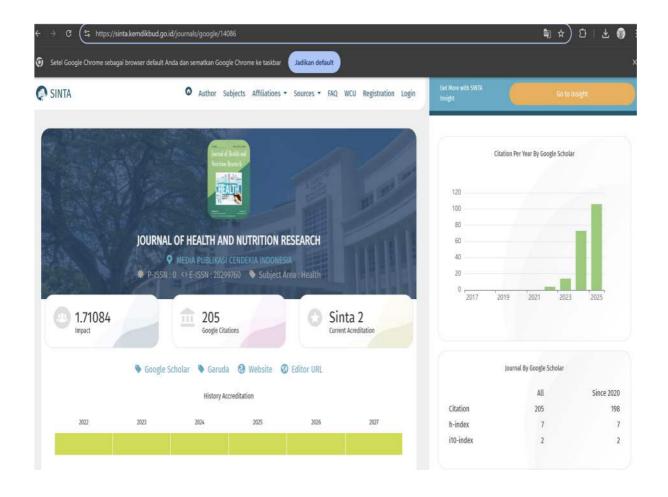
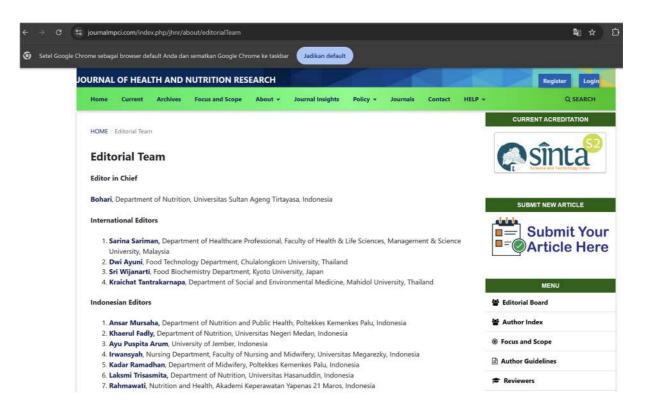
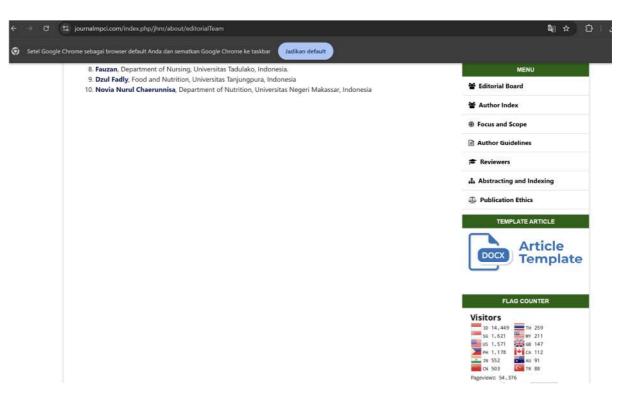
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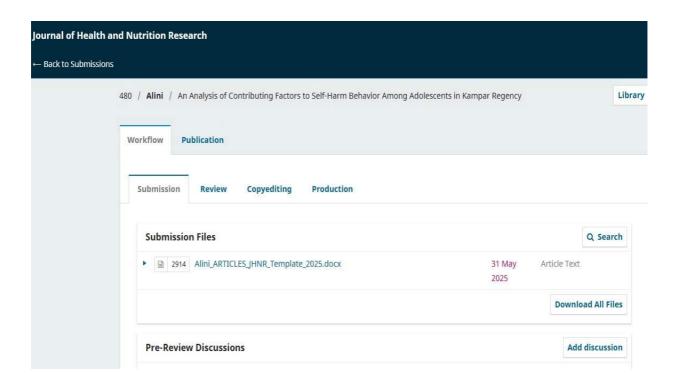
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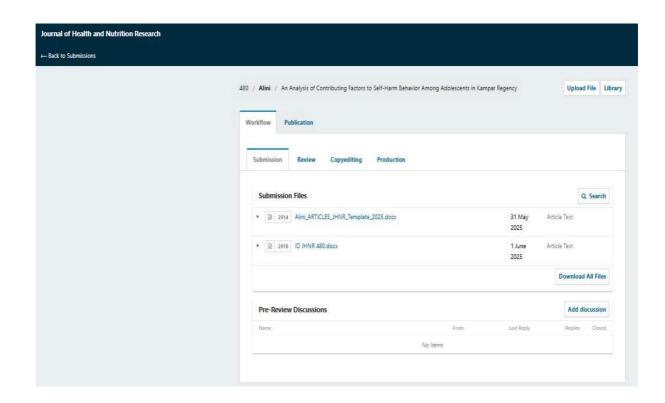


