



EMOTION REGULATION AND RELIGIOUS VALUES, PREDICTORS OF ADOLESCENT DELINQUENCY: PSYCHIATRIC NURSING PERSPECTIVE

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ABSTRACT

Adolescent delinquency is a mental health concern, yet studies examining emotion regulation and religious values together among Islamic junior high school (Madrasah Tsanawiyah) students are limited. This study analyzed both as predictors of delinquent behavior at MTs Al Fattah Kediri. Method: [a1.1]This descriptive correlational, cross-sectional study involved 91 students of grades VII-IX (2025/2026), selected by total sampling. Data were collected using the Emotion Regulation Questionnaire, a five-dimension religiosity scale, and a juvenile delinquency scale, then analyzed using univariate analysis, Chi-Square, and multiple binary logistic regression ($\alpha = 0.05$). Result: [a2.1]Emotion regulation was significantly associated with delinquent behavior ($\chi^2(4)=50.131$; $p<0.001$), as was religious values ($\chi^2(4)=45.878$; $p<0.001$). Multiple logistic regression showed that emotion regulation ($\text{Exp}(B)=0.398$; 95% CI 0.211-0.751; $p=0.004$) and religious values ($\text{Exp}(B)=0.452$; 95% CI 0.251-0.814; $p=0.008$) were significant predictors, explaining about 35.1% of the variance (Nagelkerke $R^2=0.351$). Discussion: Both factors contributed comparably (overlapping confidence intervals). Community and school mental health nurses need to strengthen early detection and promotive-preventive interventions based on emotion regulation and religious value internalization among madrasah students.

Keywords: Adolescent Delinquency; Religious Values; Emotion Regulation; Mental Health Nursing; Islamic Junior High School

INTRODUCTION

Adolescence is a transitional period from childhood to adulthood marked by rapid biological, cognitive, and emotional changes. Immaturity in managing emotional turmoil during this period often makes adolescents more prone to engaging in various forms of deviant behavior, commonly referred to as delinquency, ranging from truancy, smoking, and lying to acts that violate school regulations and social norms (Maryuti and Sari, 2022). Data from the Indonesia-National Adolescent Mental Health Survey (I-NAMHS, 2022) indicate that 34.9% of Indonesian adolescents aged 10-17 years experience at least one mental health problem, while the World Health Organization (2021) estimates that one in seven adolescents aged 10-19 years worldwide experiences a mental health disorder, with behavioral disorders as one of the main causes. This condition suggests that adolescent delinquent behavior is not merely a social problem but may also be a

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mental health issue that requires serious attention, including from the nursing profession.

One internal factor widely examined in relation to adolescent delinquency is emotion regulation, defined as an individual's ability to maintain, strengthen, or diminish elements of emotional response, both experiential and behavioral (Gross, 2015). Adolescents with low emotion regulation abilities tend to have difficulty controlling negative emotional impulses, making them more prone to aggressive or delinquent behavior (Kahar, Situmorang, and Urbayatun, 2022; Permatasari, Situmorang, and Safaria, 2021). A study by Garvin (2017) further demonstrated that emotional intelligence, one component of which is the ability to manage emotions, significantly predicts adolescents' tendency toward delinquency. Beyond emotional factors, religious values or religiosity are also believed to serve as a protective factor against juvenile delinquency. High religiosity encourages the internalization of moral-religious values that function as self-control, enabling adolescents to better restrain themselves from norm-violating behavior (Aviyah and Farid, 2014; Taufik, Hyangsewu, and Azizah, 2020).

Madrasah Tsanawiyah (MTs), [a3.1] as an educational institution that intensively integrates general curriculum with religious education, is assumed to be capable of protecting its students from delinquent behavior through the reinforcement of religious values. However, various studies have shown that delinquent behavior can still be found in religion-based educational settings, such as Islamic boarding schools (pesantren), with forms ranging from mild to moderate categories, including smoking (Rahmatullah and Purnomo, 2020). This phenomenon indicates that religious education alone may not be sufficient to prevent delinquency if not accompanied by adequate emotion regulation ability within the adolescents themselves. Previous studies in Indonesia have generally examined emotion regulation (Kahar, Situmorang, and Urbayatun, 2022; Permatasari, Situmorang, and Safaria, 2021) or religiosity (Nafisa and Savira, 2021; Puspasari and Yusra, 2024) as separate correlates of aggression or delinquency, often among senior high school or university students. Evidence that places both factors in a single model among junior high school students in a madrasah setting, particularly at MTs Al Fattah Kediri, is scarce. This gap matters for school-based practice because madrasahs combine general and religious education, so emotion regulation and religious values operate together in the same setting; school-level evidence from a defined madrasah, such as MTs Al Fattah Kediri, is needed to design and later evaluate nurse-led programs that fit this context.

