



**RELIGIOSITY DOES NOT MODERATE THE RELATIONSHIP BETWEEN  
FORGIVENESS AND MENTAL HEALTH OF SURVIVORS OF THE 2004 TSUNAMI  
INDONESIA: A CROSS-SECTIONAL STUDY**

***Religiusitas Tidak Memoderasi Hubungan Pemaafan Dengan Kesehatan Mental Penyintas  
Bencana Tsunami 2004 Di Indonesia: Studi Cross-Sectional***

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**ABSTRACT**

**Background:** The tsunami that struck Aceh in 2004 had widespread negative impacts, including material losses, physical health problems, and psychological stress experienced by survivors. Twenty years after the event, various mental disorders such as anxiety, depression, and other emotional disorders are still found among the affected communities. In the religious culture of Aceh, religiosity is seen as a form of coping that can aid in psychological recovery. **Purpose:** This study aims to examine the role of religiosity as a moderate variable in the relationship between forgiveness and mental health among Aceh tsunami survivors. **Methods:** The study used a quantitative approach with multiple regression analysis technique, involving 464 survivors selected through purposive sampling. Participants completed three research instruments, namely the Mental Health Inventory-18, Heartland Forgiveness Scale, and The Centrality of Religiosity Scale. **Results:** Data analysis used Hayes PROCESS moderation model 1, which showed that religiosity did not act as a moderator variable in the relationship between forgiveness and mental health. Moreover, no significant direct relationship was found between forgiveness and mental health. **Conclusion:** These findings indicate that forgiveness does not directly influence the level of mental health among tsunami survivors, and that religiosity does not strengthen this relationship in this context.

**Keywords:** mental health, forgiveness, survivors, religiosity, tsunami aceh in 2004

**ABSTRAK**

**Latar Belakang:** Tsunami Aceh 2004 menimbulkan dampak negatif luas, termasuk kerugian materiil, gangguan kesehatan fisik, dan tekanan psikologis pada penyintas. Dua puluh tahun setelah kejadian, gangguan mental seperti kecemasan, depresi, dan gangguan emosi masih ditemukan di masyarakat terdampak. Dalam budaya Aceh yang religius, religiusitas dipandang sebagai bentuk koping yang dapat membantu pemulihan psikologis. **Tujuan:** Penelitian ini menguji peran religiusitas sebagai variabel moderator dalam hubungan antara pemaafan dan kesehatan mental pada penyintas tsunami Aceh. **Metode:** Penelitian menggunakan pendekatan kuantitatif dengan analisis regresi linier berganda, melibatkan 464 penyintas yang dipilih melalui purposive sampling. Partisipan mengisi tiga instrumen: Mental Health Inventory-18, Heartland Forgiveness Scale, dan The Centrality of Religiosity Scale. **Hasil:** Analisis data menggunakan model moderasi PROCESS Hayes model 1 menunjukkan religiusitas tidak berperan sebagai variabel moderator dalam hubungan antara pemaafan dan kesehatan mental. Tidak ditemukan hubungan langsung signifikan antara pemaafan dan kesehatan mental. **Kesimpulan:** Temuan ini menunjukkan pemaafan tidak secara langsung memengaruhi kesehatan mental penyintas tsunami, dan religiusitas tidak memperkuat hubungan tersebut.

**Kata Kunci:** kesehatan mental, pemaafan, penyintas, religiusitas, tsunami aceh 2004

## INTRODUCTION

The tsunami of December 26, 2004, was one of the largest tsunamis in modern times, with a death toll exceeding 173,741 and 394,539 displaced (Sakdiah & Mauliza, 2023). Findings by Syamsidik *et al.* (2019) indicated that many areas were worst affected by the tsunami, including the cities of Banda Aceh, Aceh Besar, West Aceh, and Aceh Jaya. Moreover, other areas of Aceh were also affected, including Pidie, Bireuen, and Lhokseumawe.

The 2004 Aceh tsunami impacted social and economic life, causing losses to the environment, housing, places of worship, health, education, and government facilities (Harley, 2017). Several sectors experienced damage, including the economic sector and the destruction of agricultural land (Syamsidik *et al.*, 2019).

