidal self-injury within a culturally grounded Pakistani context.

KEYWORDS: Religiosity, Emotional Dysregulation, Non-Suicidal Self-Injury (NSSI), Emotion Regulation, PLS Structural Equation Modeling

INTRODUCTION

Non-suicidal self-injury (NSSI) is an intentional, self-inflicted bodily harm without suicidal intent. It is a significant clinical and public health concern, particularly among teenagers and young adults, whose lifetime rates are estimated to be 17–22% (Ose et al., 2021). In the past, non-suicidal self-harm was recognized as a component of criterion five of borderline personality disorder (BPD). However, it was established that NSSI is also a distinct in its own both from BPD (Bentley et al., 2015a; Glenn & Klonsky, 2013; Kerr et al., 2010) and suicidal self-harm (Halicka & Kiejna, 2015) and other forms of self-injurious behavior like excoriation, trichotillomania, and repetitive self-harm that can be seen in neurodevelopmental disorders such as autism spectrum disorder and intellectual disability) (Furniss & Biswas, 2020). Non-suicidal self-injury (NSSI) was first included in DSM-5 (American Psychiatric Association, 2013) because to its clinical significance. It was first listed in Section III "Conditions for Further Study" and later in Section II "Other conditions that may be a Focus of Clinical Attention" of DSM-5-TR (American Psychiatric Association, 2022). The diagnostic criterion of NSSI is given in Table 1.

While NSSI has been repeatedly associated with mood disorders (Haw et al., 2001), this behavior is also shown in a wide range of psychiatric illnesses, such as eating disorders, anxiety disorders, trauma-related disorders, and attention-deficit/hyperactivity disorder (ADHD) (Bentley et al., 2015b; Turner et al., 2016; Warne et al., 2023). This heterogeneity in diagnosis highlights that the categorical approach of the DSM-5 (and its revision, the DSM-5-TR) does not fully capture the complexity of NSSI. In contrast, Emotional dysregulation refers to difficulties in responding to intense emotional events, often leading individuals to rely on maladaptive coping strategies such as NSSI, arising from deficits in emotion regulation capacity in order to alleviate intense emotional distress, avoid negative internal experiences, restore a sense of control and induce temporary relief or emotional numbness (Wang & Eaton, 2023). Thus, NSSI can be conceptualized as an impulsive act driven by an inability to regulate emotional intensity effectively.

Research suggests that individuals with high emotional dysregulation demonstrate reduced ability to delay gratification, difficulty controlling urges during distress and increased likelihood of engaging in risk-taking behaviors. Within this framework, NSSI functions as a negative reinforcement mechanism, where the reduction of distress increases the likelihood of repeated behavior.

TABLE 1 Diagnostic Criteria for NSSID (DSM-5 & DSM-5-TR)

Criterion	DSM-5 (American Psychiatric Association, 2013)
A	Engagement in NSSI on ≥5 days in the past year
B	Expectation that NSSI will relieve distress, resolve interpersonal problems, or induce positive feelings
C	Presence of ≥1: (a) negative thoughts/emotions or interpersonal problems prior to NSSI, (b) preoccupation with NSSI, or (c) frequent urges to engage in NSSI
D	Behavior is not socially sanctioned or limited to minor self-injury
E	Clinically significant distress or impairment in functioning
F	Not occurring exclusively during psychosis, delirium, substance use/withdrawal, or better explained by another condition

*Diagnostic criteria remain unchanged in the DSM-5-TR (American Psychiatric Association, 2022).

Non-suicidal self-injury (NSSI) is a global mental health issue, especially among young people and adolescents. According to a meta-analysis, the lifetime prevalence of NSSI in teenage populations is estimated to be around 22%, and its global prevalence ranges from 17% to 23% (Xiao et al., 2022). In contrast, epidemiological data from Pakistan remain limited due to cultural stigma, underreporting, and the absence of large-scale national surveys. However, available regional evidence suggests that the prevalence of self-injurious behaviors in Pakistan may be comparable to global trends, particularly among youth populations, though likely underestimated due to sociocultural barriers to disclosure.