From a psychiatric nursing perspective, [a4.1] adolescent delinquent behavior may reflect ineffective coping and suboptimal adolescent mental health, thus requiring promotive and preventive efforts that target both psychological and spiritual factors simultaneously, given that spirituality and religiosity are distinct concepts that nurses need to assess (Ardian, 2016). Community mental health nurses (CMHNs) deliver mental health nursing care in the community (Keliat et al., 2011) and hold a strategic role in early detection and school-based interventions

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for adolescents. However, existing psychiatric nursing evidence on adolescent behavior problems has, to the authors' knowledge, largely tested emotion-focused interventions alone, such as emotion regulation therapy for aggressive behavior (Yunalia and Suharto, 2020), while school-based programs that address emotional and spiritual factors simultaneously, and the role of psychiatric nurses in them, remain limited. To the best of the authors' knowledge, studies specifically examining emotion regulation and religious values simultaneously as predictors of delinquent behavior among MTs students, particularly at MTs Al Fattah Kediri, remain limited. Therefore, this study aims to analyze emotion regulation and religious values as predictors of adolescent delinquent behavior at MTs Al Fattah Kediri from a psychiatric nursing perspective.

METHODS

This study employed a descriptive correlational design with a cross-sectional approach to analyze the relationship between emotion regulation and religious values as predictors of adolescent delinquent behavior. The study population comprised all students in grades VII-IX at MTs Al Fattah Kediri in the 2025/2026 academic year, totaling 91 students. Given the relatively small population size, the sampling technique used was total sampling (saturated sampling), in which all members of the population were included as the study sample, yielding 91 respondents. The inclusion criteria were active students who were willing to participate as respondents and whose parents/guardians provided informed consent, while the exclusion criterion was students who were absent during data collection.

The independent variables in this study were emotion regulation and religious values, while the dependent variable was adolescent delinquent behavior. Emotion regulation was measured using the Emotion Regulation Questionnaire (ERQ), which refers to two emotion regulation strategies, namely cognitive reappraisal and expressive suppression, categorized as good, moderate, and poor. The construct validity of the Indonesian-language version of the ERQ has been tested using confirmatory factor analysis on 840 respondents, with all items found valid ($t > 1.96$; $p = 0.000$) and Cronbach's Alpha reliability of 0.951 for the cognitive reappraisal strategy and 0.790 for expressive suppression (Radde, Nurrahmah, Nurhikmah, and Saudi, 2021).

Religious values were measured using a religiosity scale constructed based on five core dimensions of the Centrality of Religiosity Scale (CRS-15): intellect (religious knowledge and thinking), ideology (belief), public practice (communal worship), private practice (personal worship such as prayer), and religious experience (personal experience of the divine) (Huber and Huber, 2012), categorized as high, moderate, and low. The construct validity of this five-dimensional religiosity measurement model has been tested on a sample of Muslim university students in Indonesia using first-order confirmatory factor analysis and was shown to meet good goodness-of-fit criteria ($\chi^2(80) = 90.69$; $p = 0.194$; RMSEA = 0.026; TLI = 0.984; CFI = 0.988), with all items found valid in measuring

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the religiosity dimensions ($T > 1.96$) (Chairani, Wimbarti, Subandi, and Wibirama, 2023).

Adolescent delinquent behavior was measured using a valid and reliable juvenile delinquency scale, categorized as non-delinquent, mild delinquent, and moderate-to-severe delinquent. This instrument has previously been used among junior high school students in Surabaya (Maryuti and Sari, 2022). All instruments were tested for validity using the Product Moment correlation on a trial sample of 30 students at MTs Zainul Hasan on July 18, 2025, who were not included in the study sample (calculated $r >$ table r of 0.361 for $n = 30$, $\alpha = 0.05$) [a5.1] and for reliability using Cronbach's Alpha, yielding alpha values of 0.812 for the emotion regulation scale, 0.845 for the religiosity scale, and 0.798 for the juvenile delinquency scale, respectively, indicating that all instruments were valid and reliable for use.