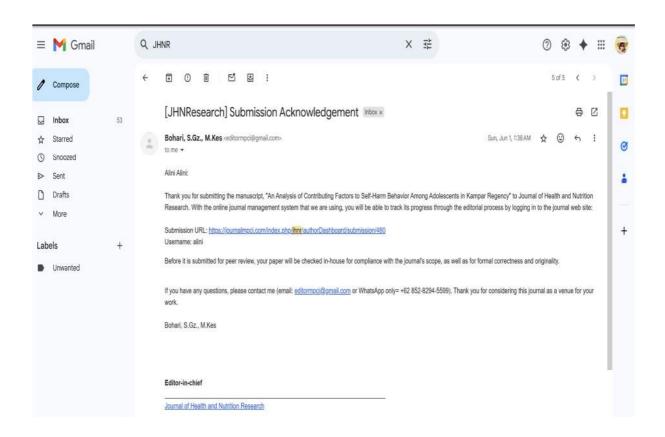




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An Analysis of Contributing Factors to Self-Harm Behavior Among Adolescents in Kampar Regency

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ABSTRACT

Adolescents are a vulnerable population experiencing significant psychological and social changes, often leading to emotional difficulties and maladaptive behaviors such as self-harm. This study aims to analyze the association between bullying, self-esteem, anxiety, and peer relationship problems with self-harm behavior among high school students in Kampar Regency, Indonesia. A cross-sectional design was employed, involving 678 adolescents aged 15-18 years who met the inclusion criteria. Data were collected using validated structured questionnaires, including the Olweus Bullying Scale, Rosenberg Self-Esteem Scale, Hamilton Anxiety Rating Scale, and Peer Relationship Scale. Univariate analysis showed that 40% of respondents had experienced bullying, 30% had low self-esteem, 25% reported moderate to severe anxiety, and 35% had peer relationship problems. The prevalence of self-harm behavior was 18%. Bivariate analysis using the chi-square test revealed significant associations between all independent variables and self-harm behavior (p < 0.05). Multivariate logistic regression identified moderate to severe anxiety as the strongest predictor (OR 3.7; 95% CI: 2.3-5.8), followed by low self-esteem (OR 3.1; 95% CI: 2.0-4.9), bullying experience (OR 2.8; 95% CI: 1.9-4.2), and peer relationship problems (OR 1.8; 95% CI: 1.2-2.9). These findings highlight the urgent need for comprehensive school-based psychosocial interventions targeting bullying prevention, self-esteem enhancement, anxiety management, and the improvement of peer relationships to reduce the prevalence of self-harm among adolescents in Kampar Regency.

Key Messages:

- Comprehensive psychosocial interventions in schools-targeting bullying prevention, self-esteem enhancement, anxiety management, and peer relationship improvement-are urgently needed to reduce selfharm among adolescents.
- Early identification and support for at-risk students should be prioritized to address the complex interplay of psychosocial factors underlying self-harm behaviors.
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GRAPHICAL ABSTRACT

An Analysis of Contributing Factors to Self-Harm Behavior Among Adolescents in Kampar Regency

- Bullying
- Self-esteem
- Anxiety
- Peer Problems



Self Harm in Adolescents



Recommendations:

Early detection and support for at-risk students are essential to address the complex psychosocial factors underlying self-harm behavior

INTRODUCTION

Adolescence is a transitional phase from childhood to adulthood, typically ranging from 10 to 19 years of age (1). During this period, adolescents often experience identity conflicts and difficulties in emotional regulation, which can lead to negative behaviors such as self-harm, social deviance, and substance abuse (2). One issue that has received increasing attention among adolescents is self-harm behavior.

The American Psychiatric Association (2022) (3) defines nonsuicidal self-injury (NSSI) as the deliberate, self-inflicted damage of body tissue without suicidal intent. NSSI is often a manifestation of deeper mental health problems, such as depression, anxiety, post-traumatic stress disorder (PTSD), and borderline personality disorder. This behavior frequently serves as a coping mechanism for adolescents to manage or express overwhelming emotional pain, profound sadness, or feelings of isolation. Although NSSI is not intended as a suicide attempt, it can be a strong indicator of more serious suicidal tendencies in the future (4).