Another impact felt by the Aceh people is the psychological impact on the victims. This aligns with previous research, which found that approximately 15-20 percent of post-disaster victims experienced mild to moderate psychological disorders, including Post-Traumatic Stress Disorder (PTSD), psychosis, major depression, and high anxiety, which ranged from 3-4 percent (Jakandar, 2019; Seto *et al.*, 2019). Specifically, Suriastini *et al.* (2022) showed a high prevalence of post-traumatic stress disorder (PTSD) among victims of the 2004 tsunami, particularly in Aceh.

In post-disaster situations, methods are needed to identify factors that promote the recovery process (Kshtriya *et al.*, 2022). Forgiveness has been found to be a driving factor in post-traumatic recovery (Park, 2016; Toussaint *et al.*, 2017). Forgiveness is considered a driving force for fostering mental, physical, and spiritual resilience in disaster situations and is highly recommended as a post-disaster response (Worthington *et al.*, 2016). In Aceh society,

the concept of forgiveness is influenced by Aceh cultural norms derived from Islam. Forgiveness is also considered a way to reduce emotional pain (Hafnidar *et al.*, 2018). The greater an individual's level of forgiveness, the faster they can eliminate negative feelings and develop positive ones (Afshinmehr *et al.*, 2014), in line with Juwita and Kustanti's (2020) stated that greater forgiveness leads to higher psychological well-being.

It is stated that the majority of Aceh are Muslim (98%), and for Aceh, Islam is considered the primary lens through which they understand the world (Rahiem *et al.*, 2017). According to Amalia *et al.* (2021), Aceh people have a high level of religiosity because, in addition to having strong religious beliefs, they actualize their beliefs by demonstrating actions to implement Islamic law. After the 2004 tsunami, Aceh people applied their beliefs and value systems to cope and heal themselves. They view their faith as a source that can give them strength to recover from the disaster. Aceh people tend to view events based on Islamic teachings (Rahiem *et al.*, 2017).

Religiosity is the extent of a person's knowledge, belief, and devotion to their religion, as well as their appreciation of their religion (Rahmawati *et al.*, 2016). According to Safarina and Suzana (2020), religiosity can heal the trauma experienced by the Aceh tsunami victims, who believe that what happened was God's will. Worshiping God is a characteristic of Acehnese Muslims, and thus, worshiping God contributes to high psychological resilience in Acehnese communities. This is in line with Pismawenzi's (2015) research findings, which showed a significant positive relationship between religiosity and mental resilience in coastal communities prone to earthquakes and tsunamis.

While numerous studies have identified a favorable correlation between forgiveness and mental health (Juwita & Kustanti, 2020), there is currently a lack of research examining the function of religiosity as a moderating element in the relationship between forgiveness and mental health, especially among disaster survivors. Hence, the purpose of this study is to determine religiosity as a moderator in the relationship between forgiveness and mental health in survivors of the 2004 Aceh tsunami. The findings are expected to provide theoretical contributions to positive psychology as well as practical implications for disaster survivors. Thus, the hypothesis in this study is that religiosity plays a role as a moderator variable in the relationship between forgiveness and mental health in survivors of the 2004 Aceh tsunami. Specifically, this study aims to determine the role of religiosity as a moderator variable in the relationship between forgiveness and mental health in survivors of the 2004 Aceh tsunami.

## METHOD

### Study Design

This study employed a quantitative method with multiple linear regression analysis techniques, employing a cross-sectional design, meaning data was collected only once. There were two categories of religiosity in this study: very religious and religious. Both categories indicated that religiosity did not act as a moderator variable in the relationship between forgiveness and mental health in this study sample. This was done to examine differences in mental health predictions based on religiosity.

### Research Population and Sample

A total of 464 direct survivors participated in this study. The sample was selected using purposive sampling, which involves collecting samples based on criteria relevant to the research objectives. The

criteria were as follows: direct survivors of the 2004 Aceh tsunami, male and female, from the regions of Banda Aceh, Aceh Besar, Meulaboh, Nagan Raya, Sabang, Pidie, and Aceh Jaya. This technique was used because participants must meet specific characteristics relevant to the research objectives. However, this approach has the potential for selection bias because the sample was not drawn randomly, so the results may not be fully generalizable to the entire population of 2004 tsunami survivors in Aceh.