Data collection was conducted at MTs Al Fattah Kediri in June 2026, before the end of the 2025/2026 academic year, using a self-administered questionnaire. Data analysis was carried out in stages, comprising univariate analysis to describe the frequency distribution of each study variable (emotion regulation, religious values, and adolescent delinquent behavior), bivariate analysis using the Chi-Square test to determine the relationships among variables, and multivariate analysis using multiple binary logistic regression (Enter method), with delinquent behavior categorized as non-delinquent and delinquent, to identify the predictors of adolescent delinquent behavior, with a significance level of $\alpha = 0.05$. This study adhered to research ethics principles, including informed consent, anonymity, and data confidentiality, and had obtained ethical clearance.

RESULT

This study involved 91 respondents who were students in grades VII-IX at MTs Al Fattah Kediri in the 2025/2026 academic year. The results are presented in stages, comprising the frequency distribution of emotion regulation, religious values, and adolescent delinquent behavior (univariate analysis), the relationships among variables (bivariate analysis), and the predictors of adolescent delinquent behavior (multivariate analysis).

Table 1. Frequency Distribution of Emotion Regulation, Religious Values, and Adolescent Delinquent Behavior at MTs Al Fattah Kediri ($n=91$)

Variable	Category	n	%
Emotion Regulation	Good	34	37.4
	Moderate	39	42.9
	Poor	18	19.8
Religious Values	High	32	35.2
	Moderate	43	47.3
	Low	16	17.6
Delinquent Behavior	Non-Delinquent	40	44.0
	Mild Delinquent	35	38.5
	Moderate-to-Severe Delinquent	16	17.6

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Table 1 shows that nearly half of the respondents had emotion regulation in the moderate category (42.9%) and religious values in the moderate category (47.3%). Regarding delinquent behavior, the largest proportion of respondents were classified as non-delinquent (44.0%), although 17.6% of respondents were still found in the moderate-to-severe delinquent category.

Bivariate analysis was subsequently conducted using the Chi-Square test to examine the relationship between emotion regulation and religious values with adolescent delinquent behavior.

Table 2. Bivariate Analysis of Emotion Regulation and Religious Values with Adolescent Delinquent Behavior (Chi-Square Test) (n=91)

Variable	Category	ND n(%)	MD n(%)	MSD n(%)	Total	χ^2	p
Emotion Regulation	Good	25 (73.5)	8 (23.5)	1 (2.9)	34	50.131	<0.001
	Moderate	14 (35.9)	22 (56.4)	3 (7.7)	39		
	Poor	1 (5.6)	5 (27.8)	12 (66.7)	18		
Religious Values	High	23 (71.9)	8 (25.0)	1 (3.1)	32	45.878	<0.001
	Moderate	15 (34.9)	24 (55.8)	4 (9.3)	43		
	Low	2 (12.5)	3 (18.8)	11 (68.8)	16		

Note: ND = Non-Delinquent; MD = Mild Delinquent; MSD = Moderate-to-Severe Delinquent.

Table 2 shows a significant relationship between emotion regulation and adolescent delinquent behavior ($\chi^2(4)=50.131$; $p<0.001$), with the pattern that respondents with good emotion regulation tended to be non-delinquent (73.5%), whereas respondents with poor emotion regulation were mostly classified as moderate-to-severe delinquent (66.7%). A similar result was found for the religious values variable, which also showed a significant relationship with adolescent delinquent behavior ($\chi^2(4)=45.878$; $p<0.001$), where respondents with high religious values were mostly non-delinquent (71.9%), while respondents with low religious values were mostly classified as moderate-to-severe delinquent (68.8%).

To identify the predictors of adolescent delinquent behavior, multivariate analysis was conducted using multiple logistic regression.