Religiosity is the religious beliefs, practices, experiences, emotions that guide how they process and respond to major life challenges (Abu-Raiya & Hill, 2014). Religious coping expresses spirituality, a strong connection with God with a belief that there is a meaning in life. These people exhibit good connection and trust in their relationships. In contrast, religious coping depicts a fragile relationship with God. These people perceive the world as full of threats and experience difficulty forming stable relationships with others. Religious coping was linked to a lower frequency of NSSI, according to a study among college students (Buser et al., 2017a). Similarly, in another study, it was evidenced that greater reliance on positive religious coping resulted in lower likelihood of engaging in NSSI (Westers et al., 2014). Despite extensive evidence linking emotional dysregulation to non-suicidal self-injury, limited research has examined the moderating role of religiosity in this relationship, particularly using advanced statistical approaches such as structural equation modeling.

LITERATURE REVIEW

The prevailing model that explains and conceptualizes NSSI as maladaptive coping strategy employed to regulate overwhelming emotional distress is *Emotion Regulation Theory* (Linehan, 1993; Wolff et al., 2019a). The other model that classifies the function of NSSI into four types is *Four Factor Model* (Nock & Prinstein, 2004). The model focusses on the purpose (function) of NSSI for the individual, rather than the behavior itself. Based on the principle of operant conditioning, that behavior is maintained by its consequences.

The four-function model of NSSI distinguished NSSI functions based on two dimensions: contingencies (intrapersonal and interpersonal) and reinforcement (positive and negative). Based on these two dimensions, Nock outlines four functions of NSSI which are *1) Automatic-negative reinforcement:* It is the most common function wherein it is used to reduce aversive painful emotions. *2) Automatic-positive reinforcement:* It is used to generate desired sensory stimulations (e.g., relieve emotional numbness, self-soothing, or self-punishment). *3) Social-negative reinforcement:* It is used to escape unwanted interpersonal situations or obligations. *4) Social-positive reinforcement:* It is used to elicit desired social responses, such as attention or help from others. Nock conceptualized NSSI functions as the reason, be it an antecedent or an immediate consequence, which determines the development and maintenance of NSSI in an individual.

Working with these two concepts together, when a person faces intolerable negative affect like anxiety, anger, emptiness and lack healthy coping skills, they experience intense emotional pressure. NSSI provides an immediate reduction in distress. This temporary relief strongly maintains the behavior through "automatic negative reinforcement" (Lin et al., 2018; Stoerkel et al., 2023). However, this short-term relief often triggers secondary negative emotions (e.g., shame and guilt), exacerbating internal distress and forming a vicious cycle leading to subsequent urges for self-injury (Wolff et al., 2019). Religious coping has been identified as a potential factor influencing engagement in non-suicidal self-injury (NSSI) (Buser et al., 2017). According to a meta-analysis by Haney (2020), there is a slight but substantial negative correlation between religiosity and NSSI, meaning that people who identify as highly religious are less likely to engage in NSSI. The findings of a study

by Malkosh-Tshopp et al. (2020) also shows higher commitment to religious practices and stronger confidence in religious principles is protective against NSSI.

CONCEPTUAL FRAMEWORK

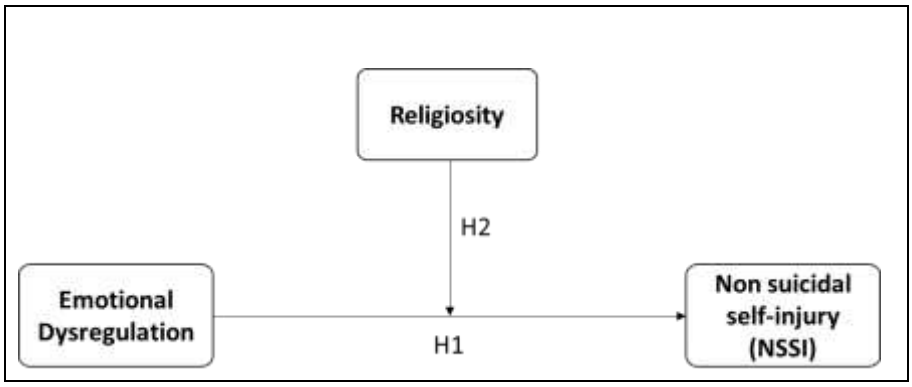

FIGURE 1 Conceptual Framework

H_1: Emotional dysregulation is positively associated with non-suicidal self-injury.
H_2: Religiosity moderates the relationship between emotional dysregulation and non-suicidal self-injury.