### Research Instruments Used

Three tested instruments were used in this study and distributed to respondents via questionnaire. These three instruments were:

1. Mental Health Inventory-18 (MHI-18) from Veit dan Ware (1983): This instrument consisted of 18 items, used to assess mental health. This instrument used a Likert scale with six response options. The total score was obtained by adding all items, so the score ranges from 18 to 108. The categorization of mental health measurements was a score  $< 48$  (low), a score of  $48 \leq X \leq 78$  (moderate), and a score  $\geq 78$  (high).
2. Heartland Forgiveness Scale (HFS) from Thompson and Snyder (2003), it was used to measure the level of forgiveness. This instrument used a Likert scale with seven answer alternatives. The total score was obtained by adding all the items so that the score ranges from 32 to 126. The forgiveness measurement categorization was a score  $< 54$  indicates low forgiveness, a score of  $54 \leq X \leq 90$  indicated moderate forgiveness, and high forgiveness with a score  $\geq 90$ .
3. The Centrality of Religiosity Scale (CRS-18) from Huber and Huber (2012), used to assess levels of religiosity. This instrument used a Likert scale with five response options. The total score was

obtained by summing all items, resulting in a score ranging from 17 to 75. The categorization of religiosity measurement was as follows: a score of 1.0–2.0 indicated non-religious, a score of 2.1–3.9 indicated religious, and a score of 4.0–5.0 indicated highly religious.

All three instruments indicated that higher scores indicate higher levels of mental health, forgiveness, and religiosity. Data were analyzed using descriptive statistics such as mean, standard deviation, minimum and maximum scores, and a Cronbach's Alpha reliability test was conducted to assess the consistency of the measurement instruments. This research instrument was developed in English, requiring translation into Indonesian to accommodate the cultural and linguistic appropriateness of the study population. In this study, the Mental Health Inventory-18, Heartland Forgiveness Scale, and The Centrality of Religiosity Scale were adapted into Indonesian by three lecturers involved in the Lecturer Research Grant.

The research findings revealed that the Mental Health Inventory-18 instrument had a Cronbach's alpha value of 0.883 with an item discrimination index ranging from 0.361 to 0.635. The Heartland Forgiveness Scale had a Cronbach's alpha value of 0.755 with an item discrimination index ranging from 0.040 to 0.506. The Centrality of Religiosity Scale had a Cronbach's alpha value of 0.894 with an item discrimination index ranging from 0.503 to 0.676. Furthermore, the research data was processed and analyzed using Jeffrey's Amazing Statistics Program (JASP) version 0.19.3.0 for Windows to facilitate statistical analysis of the research variables.

### Research Data Collection

Data collection was conducted using two methods: online and offline. Online questionnaires were distributed through social media platforms such as WhatsApp

and Instagram to reach a wider range of respondents. However, offline questionnaires, researchers distributed printed questionnaires and personally visited several areas affected by the 2004 tsunami in Aceh to obtain respondents who met the research criteria. Field data collection began on May 11 and ended on July 20, 2024.

### Data Analysis

Prior to doing the linear regression analysis, an assumption test was conducted, encompassing normality, multicollinearity, and homoscedasticity, to verify that the assumptions were satisfied. Linear regression was used because all research variables were measured as interval-sized total scores. Meanwhile, data categorization (low, medium, and high) was only used in the descriptive stage to provide a general overview of the levels of forgiveness, religiosity, and mental health among survivors of the 2004 tsunami in Aceh. The analysis used was the PROCESS Hayes model 1 moderation analysis.