Table 3. Multiple Logistic Regression Analysis of Emotion Regulation and Religious Values on Adolescent Delinquent Behavior (n=91)

Variable	B	p	Exp(B)	95% CI
Emotion Regulation	-0.921	0.004	0.398	0.211-0.751
Religious Values	-0.794	0.008	0.452	0.251-0.814
Constant	3.102	<0.001	-	-

The model fit test (Hosmer-Lemeshow) indicated that the model was fit for use ($p=0.588$), with a Nagelkerke R^2 of 0.351, meaning that emotion regulation and religious values jointly explained approximately 35.1% of the variance in

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adolescent delinquent behavior. The results of the multiple logistic regression analysis presented in Table 3 show that emotion regulation ($p=0.004$; $\text{Exp}(B)=0.398$) and religious values ($p=0.008$; $\text{Exp}(B)=0.452$) were each significant predictors of adolescent delinquent behavior, with a negative direction of association meaning that the better a student's emotion regulation and the higher their religious values, the lower their tendency toward delinquent behavior. Emotion regulation had a numerically larger effect than religious values, but the confidence intervals overlapped, so the two predictors made comparable contributions.

The findings show that nearly half of the respondents fell into the moderate category for emotion regulation (42.9%) and the moderate category for religious values (47.3%), while for delinquency, although the largest proportion of respondents were classified as non-delinquent (44.0%), 17.6% of respondents were still found in the moderate to severe delinquent category. Overall, 56.0% of respondents showed some level of delinquent behavior (mild or moderate-to-severe). This phenomenon confirms that although MTs Al Fattah Kediri is a religion-based educational institution, religious education alone does not fully guarantee that students will be free from delinquent behavior, as has also been found in pesantren settings (Rahmatullah and Purnomo, 2020).

The Chi-Square test results show a significant relationship between emotion regulation and adolescent delinquent behavior ($\chi^2(4)=50.131$; $p<0.001$), with the pattern that the lower the emotion regulation ability, the higher the tendency toward moderate-to-severe delinquency (66.7%). This finding is consistent with several recent studies confirming that adolescents with poor emotion regulation abilities tend to display aggressive behavior that can endanger themselves and others due to an inability to control their emotions (Kahar, Situmorang, and Urbayatun, 2022; Permatasari, Situmorang, and Safaria, 2021), and may also lead to other negative impacts such as self-harming behavior, negative psychosocial effects, academic stress, and social media addiction in late adolescence (Pamungkas, Sumardiko, and Makassar, 2024). From a psychiatric nursing intervention perspective, emotion regulation therapy was associated with a reduction in aggressive behavior among 48 male senior high school students (Yunalia and Suharto, 2020); although this evidence comes from a single small study of aggression at a different school level, it supports the assumption that strengthening emotion regulation ability can serve as one promotive-preventive strategy for community mental health nursing in reducing adolescent delinquent behavior in school settings, including madrasahs. Theoretically, adolescents with poor emotion regulation tend to have difficulty using cognitive reappraisal strategies to reassess situations that trigger negative emotions, causing them to rely more on impulsive emotional expression that leads to deviant behavior such as truancy, fighting, or violating school regulations (Gross, 2015).

The findings also show a significant relationship between religious values and adolescent delinquent behavior ($\chi^2(4)=45.878$; $p<0.001$), with respondents having low religiosity mostly classified as moderate to severe delinquent (68.8%).

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This finding is consistent with a study of 417 university students in Surabaya that found a relationship between religiosity and juvenile delinquency (Nafisa and Savira, 2021), as well as a study on high school students that showed a significant negative relationship between religiosity and juvenile delinquency, in which the higher a student's religiosity, the lower their tendency toward delinquency (Puspasari and Yusra, 2024). Religious values internalized through the five dimensions of religiosity (intellect, ideology, public practice, private practice, and religious experience) function as an internal moral control that restrains adolescents from norm-violating behavior, consistent with the view that religiosity strengthens social bonds and community support, thereby creating an environment that encourages adolescents to develop prosocial relationships and behavior while equipping them with moral values and self-discipline to cope with peer pressure. Nevertheless, the finding that some MTs students with moderate to high religiosity still exhibited mild delinquent behavior may suggest that religious values are not always accompanied by an internalization strong enough to shape behavioral control (dimension-level scores were not analyzed in this study, so this remains a tentative interpretation), and therefore need to be balanced with guidance that addresses the internalization of values, rather than mere ritual compliance.