METHODOOGY

RESESARCH DESIGN

This study employed a quantitative, cross-sectional design using Partial Least Squares Structural Equation Modeling (PLS-SEM) by using Smart PLS 4. PLS-SEM is appropriate for prediction-oriented models, moderation analysis and non-normal clinical data (Hair et al., 2010). Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) by using SmartPLS.

Data were collected from private psychiatric clinics in Bahawalpur Division (Bahawalpur, Rahim Yar Khan, Bahawalnagar), Pakistan, wherein individuals commonly present with emotional dysregulation and self-harm behaviors. The researcher recruited participants from private psychiatric hospitals for this study. A sample size of 250 was considered adequate as it meets the 10-times rule recommended by Hair et al., (2010), which suggests that the sample should be at least ten times the maximum number of structural paths in the model. This sample exceeds the minimum requirement, ensuring sufficient statistical power and stable parameter estimation for the analyses conducted. The inclusion criteria have been formulated through a review of previous studies involving the target population. Below are the specific inclusion criteria:

Participants were included in the study if they:

- Participants who endorsed at least one instance of non-suicidal self-injurious behavior in the past 6–12 months.
- Participants were included based on self-reported engagement in non-suicidal self-injurious behavior as assessed by the DSHI, consistent with DSM-5-TR Section III research criteria.
- Individuals aged 15–24 years were included, given that empirical evidence demonstrates that NSSI onset and prevalence are highest during adolescence and young adulthood.

Participants were excluded from the study if:

- Participants were presented with severe psychosis or other serious psychiatric conditions that could impair reliable participation.

MEASURES

The standardized instruments used in this study included measures of emotional dysregulation, non-suicidal self-injury (NSSI), and religiosity. Emotional dysregulation was assessed using the Difficulties in Emotion Regulation Scale (DERS) (Gratz & Roemer, 2004), a widely used self-report measure that evaluates multiple dimensions of emotion regulation difficulties, including emotional awareness, clarity, and impulse control. Higher scores on the DERS indicate greater difficulties in regulating emotions. Responses ranges from 1 (Almost never) → 5 (Almost always). The Difficulties in Emotion Regulation Scale (DERS) has demonstrated excellent internal consistency, with a reported Cronbach's alpha of 0.93.

Non-suicidal self-injury was measured using the Deliberate Self-Harm Inventory (DSHI) (Gratz, 2001), which assesses the presence, frequency, and types of self-injurious behaviors without suicidal intent. The DSHI captures a range of behaviors such as cutting, burning, and hitting oneself, providing a comprehensive understanding of NSSI engagement. The Deliberate Self-Harm Inventory (DSHI) has shown acceptable reliability, with a Cronbach's alpha of 0.82.

Religiosity was measured using the Pakistani Religious Coping Practices Scale (PRCPS) (Khan & Watson, 2006), which assesses the extent to which individuals engage in religious coping practices within the Pakistani cultural context. Based on Pargament's (1997) conceptualization of religious coping, this scale consists of eight items rated on a 4-point Likert scale ranging from 1 (not at all) to 4 (a great deal), with total scores ranging from 8 to 32. Higher scores indicate greater engagement in religious coping practices. The scale has demonstrated acceptable reliability, with a reported Cronbach's alpha of 0.74, and has been previously used in Pakistani samples, including individuals coping with serious health conditions.

RECRUITMENT PROCEDURE

A total of 250 individuals were initially approached and assessed for eligibility to participate in the study using purposive sampling. Of these, 38 individuals were excluded due to not meeting the inclusion criteria or providing incomplete responses. Consequently, a final sample of 212 participants was retained for analysis. These participants provided complete and usable data and were included in the final statistical analyses. All participants were included who reported engagement in non-suicidal self-injurious behavior as assessed by the Deliberate Self-Harm Inventory (DSHI), consistent with DSM-5-TR Section III research criteria. Information sheet was provided and once agreed, selected participants were enrolled into the research process. Written informed consent was obtained from all participants before they were enrolled in the study.