#### A. Normality Test

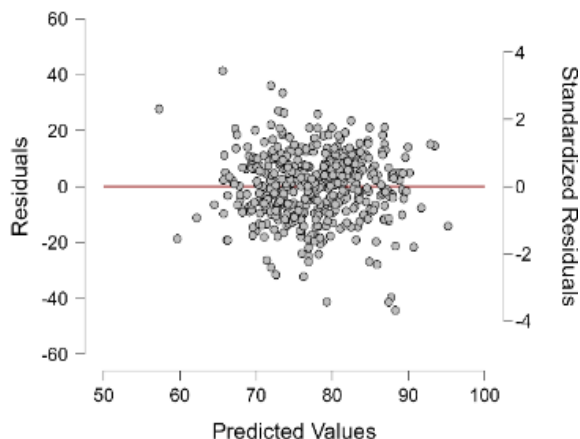
The normality test in the study was carried out by looking at the skewness and kurtosis values. The test results showed that the three instruments were normally distributed with skewness and kurtosis values in the range of  $\pm 1.96$ .

#### B. Multicollinearity Test

The results of the multicollinearity test in this study indicated that there was no multicollinearity between the forgiveness and religiosity variables with a VIF value of 1.071 or  $>1$  and tolerance of 0.934 or  $<10$ .

#### C. Heteroscedasticity Test

If the variance of the residuals was equal to that of the residuals of other observations, the regression model was considered to meet the requirements of the heteroscedasticity test.



**Figure 1.** Scatter Plot Graph of Heteroscedasticity Test

Based on the scatter plot above, it showed that the points were spread inconsistently or randomly without forming a particular pattern, so it can be concluded that there was no heteroscedasticity in this study.

$R^2$	
Model 1	
<b>Mental Health</b>	<b>0.208</b>

**Figure 2.** Result of Effect Size R2 Test

The results of the R2 effect size test indicated that the overall regression model was able to explain 20.8% of the variation in mental health ( $R^2 = 0.208$ ). This value was

considered low (Cohen, 1998), meaning that these variables made a relatively limited contribution to explaining variations in mental health among tsunami survivors.

### Ethics Clearance

This research has received ethics approval from the KEPK FK USK or the Health Research Ethics Committee of the Faculty of Medicine, Syiah Kuala University, with permit number 054/EA/FK/2024. All respondents provided written informed consent before completing the questionnaire.

## RESULT

### Descriptive Analysis of Demographic Data

The demographic characteristics of the research sample are described as follows. The majority of the study sample were male, 236 (49.1%), aged 22 to 87. This study sample was drawn from the most severely affected area of the Banda Aceh tsunami, with 220 (47.4%) representing the dominant region. Based on age, the majority experienced the tsunami as adults, with a total of 175 (37.7%). Based on educational level, the majority of the sample had a bachelor's degree (223) and a bachelor's degree (48.1%). Furthermore, in terms of occupation, the majority worked as civil servants (131) (28.3%). The demographic data for the study can be seen in Table 1 below:

**Table 1.** Distribution of research Sample

Description	n	Percentage (%)	Total (%)
<b>Gender</b>			
Male	228	49,1	100
Female	236	50,9	
<b>Age this year</b>			
24-34 years	204	44,0	100
35-60 years	242	52,2	
61-75 years	14	3,0	
> 75 years	4	0,9	
<b>Age during the Tsunami 2004 happened</b>			
Children	162	34,9	100
Adolescent	123	26,5	
Adult	175	37,7	
Elderly	1	0,2	

**Continuation of Table 1.** Distribution of research Sample

Description	<i>n</i>	Percentage (%)	Total (%)
<b>Latest Educational</b>			
Primary School	8	1,7	
Junior High School	21	4,5	
Senior High School	145	31,3	
Bachelor	223	48,1	100
Master	59	12,7	
Doctoral	6	1,3	
Uneducated	2	0,4	
<b>Marriage Status</b>			
Single	149	32,1	
Married	287	61,9	100
Widow	20	4,3	
Widower	8	1,7	
<b>Occupation</b>			
Civil Servant	131	28,3	
Freelance	44	9,5	
Permanent Employee	16	3,5	100
Self-Employed	165	35,5	
Unemployed	108	23,3	
<b>Salary/Wage monthly</b>			
Below the Banda Aceh Minimum Wage	108	23,3	
Above the Banda Aceh Minimum Wage	82	17,7	
Uncategorized (Does not meet the Banda Aceh Minimum Wage classification)	163	35,1	100
Choose not to answer	111	23,9	
<b>Domicile</b>			
Banda Aceh	220	47,4	
Aceh Besar	81	17,5	
Pidie	83	17,9	100
Nagan Raya	12	2,6	
Meulaboh	45	9,7	
Sabang	7	1,5	
Aceh Jaya	16	3,4	