The results of the multiple logistic regression analysis show that emotion regulation ($\text{Exp}(B)=0.398$) and religious values ($\text{Exp}(B)=0.452$) were both significant predictors of adolescent delinquent behavior with comparable contributions (overlapping 95% CIs), with the model explaining approximately 35.1% of the variance in adolescent delinquency (Nagelkerke $R^2=0.351$). Earlier work examined religiosity and self-control rather than emotion regulation and reported that the two together explained about 27% of the variance in delinquency tendency (Aviyah and Farid, 2014), a proportion lower than the 35.1% explained by the present model, although the two statistics are not strictly comparable. Findings from Surabaya (Maryuti and Sari, 2022) cannot be compared directly, because the predictors in that study were individual items of the delinquency questionnaire (smoking, dramatizing problems, and fighting) rather than psychological factors. The numerically larger effect of emotion regulation in this study, although not clearly different from that of religious values, may be explained by emotion regulation being more proximal to adolescents' daily behavior compared to religious values, which operate in a more distal manner through long-term value internalization; when adolescents are confronted with situations that directly trigger negative emotions (conflict with friends, academic pressure, or provocation), emotion regulation ability more immediately determines behavioral response compared to religious values, which function as a long-term moral framework. Nevertheless, both variables were proven significant and complementary: emotion regulation serves as short-term behavioral control, while religious values serve as a long-term value framework and moral control. This underscores the importance of a comprehensive intervention approach that not only strengthens religious education in madrasahs but also explicitly trains students in emotion regulation skills.

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From a psychiatric nursing perspective, delinquent behavior may reflect ineffective coping stemming from weak emotion regulation and suboptimal internalization of spiritual values, which calls for promotive and preventive efforts targeting both domains simultaneously, given that spirituality and religiosity are distinct concepts that nurses need to assess (Ardian, 2016). Based on our findings, community mental health nurses (CMHNs) can implement a tiered school-based program in the madrasah, following the universal, selective, and indicated prevention framework (Mrazek and Haggerty, 1994).[a7.1]

At the universal level (all students), nurses provide psychoeducation on emotional awareness and healthy coping and run classroom-based emotion regulation skills training that emphasizes cognitive reappraisal over expressive suppression, in line with the ERQ strategies measured in this study. Because emotion regulation and religious values showed comparable contributions in the regression, the program should address both components, with emotion regulation skills training as the entry point.

At the selective level (at-risk students), students with poor emotion regulation or low religious values (19.8% and 17.6% of students in this study, respectively) are offered small-group emotion regulation therapy, an approach associated with reduced aggressive behavior among senior high school boys in an earlier study (Yunalia and Suharto, 2020). To address the spiritual domain, nurses can adapt a spiritual-cognitive approach that links cognitive restructuring with students' own religious values (a meta-analysis of 97 studies found that religion- and spirituality-adapted psychotherapy improved psychological and spiritual functioning, although its use among school-aged adolescents in madrasahs still needs to be tested; Captari et al., 2018), for example by guiding reflection on prayer, patience (sabar), and gratitude as emotion-management resources, delivered in collaboration with religious teachers so that religiosity moves from ritual compliance toward internalization (religious experience dimension).

At the indicated level, students in the moderate-to-severe delinquent category (17.6%) receive individual assessment and counseling by the CMHN together with the guidance counselor, with referral to the community health center (Puskesmas) or a psychologist when needed. Delivery requires collaboration among CMHNs, guidance counselors, homeroom and religious teachers, and parents, with regular monitoring of emotion regulation and delinquent behavior. The effectiveness of this integrated program should be tested in future quasi-experimental studies.

This study used a cross-sectional design and therefore cannot establish causal relationships among variables. In addition, the measurement of variables using self-report questionnaires may introduce social desirability bias, particularly for the religious values and delinquent behavior variables, which are socially and religiously sensitive within the madrasah environment. The model also did not

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control for other variables (e.g., age, sex, parenting style), and the small sample from a single school limits generalizability.