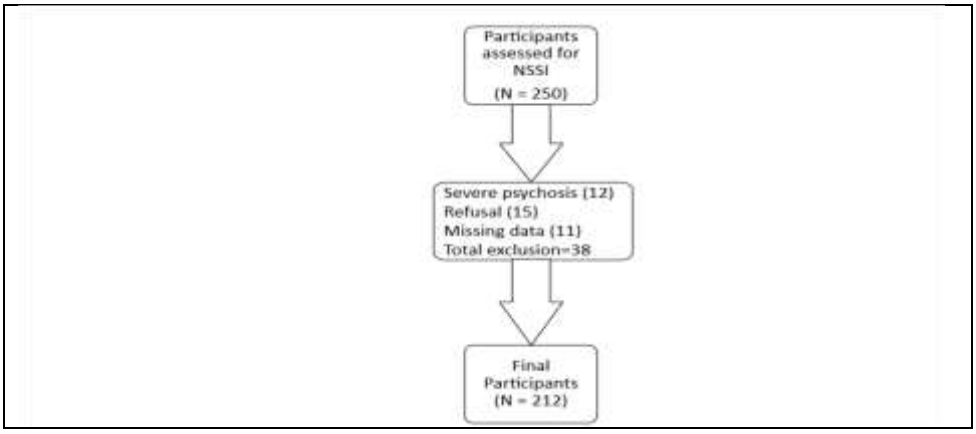

FIGURE 2 SELECTION PROCESS OF STUDY PARTICIPANTS

DATA ANALYSIS

A two-step method was used to analyze the data. The measuring model was evaluated in the first stage to determine the constructs' validity and reliability. Indicator reliability was assessed through outer loadings, and internal consistency was examined using composite reliability (CR) and Cronbach's alpha. Average variance extracted (AVE) was used to establish convergent validity, while the heterotrait–monotrait ratio (HTMT) was used to assess discriminant validity.

In the second stage, the structural model was evaluated to examine hypothesized relationships. Multicollinearity was examined using Variance Inflation Factors (VIF), followed by the estimation of path coefficients. The explanatory and predictive relevance of the model was evaluated using R^2, effect size (f^2), and predictive relevance (Q^2). Lastly, moderation analysis was conducted using the product indicator approach (Sarstedt et al., 2021) to examine the moderating role of religiosity. An interaction term (Emotional Dysregulation × Religiosity) was made and then used to assess its effect on NSSI.

RESULTS

In order to gain insight into the demographic characteristics of a target population, it is crucial to understand their preferences, behaviors and needs. This demographic study provides a thorough overview of a sample group, categorized by several characteristics including age, gender, and level of education. These demographic categories provide a comprehensive profile of the participants, allowing for comprehending the diverse factors that influence their decisions.

TABLE 2 Demographic Details of the Participants

Variable		**Frequency**	**Percentage**
Gender	Male	98	46.2%
	Female	114	53.8%
Age	18–25	76	35.8%
	26–35	82	38.7%
	36+	54	25.5%
Education	Undergraduate	102	48.1%

	Graduate	78	36.8%
	Others	32	15.1%

Measurement Model

The measurement model is used to evaluate both construct validity and reliability, ensuring that the latent variables are accurately and consistently measured. The measurement model demonstrates satisfactory reliability and convergent validity for all constructs as shown in Table 3. In particular, item loadings greater than 0.60 show that the indicators match the suggested threshold and accurately reflect their respective latent variables. (Hair et al., 2010). Cronbach's alpha scores between 0.84 and 0.92 and composite reliability (CR) values between 0.88 and 0.93, which all exceed the acceptable limit of 0.70, provide additional evidence for internal consistency. Furthermore, the average variance extracted (AVE) values for Religiosity (0.56), Emotional Dysregulation (0.59), and NSSI (0.52) are higher than the suggested threshold of 0.50, indicating that the constructs account for a significant amount of variance in relation to measurement error. All of these results support the measurement model's eligibility for further structural model analysis by showing that it is both dependable and exhibits sufficient convergent validity.

TABLE 3 Reliability and Convergent Validity\

Construct	**Items**	**Cronbach's α**	**Composite Reliability (CR)**	**Average Variance Extracted (AVE)**
Religiosity	8	0.84	0.88	0.56
Emotional Dysregulation	16	0.92	0.93	0.59
NSSI	14	0.87	0.90	0.52
Religiosity	8	0.84	0.88	0.56

The Heterotrait-Monotrait (HTMT) ratio is a frequently employed technique to evaluate the discriminant validity in a measurement model. As presented in Table 4, the HTMT value between emotional dysregulation and religiosity was 0.71, between emotional dysregulation and NSSI was 0.79, and between religiosity and NSSI was 0.66. These results indicate that each construct is empirically distinct from the others, thereby confirming adequate discriminant validity of the measurement model.