This study showed that the majority of the study sample had high mental health, with 234 (50.4%). This aligned with research conducted by Keyes (2013), which stated that high mental health means having low psychological stress, where individuals experience positive emotions in their lives and can function well psychologically and socially. This study showed that forgiveness

among Aceh people was at a moderate level, at 349 (75.2%). The majority of Aceh people's religiosity was categorized as very religious, at 412 (88.8%). According to Amalia *et al.* (2021), the high religiosity of the Aceh people can be seen from their adherence to Islamic law. The categorization of mental health, forgiveness, and religiosity can be seen in Table 2.

**Table 2.** Categorization of mental health, forgiveness and religiosity

No.	Variable	Score	Category	Frequency (%)
1.	Mental Health	< 48	Low	11 (2,4)
		48 - 78	Moderate	219 (47,2)
		78 ≥	High	234 (50,4)
2.	Forgiveness	< 54	Low	113 (24,4)
		54 - 90	Moderate	349 (75, 2)
		90 ≥	High	2 (0,4)

**Continuation of Table 2.** Categorization of mental health, forgiveness and religiosity

No.	Variable	Score	Category	Frequency (%)
3.	Religiosity	1,0 – 2,0	Non-religious	-
		2,1 – 3,9	Religious	53 (11,4)
		4,0 – 5,0	Extremely religious	412 (88,8)

### Research Hypothesis Test

The research hypothesis test showed significance ( $p = 0.220$  ( $p > 0.005$ )) with an estimate value ( $B = 0.220$ ), which means there was no role of religiosity as a

moderating variable in the relationship between forgiveness and mental health in survivors of the 2004 tsunami disaster in Aceh. The results of the interaction test in this study can be seen in Table 3.

**Table 3.** Mental health predicted by religiosity and forgiveness and mental health predicted by two categorizations of religiosity and forgiveness

Predictor	B	95% Confidence Interval	P-Value
Forgiveness	0.183	-1.323 - 0.760	1.489
Religiosity	0.905	-0.482 - 0.111	2.094
Forgiveness x Religiosity	-0.011	-0.030 - 0.220	0.012
Forgiveness x Religiosity Category	-0.314	-0.653 - 0.070	0.025

Table 3 showed the bivariate analysis results that forgiveness has no significant relationship with mental health ( $p > 0.05$ ). Meanwhile, religiosity also did not show a significant relationship with mental health ( $p > 0.05$ ). This finding indicated that both variables did not directly play a significant role in mental health. The regression results showed that forgiveness and religiosity individually did not play a role in predicting the mental health of survivors with a  $p$  value  $> 0.05$ . Although the coefficient value was positive, the magnitude did not reach the significant category, so the effect was not strong enough. The interaction between forgiveness and religiosity was also not significant ( $B = -0.011$ ;  $p = 0.220$ ), meaning that religiosity did not play a role as a moderating variable in the relationship between forgiveness and mental health in this study. Table 3 also presented additional analysis by dividing religiosity into two categories, namely religious and very religious, to see differences in mental health predictions based on the level of religiosity. The results show that the interaction between the two categories of religiosity did not act as

a moderating variable with a significant value ( $B = -0.314$ ;  $p = 0.070$ ).

### DISCUSSION

The findings of this study indicated that religiosity did not play a role as a moderating variable in the relationship between forgiveness and mental health in survivors of the 2004 tsunami disaster in Aceh. This means that the level of religiosity did not influence the strength or direction of the relationship between forgiveness and mental health in tsunami survivors. Based on these findings, mental health policies and post-disaster interventions should not focus solely on religiosity. The absence of religiosity as a moderating variable in this study was due to the significant relationship between religiosity and mental health as the dependent variable ( $p < 0.001$  and  $r = 0.208$ ). Based on the classification of Sharma *et al.* (1981), a moderating variable was considered a pure moderator if it has no significant effect on the dependent variable, while its interaction with the independent variable significantly influenced the dependent variable.