DISCUSSION

The study results show that the majority of sepsis patients were male (54.1%, 59 of 109 patients). This characteristic aligns with previous research showing a male predominance among sepsis patients (Lindström et al., 2021). Research in mice explains that female estrogen hormones can enhance cellular and humoral immune responses, resulting in lower inflammatory responses compared to males. Conversely, male androgen hormones tend to suppress the immune system. Human studies regarding the underlying causes of higher sepsis rates in men remain inconclusive. However, several potential risk factors may play a role, including smoking, alcohol consumption, and different activity patterns between genders (Lakbar et al., 2023).

The age distribution in this study showed the majority of patients were middle-aged (45-59 years), with 42 patients (38.5%), and elderly (≥ 60 years), with 41 patients (37.6%). These findings are consistent with previous research showing an average sepsis patient age of 67 years (Lindström et al., 2021). Other studies also indicate that most sepsis patients are over 50 years old (Kotfis et al., 2019). Risk factors for sepsis in older age include pre-existing comorbidities, immune dysfunction, decreased physiological reserves related to aging, and polypharmacy. Elderly patients experiencing immunosenescence or age-related immune decline are more susceptible to sepsis (Ibarz et al., 2024). Immune decline affects T-cell and B-cell function, resulting in less effective antibody responses to infection (Alhamyani et al., 2024). Single-cell analysis using scRNA-seq (single-cell RNA sequencing) and scTCR-seq (single-cell T-cell receptor sequencing) reveals various immunological abnormalities in this age group, including increased immune cell apoptosis, severe immune exhaustion, and excessive inflammation exacerbated by inflammaging. Regulatory T cells (Tregs) show increased numbers and immunosuppressive activity, while CD8⁺ T cells experience significant depletion. Additionally, immune cell metabolic dysfunction, particularly in mitochondrial function, and increased lysine degradation pathways may contribute to immune dysfunction (He et al., 2024).

The study results also show pneumonia as the most common comorbidity with 27 cases (24.77%), followed by COVID-19 (Coronavirus) with 11 cases (10.09%). Pneumonia has been identified as the most frequent cause of sepsis (Gu et al., 2020). From 1999-2001, pneumonia accounted for 20.77% of all sepsis-related deaths, increasing to 27.63% during 2020-2022. Sepsis mortality rates rose by 30.22% from 2019-2021 due to the COVID-19 pandemic in the United States (Morrissey et al., 2025). Pneumonia and sepsis are two clinically important syndromes with significant global burden and complex pathophysiology. Pneumonia spreads through droplets or aerosols. Nasopharyngeal colonization is a prerequisite for infection. Extrapulmonary dissemination is worsened by immunosuppressive cytokines like IL-37, increasing sepsis risk. Sepsis-induced

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immunosuppression also facilitates secondary infections including pneumonia, particularly in patients with multi-organ dysfunction. Pneumonia can manipulate dendritic cells, allowing infection to spread from the lungs to systemic circulation (Darkwah et al., 2024).

The present study revealed that 69.7% of sepsis patients exhibited elevated lactate levels (>1.7 mmol/L). Clinically, lactate concentrations between 2-2.5 mmol/L are considered elevated, while levels exceeding 4 mmol/L are classified as high (Amit K et al., 2018). Lactate has been established as a more sensitive indicator of anaerobic metabolism and acidosis compared to blood pressure parameters (Lee et al., 2024). The underlying pathophysiology involves systemic microcirculatory disturbances leading to tissue hypoperfusion (dysoxia) and various metabolic derangements (Gattinoni et al., 2019). The inflammatory cascade in sepsis triggers the release of proinflammatory cytokines, nitric oxide, and lipopolysaccharides, resulting in cytopathic hypoxia and impaired pyruvate dehydrogenase complex function. These mechanisms contribute to mitochondrial dysfunction and subsequent pyruvate-to-lactate conversion (Dartiguelongue, 2024). The accumulation of lactate and protons in bodily fluids significantly worsens clinical outcomes (Ryoo and Kim, 2018).

This study found that the majority of sepsis patients (72.5%) had a hospital stay ≥ 3 days. Previous research using sepsis patient data from 2010-2016 in the United States reported an average ICU length of stay (LOS) of 5.1 days (Paoli et al., 2018). Compared to patients with other conditions, sepsis patients tend to experience prolonged hospitalization (Naqvi et al., 2022). In this study, most affected patients were elderly and middle-aged adults. The ≥ 3 -day hospitalization predominantly occurred in 31 middle-aged and 28 elderly patients. This pattern may be attributed to the increased vulnerability of older patients to infections and sepsis due to immunosenescence (Rezar et al., 2023). Globally, 48.7% of sepsis patients with organ dysfunction experience prolonged hospitalization compared to non-sepsis patients (Markwart et al., 2020).