Self-harm among adolescents is an escalating mental health concern worldwide. Self-harm is defined as the intentional act of injuring oneself in response to emotional distress, with the aim of alleviating psychological pain (5). Several psychosocial factors, including bullying, low self-esteem, anxiety, and peer relationship problems, have been identified as significant contributors to self-harm behavior in adolescents (6). Data from a survey conducted by the American Psychological Association (2022) (3) indicate that approximately 17% of adolescents in the United States have engaged in self-harm, reflecting a high prevalence.

This phenomenon is also a growing concern in Indonesia, including in Kampar Regency, Riau, where adolescent mental health is receiving increased attention. Research by Setiawan (2024) (7) found that 10% of adolescents in Kampar experience anxiety disorders, and nearly 6% engage in self-harm as a response to social pressures.

Bullying is a particularly troubling social phenomenon with significant psychological impacts on victims, especially adolescents. Data collected by Liu et al (2024) (8) show that about 30% of adolescents in Southeast Asia, including Indonesia, experience bullying at school, which can contribute to increased symptoms of depression and anxiety. Furthermore, research by Wang et al (2023) (9) revealed that adolescents who experience bullying are twice as likely to engage in self-harm compared to those who do

not. In Indonesia, a study by Afika (2025) (10) states that violence in bullying, both physical and non-physical, has a long-lasting impact into adulthood and increases the risk of self-injury behaviour in victims.

Low self-esteem also plays a significant role in adolescent self-harm. Adolescents with low self-esteem often feel inadequate or unaccepted in their social environment, which increases feelings of helplessness and sadness. Research has shown that low self-esteem is associated with a higher risk of self-harm (11). Adolescents with negative self-perceptions are more vulnerable to emotional stress and are more likely to resort to self-harm as a coping mechanism.

Research by Afifah et al. (2025)(12) indicates that adolescents in Indonesia are vulnerable to selfharm behaviors (NSSI) due to the stigma surrounding mental health issues, limited support, and unequal access to mental health services. These factors result in mental health problems, such as anxiety and depression, being inadequately addressed, which in turn encourages self-harm behaviors among adolescents. A qualitative study in Indonesia found that adolescent girls engage in self-harm as a response to psychological problems they face, including anxiety and emotional distress. Self-harm is used as a way to relieve uncomfortable emotional feelings (13). A meta-analysis by Zhang et al. (2023) (14) found that more than half of adolescents with depression (who often also experience anxiety) have a history of selfharm behaviors. This study also noted that anxiety and depression are triggering factors for self-harm among adolescents.

Peer relationship problems are also common in adolescence, manifesting as conflict, bullying, or feelings of isolation within social groups. Poor peer relationships can lead to loneliness, alienation, and a lack of support, all of which increase the risk of self-harm. Adolescents who experience peer relationship problems often feel they lack a safe space to express their emotions, putting them at greater risk for self-harm (15).

Research conducted by Hasniati et al (2024) (16) confirmed that bullying in adolescents is closely related to increased depression, stress, low self-esteem, sleep disturbances, and the emergence of self-harm behaviour. This system review also concluded that psychological (such as anxiety and depression), social, and physical factors interact to aggravate the risk of self-harm, especially if they occur simultaneously. Anan et al (2025) (17) also found a significant correlation between bullying at school and self-harm behaviour (NSSI), with a mediating role of negative emotions such as anxiety and stress. The inability of adolescents to manage negative emotions due to bullying increases their likelihood of committing self-harm as a coping mechanism. Meanwhile, Han et al (2024) (18) confirmed that bullying causes severe psychological distress, including anxiety, depression, low self-esteem, and self-harm. The combination of several psychosocial factors increases the risk of self-harm and suicidal ideation.

Kampar Regency in Riau Province is experiencing significant adolescent mental health challenges, as indicated by recent data and studies. According to the Kampar District Health Office, the prevalence of mental health disorders among adolescents is rising, with documented cases of both depression and self-harm behaviors. For example, a study at SMPN 2 Bangkinang Kota found that while many adolescents reported high levels of emotional, social, and psychological well-being, the broader context in Indonesia shows a notable increase in mental-emotional disorders among adolescents, including symptoms of depression and anxiety (19). National data suggest that the prevalence of depression among in-school adolescents in Indonesia is around 12.6%, which aligns with the reported 15% in Kampar, and self-harm tendencies are also a growing concern (20).