TABLE 4 Discriminant Validity (HTMT)

Constructs	**ED**	**RELIGIOSITY**	**NSSI**
Emotional Dysregulation	----	----	----
Religiosity	0.71	----	----
NSSI	0.79	0.66	----

Values < 0.90 indicate → discriminant validity established (Henseler et al., 2015)

Measurement Model

Following the assessment of the measurement model, the structural model was evaluated to test the proposed hypotheses and examine the relationships among emotional dysregulation, religiosity, and NSSI. Collinearity diagnostics, path coefficient calculation, and the model's explanatory and predictive usefulness were all part of the evaluation. As part of this process, collinearity was first examined, and the VIF values ranged from 1.98 to 2.34, indicating that multicollinearity was not a concern and that the model was suitable for subsequent path analysis.

Table 5 shows that the model explains a substantial proportion of variance in NSSI, with an R^2 value of 0.49 indicating moderate-to-strong explanatory power. This suggests that emotional dysregulation, religiosity, and their interaction jointly account for nearly half of the variance in NSSI. The Q^2 value of 0.31 further confirms good predictive relevance, indicating that the model has strong out-of-sample predictive accuracy. Overall, these results support the robustness and predictive usefulness of the model (Sarstedt et al., 2021).

TABLE 5 Predictive Power

Construct	**R^2**	**Q^2**
NSSI	0.49	0.31

Moderate to strong predictive relevance

The result of the effect size (f^2) indicate that emotional dysregulation is the strongest predictor of NSSI (f^2 = 0.38), confirming its dominant role in explaining self-injurious behavior. Table 6 presents the path coefficients for the structural model examining the relationships between emotional dysregulation, religiosity, and non-suicidal self-injury (NSSI). The results confirm H1 by showing that emotional dysregulation has a robust, favorable, and statistically significant impact on NSSI ($\beta = 0.55$, $t = 8.12$, $p < .001$). This indicates that emotional dysregulation is a substantial risk factor and that people with higher levels of emotional dysregulation are far more likely to participate in NSSI behaviors.

TABLE 6 Path Coefficients

Hypothesis	Path	B	t-value	p-value	Decision
H_1	Emotional Dysregulation → NSSI	0.55	8.12	0.000	Supported

Moderation Analysis

The moderating role of religiosity was examined to determine whether it alters the relationship between emotional dysregulation and NSSI. The results, as shown in Table 7, indicate that the interaction term (ED × Religiosity) is statistically significant and negative ($\beta = -0.18$, $t = 2.87$, $p = 0.004$), thereby supporting the moderation hypothesis. This finding suggests that religiosity plays a moderating role in the relationship between emotional dysregulation and NSSI. In other words, although emotional dysregulation is positively associated with NSSI, this effect becomes weaker when levels of religiosity are higher. Conversely, at lower levels of religiosity, the association between emotional dysregulation and NSSI is stronger, indicating greater vulnerability.

TABLE 7 Moderating Effect

Hypothesis	Interaction	β	t-value	p-value	Result
H_2	ED × Religiosity → NSSI	-0.18	2.87	0.004	Supported

The interaction pattern is further illustrated in the moderation plot (Figure 2), which clearly shows individuals with low religiosity demonstrate a steeper positive relationship between emotional dysregulation and NSSI, whereas those with high religiosity exhibit a flatter slope, reflecting a reduced impact of emotional dysregulation on NSSI. Overall, these results provide evidence that religiosity functions as a protective factor by attenuating the adverse effect of emotional dysregulation on NSSI, thereby supporting a buffering mechanism within the proposed model.