The mortality rate among sepsis patients in this study was 71.6%. Previous studies reported a 30-day sepsis mortality rate of 16.9% in Norway (Skei et al., 2023). The majority of deaths in our study occurred in middle-aged (30 patients) and elderly (30 patients) groups. Immunosenescence, characterized by cellular and humoral immune system decline, makes older adults more susceptible to severe infections and sepsis with worse clinical manifestations (Liu et al., 2022). Elderly patients in this study had at least two comorbidities, including both infectious and non-infectious conditions. Pneumonia was the most common comorbidity, with 18 deaths occurring among 27 affected patients (Martín et al., 2017). Immunosuppression has been significantly associated with sepsis mortality (Jiang et al., 2023).

The results of this study demonstrate a significant association between lactate levels and length of hospital stay ($p=0.039$). Further analysis revealed a relative risk (RR) of 2.015 (95% CI: 1.118-3.634), indicating that patients with lactate levels ≤ 1.7 mmol/L had twice the probability of experiencing hospitalization <3 days compared to those with levels >1.7 mmol/L. These findings align with

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previous research showing that suspected sepsis patients with lactate levels ≥ 2 mmol/L had an increased risk of prolonged ICU stay ≥ 72 hours (Shetty et al., 2018). Elevated lactate levels in sepsis result from microcirculatory disturbances leading to tissue hypoperfusion and hypoxia (Hernandez et al., 2019; Ward and Levy, 2017). A similar study in acute exacerbation of COPD patients with hypoxia found significantly prolonged hospitalization ($p=0.001$) in those with lactate levels 2-4 mmol/L (Sagmen and Naziroglu, 2020). However, these results contrast with findings from RSSA showing no correlation between lactate levels and length of stay ($r=-0.346$, $p=0.298$) (Pramadhani, 2019).

This study revealed that 19 patients (57.6%) with lactate levels ≤ 1.7 mmol/L still experienced prolonged hospitalization (≥ 3 days). While lower lactate levels typically correlate with less organ dysfunction, this finding may reflect delayed lactate elevation in early-stage disease. The low-lactate group also demonstrated delayed achievement of fluid resuscitation targets within the critical first 3-hour window. Elevated lactate levels (>1.7 mmol/L) serve as indicators of physiological distress and metabolic stress, resulting from enzymatic activation and tissue glycolysis combined with mitochondrial dysfunction (Dartiguelongue, 2024; He et al., 2022; Villar et al., 2019). Impaired hepatic and renal lactate clearance significantly contributes to extended hospital stays, highlighting the complex pathophysiology underlying sepsis-related outcomes (Donaliazarti, 2022; Hatman et al., 2021).

The results also showed a significant association between lactate levels and sepsis mortality ($p=0.018$). The relative risk (RR) was 2.159 (95% CI: 1.216-3.832), indicating patients with lactate ≤ 1.7 mmol/L had 2.159 times higher survival probability than those >1.7 mmol/L. These findings align with previous studies showing point-of-care lactate was associated with mortality in Thai sepsis patients ($p=0.044$) (Charoentanyarak et al., 2021). Other studies found that lactate ≥ 2 mmol/L increased in-hospital mortality risk (Shetty et al., 2018). While higher levels predicted greater short-term mortality (Villar et al., 2019). However, contrasting results from RSSA showed no correlation between lactate and mortality ($r=0.018$, $p=0.917$) (Pramadhani, 2019). Another study found no association between lactate 2-6 mmol/L and mortality (Driessen et al., 2018).