Bullying remains a significant problem in Kampar Regency. Research in local schools, such as SD Negeri 015 Gunung Bungsu, XIII Koto Kampar District, highlights that bullying is prevalent and that schools are actively working to prevent and address it through supervision, sanctions, counseling, and rehabilitation for victims (21). Approximately 20% of adolescents in Kampar have reported experiencing bullying at school, which is consistent with findings from other regions in Indonesia.

Compounding these issues are low parental education levels and limited access to mental health services. Studies indicate that lower parental education, especially the father's, is associated with poorer mental health outcomes in adolescents, as parental education influences both mental health literacy and the likelihood of seeking support (22). Access to mental health services in Kampar is hindered by several barriers, including stigma, lack of social support, limited availability of mental health professionals, and

geographic challenges—rural areas often require long travel distances to reach mental health facilities (23). These barriers reduce the effectiveness of prevention and intervention efforts for adolescent self-harm and other mental health problems (24).

In summary, adolescent mental health in Kampar Regency is challenged by high rates of depression, self-harm, and bullying, exacerbated by low parental education and restricted access to mental health care. Addressing these issues requires coordinated efforts involving schools, families, and improved mental health infrastructure

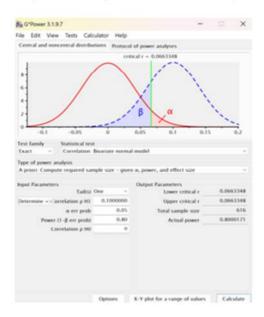
Based on this background, the present study aims to investigate the relationship between bullying, self-esteem, anxiety, and peer relationship problems with self-harm behavior among adolescents in Kampar Regency. This research is important due to the high prevalence of self-harm among adolescents in Kampar and the lack of local studies addressing the psychosocial factors influencing this behavior. Understanding the associations between bullying, low self-esteem, anxiety, and peer relationship problems with self-harm will provide a scientific basis for developing community- and school-based mental health interventions.

METHODS

This study employed a cross-sectional design to analyze the relationship between the independent variables (bullying, self-esteem, anxiety, and peer relationship problems) and the dependent variable (self-harm behavior). The study population comprised all high school adolescents aged 15 to 18 years in Kampar Regency. The sample in this nursing research was determined based on inclusion and exclusion criteria.

The inclusion criteria were as follows: adolescents aged 15 to 18 years; adolescents who were still actively enrolled as high school students in Kampar Regency; adolescents who were able to communicate effectively; and adolescents who had obtained written consent from their parents or guardians to participate in the study. The exclusion criteria were: adolescents who were no longer enrolled or were inactive in high school in Kampar Regency; adolescents with a history of chronic illness requiring prolonged hospitalization; and adolescents in high schools in Kampar Regency who were unwilling to participate as respondents.

The sample size was calculated using G-Power Software Version 3.1.9.7 with an assumed $\alpha = 0.05$ (medium effect size according to Cohen et al., 1995), and a power level of 0.80, based on the study by Purwandra et al (2022) (25). The estimated minimum sample size was 616 participants, with an additional 10% (62) to account for potential dropout, resulting in a total minimum sample of 678 participants.



The sampling technique used in this study involved cluster sampling to determine which high schools would serve as study sites. Subsequently, purposive sampling was applied to select respondents according to the inclusion criteria. This approach was chosen because the selected sample was required to meet specific criteria and have an equal opportunity to be included.

Data were collected using validated structured questionnaires. The questionnaires included scales to measure bullying (Olweus Bullying Scale), self-esteem (Rosenberg Self-Esteem Scale), anxiety (Hamilton Anxiety Rating Scale), and peer relationship problems (Peer Relationship Scale). Univariate analysis was conducted to describe the frequency distribution of the study variables, while bivariate analysis using the chi-square test was performed to examine the relationships between variables. Multivariate logistic regression analysis was conducted to identify the most influential factors associated with self-harm behavior.

CODE OF HEALTH ETHICS

This study did not have direct contact with patients, and did not use animal testing in the study.