The results of this study aligned with those of Nasser and Cheema (2021), which showed that religiosity does not act as a moderator of empathy, community mind-set, and forgiveness. Other research demonstrating the same finding was that of Garcia *et al.* (2017), which showed that religiosity and religious coping do not automatically strengthen or weaken the relationship between stress and psychological responses.

No direct relationship was found between forgiveness and mental health ( $B = 0.183$ ,  $p = 0.760$ ), indicating that forgiveness has no direct impact on mental health. These results contradict several studies that suggest that forgiveness is related to mental health (Juwita & Kustanti, 2020; Rasmussen *et al.*, 2019).

Based on a positive psychology perspective, forgiveness is considered important because of its positive role in maintaining mental health (Kulcsár, 2006). Furthermore, forgiveness can foster inner peace, release negative feelings, and bring peace of mind (Nihayah *et al.* 2021). However, the empirical results in this study indicate that, in certain contexts, forgiveness does not always have a positive impact on mental health. This is supported by several previous studies. First, Utami *et al.* (2018) found that forgiveness played no role in subjective well-being. Second, Amna *et al.* (2024) study showed no significant relationship between forgiveness and mental health in survivors 20 years after the tsunami.

The lack of a relationship between forgiveness and mental health can be explained from several perspectives. First, Gregory (2025) article emphasized that encouraging trauma victims to forgive can actually hinder the recovery process and, in some cases, even worsen mental health. Second, conceptually, there are theoretical differences between forgiveness in Islamic

societies and forgiveness in Western psychology. This is supported by Khasan (2017) who stated that forgiveness in Islam is influenced by religiosity. Meanwhile, in Western psychology, forgiveness is viewed as an internal process (Worthington *et al.*, 2016). Third, according to Stammel *et al.* (2015), in the context of mass trauma, not all healing dynamics can be achieved through forgiveness. This study, conducted in the long-term post-disaster period, approximately two decades after the Aceh tsunami, was examined. The three measuring instruments used in this study—mental health, forgiveness, and religiosity—were measured post-disaster, thus reflecting the psychological state of respondents in the post-disaster recovery and adaptation process.

This study has limitations that should be considered. First, the data was obtained through a self-report questionnaire, which could potentially introduce subjective bias from respondents. Second, this study employed only a quantitative approach, thus limiting the depth of forgiveness in the survivors' experiences. Hence, insights related to the meaning of forgiveness and religiosity have not been fully explored. Finally, because the variables were measured two decades after the tsunami, current mental health conditions may no longer be related to the disaster experienced.

## CONCLUSION AND SUGGESTION

This study shows no relationship between forgiveness and mental health. Furthermore, religiosity was not shown to act as a moderating variable in the relationship between forgiveness and mental health. The findings of this study provide theoretical contributions by broadening understanding of the role of religiosity in forgiveness and mental health, particularly in the context of disasters. Several previous studies have shown that forgiveness has a positive effect

on mental health, but this study demonstrates that these effects can vary depending on the context of each individual's religiosity.

Based on the research findings, it is recommended that policymakers and mental health practitioners develop programs that foster forgiveness, emotional healing, and psychological resilience in disaster survivors. This program also provides emotional support for survivors who are not yet ready to forgive. Further research is also recommended to utilize interviews to gain a deeper understanding.

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### AUTHOR CONTRIBUTION

Author Priya Exsa is the first author and lead researcher of this research. Author Zaujatul Amna is the research supervisor, second author, and lead researcher of this Research Grant. Author Dahlia and author Muhamad Antos Riady as reviewers who provided direction and input regarding the article.

### CONFLICT OF INTEREST

The authors declare there are no conflicts of interest.

### DECLARATION OF ARTIFICIAL INTELLIGENCE (AI)

The authors acknowledge the use of ChatGPT for language enhancement in the preparation of this manuscript. All AI-generated content has been rigorously reviewed, edited, and validated to ensure accuracy and originality. Full responsibility for the final content of the manuscript rests with the authors.

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