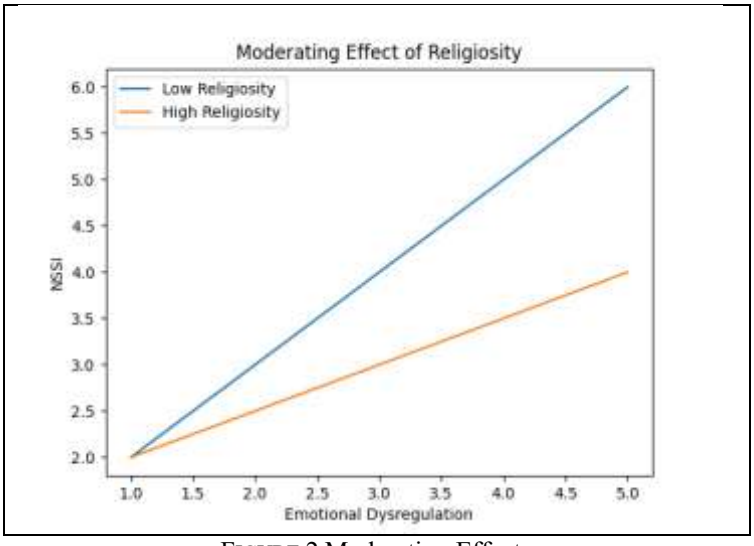

FIGURE 2 Moderating Effect

DISCUSSION

The findings of this study indicate that emotional dysregulation significantly predicts NSSI, reinforcing the view that self-harm is a maladaptive affect regulation technique rather than just an impulsive behavior. More significantly, religiosity functioned as a moderator rather than a straightforward protective factor. At low levels of religiosity, emotional dysregulation showed a strong positive association with NSSI and at high levels of religiosity, this relationship weakened, suggesting a moderating effect.

These results imply that religiosity functions not just in terms of behavioral regulation but also at the level of emotional processing. In particular, religion seems to both facilitate adaptive cognitive reappraisal and modify

the appraisal of distress through meaning-making frameworks (e.g., suffering as intentional or divinely designed). Consequently, there is a decrease in the emotional intensity and perceived uncontrollability of distress. Importantly, this process diminishes the functional necessity of maladaptive coping strategies such as non-suicidal self-injury (NSSI). In this way, religion may change the functional usefulness of NSSI by offering different ways to control emotions, which would lessen the need for self-injurious behavior.

THEORETICAL IMPLICATIONS

The present findings extend Emotion Regulation Theory by positioning religiosity as a macro-level regulatory system that shapes how individuals select, interpret, and implement emotion regulation strategies. Rather than operating only at the level of discrete techniques (such as suppression or reappraisal), religiosity offers a more comprehensive framework for meaning that affects how emotional experiences are evaluated. In this sense, it directs and guides not just how people control their emotions but also which techniques are deemed suitable, useful, or essential. Religion functions as a higher-order structure that arranges emotional processing and regulatory responses by integrating emotional experiences into a framework of ideas about transcendence, suffering, and purpose.

CLINICAL IMPLICATIONS

The findings have important implications for clinical practice, particularly in culturally religious contexts. First, given its impact on emotional processing and treatment outcomes, physicians ought to think about methodically evaluating religiosity as part of psychological evaluation. Second, combining culturally sensitive methods with emotion regulation training may improve therapeutic sessions by ensuring that treatment plans are in line with clients' values and belief systems. This may involve incorporating meaning-based reflection, spiritually congruent cognitive restructuring, or faith-informed coping strategies where appropriate. Lastly, as people with high and low degrees of religiosity may differ in how they interact with therapy, process distress, and react to intervention strategies, treatment strategies should be customized based on these levels. Such personalized strategies have the potential to enhance both engagement and therapeutic effectiveness.

LIMITATIONS & FUTURE DIRECTIONS

Despite its contributions, the study is subject to several limitations. The use of a cross-sectional design restricts the ability to draw causal inferences regarding the relationships among religiosity, emotional regulation, and psychological outcomes. Additionally, reliance on self-report measures introduces the possibility of response biases, including social desirability and subjective misinterpretation of items. Finally, the findings are grounded within a specific cultural context, which may limit their generalizability to other populations, particularly those in more secular or culturally distinct settings. These limitations should be considered when interpreting the results.

Future research should build upon these findings by employing longitudinal designs to examine how religiosity influences emotional regulation processes and treatment outcomes over time. Experimental studies are also needed to establish causal mechanisms, particularly in relation to how religiosity interacts with therapeutic interventions. Furthermore, there is a need for intervention-based research that explicitly integrates religiosity into treatment frameworks, allowing for the evaluation of culturally adapted therapies and their effectiveness across varying levels of religiosity. Such efforts would contribute to the development of more comprehensive and context-sensitive models of mental health care.

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