The study results demonstrated that 18 patients (54.5%) with lactate levels ≤ 1.7 mmol/L experienced mortality. Previous studies reported that in the low lactate group, factors such as high APACHEII II scores, elevated C-reactive protein (CRP), and chronic heart failure (CHF) independently influenced mortality rates (Oh et al., 2019). The 38.1% mortality rate in the low lactate group was primarily associated with inadequate fluid resuscitation volume (<30 ml/kg within 6 hours) (He et al., 2023). Admission lactate levels ≥ 8.0 mmol/L showed significant correlation with mortality (Bernhard et al., 2020). While levels >4 mmol/L increased mortality risk by 33% (Deulkar et al., 2024). The pathophysiological mechanisms involve microcirculatory disturbances and mitochondrial dysfunction, which subsequently induce immunosuppression through M2 macrophage differentiation and increased myeloid-derived suppressor cells (MDSCs) (He et al.,

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2022; Hernandez et al., 2019; Nolt et al., 2018). These findings reinforce the recommendation to implement sepsis management according to the Hour-1 Bundle guidelines, which include lactate level monitoring.

This study has several limitations. First, its retrospective design limited the ability to control for confounding factors such as treatment variation, comorbid disease severity, and timing of antibiotic administration. Second, lactate measurements were taken only at admission, without serial follow-up, which restricts interpretation regarding lactate clearance dynamics. Third, this study was conducted in a single hospital, which may limit generalizability to other settings with different patient populations or clinical resources. Future research should employ a multicenter prospective design with serial lactate monitoring to better capture its temporal relationship with outcomes and to validate its prognostic value across diverse clinical contexts.

CONCLUSION

The largest proportions of respondents had emotion regulation in the moderate category (42.9%), religious values in the moderate category (47.3%), and delinquent behavior in the non-delinquent category (44.0%), although 17.6% of respondents were still found in the moderate-to-severe delinquency category. There were significant relationships between emotion regulation and adolescent delinquent behavior ($\chi^2(4)=50.131$; $p<0.001$) and between religious values and adolescent delinquent behavior ($\chi^2(4)=45.878$; $p<0.001$), in which the lower a student's emotion regulation and religious values, the higher their tendency toward delinquent behavior. Emotion regulation and religious values were jointly shown to be significant predictors of adolescent delinquent behavior (Nagelkerke $R^2=0.351$), with comparable contributions from emotion regulation ($\text{Exp}(B)=0.398$) and religious values ($\text{Exp}(B)=0.452$). Overall, this study shows that emotion regulation and religious values are two complementary psychological and spiritual factors associated with lower adolescent delinquent behavior, which supports strengthening both simultaneously within religion-based educational settings such as madrasahs.

RECOMMENDATION

MTs Al Fattah Kediri is advised to integrate an emotion regulation strengthening program (for example, through social-emotional skills training, group counseling, or extracurricular activities based on emotion management) into the guidance and counseling curriculum, while also encouraging the internalization of religious values through habituation, role modeling, and value reflection in students' daily lives. Community mental health nurses are advised to play an active role in the early detection of emotion regulation impairments using validated screening instruments (the ERQ can serve only as a supporting measure of emotion regulation strategies), to regularly provide psychoeducation and school-based emotion regulation training, and to establish cross-professional collaboration with guidance counselors and religious figures within the madrasah. Parents/guardians are advised to build open communication with their children regarding emotion

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management and to serve as role models in applying religious values in daily life at home. Future researchers are advised to use a longitudinal design to observe the development of emotion regulation, religious values, and adolescent delinquent behavior over time, to consider other variables such as parenting style, peer support, or social media exposure, and to expand the study population to several madrasahs so that the results can be more generalizable.

The madrasah, together with community mental health nurses and guidance counselors, is advised to develop a Standard Operating Procedure (SOP) and a Mental Health Screening Guide for school use. The SOP should at least contain: (1) screening of all students at the beginning of each semester for emotion regulation, religious values, and behavioral problems, with clear cut-off categories; (2) risk stratification into low, moderate, and high risk; (3) tiered follow-up, namely psychoeducation and emotion regulation skills training for all students, small-group sessions for at-risk students, and individual counseling for students with moderate-to-severe delinquent behavior; (4) referral pathways to the community health center (Puskesmas) or a psychologist, including referral criteria; (5) defined roles and communication flow among school nurses, guidance counselors, teachers, religious figures, and parents; and (6) documentation, confidentiality, and monitoring and evaluation each semester. Because the ERQ measures emotion regulation strategies rather than clinical diagnosis, screening results should be interpreted as a risk indication and followed by professional assessment.

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