RESULTS

Respondent Characteristics

This study involved 678 high school adolescents in Kampar Regency who met the inclusion criteria. The mean age of respondents was 16.5 years (SD \pm 1.0), with 55% being female and 45% male. The class distribution consisted of 33% in grade X, 34% in grade XI, and 33% in grade XII.

Univariate Analysis

The distribution of research variables is presented in Table 1. A total of 40% of respondents reported having experienced bullying, 30% had low self-esteem, 25% experienced moderate to severe anxiety, and 35% reported peer relationship problems. Additionally, 18% of respondents reported having engaged in self-harm behaviors.

Table 1. Distribution of Research Variables among High School Adolescents in Kampar Regency (n=678)

in Kampar Regency (n=678)			
Variable	n	%	
Ever Experienced Bullying	271	40	
Never Experienced Bullying	407	60	
Low Self-Esteem	203	30	
Moderate-High Self-Esteem	475	70	
Moderate-Severe Anxiety	170	25	
Mild/No Anxiety	508	75	
Peer Relationship Problems	237	35	
No Peer Relationship Problems	441	65	
Self-Harm	122	18	
No Self-Harm	556	82	

Bivariate Analysis

Chi-square test results showed significant associations between all independent variables and self-harm behavior (p < 0.05). Respondents who had experienced bullying, had low self-esteem, experienced moderate to severe anxiety, and had peer relationship problems reported self-harm behaviors more frequently than other groups. Detailed results of the bivariate analysis are presented in Table 2.

Table 2. Association Between Independent Variables and Self-Harm Behavior

Variable	Self-Harm	No Self-	p-value
	(%)	Harm (%)	
Ever Experienced Bullying	32	68	< 0.001
Never Experienced Bullying	9	91	
Low Self-Esteem	36	64	< 0.001
Moderate-High Self-Esteem	11	89	
Moderate-Severe Anxiety	41	59	< 0.001
Mild/No Anxiety	11	89	
Peer Relationship Problems	29	71	0.002
No Peer Problems	13	87	

Multivariate Analysis

Multivariate logistic regression analysis was conducted to determine the most influential factors on self-harm behavior. The analysis showed that moderate to severe anxiety was the strongest predictor of self-harm (OR 3.7; 95% CI: 2.3–5.8; p < 0.001), followed by low self-esteem (OR 3.1; 95% CI: 2.0–4.9; p < 0.001), history of bullying (OR 2.8; 95% CI: 1.9–4.2; p < 0.001), and peer relationship problems (OR 1.8; 95% CI: 1.2–2.9; p = 0.004). All independent variables remained statistically significant after simultaneous adjustment.

Table 3. Multivariate Logistic Regression Analysis of Factors Associated with Self-Harm Behavior

With our Harm Demarks			
Variable	OR	95% CI	p-value
Bullying	2.8	1.9-4.2	< 0.001
Low Self-Esteem	3.1	2.0-4.9	< 0.001
Moderate-Severe Anxiety	3.7	2.3-5.8	< 0.001
Peer Relationship Problems	1.8	1.2-2.9	0.004

This study found that bullying, low self-esteem, anxiety, and peer relationship problems significantly increased the risk of self-harm behavior among high school adolescents in Kampar Regency. Moderate to severe anxiety was identified as the most dominant risk factor. These findings highlight the need for psychosocial interventions and mental health support within the school environment to reduce the prevalence of self-harm among adolescents.

DISCUSSION

This study aimed to analyze the relationship between bullying, self-esteem, anxiety, and peer relationship problems with self-harm behavior among high school adolescents in Kampar Regency. The results indicate that all four variables have a significant association with self-harm, both in bivariate and multivariate analyses. These findings contribute important insights into the risk factors for self-harm among adolescents, particularly in the Indonesian context, and reinforce international research findings from the past five years.

The researchers assumed that self-harm behavior among adolescents does not occur suddenly, but is the result of a complex interaction between psychosocial and environmental factors. In this context, bullying, low self-esteem, anxiety, and peer relationship problems are considered the main triggers that can increase the risk of self-harm. This assumption is based on stress and coping theory, which posits that individuals who are unable to manage stress effectively tend to seek maladaptive ways to reduce emotional pressure, including self-harm (26).

Adolescents are also assumed to be a highly vulnerable age group in terms of social and emotional pressures. Adolescence is characterized by significant biological, psychological, and social changes, often presenting various adjustment challenges. The inability to cope with such pressures can trigger self-harming behavior as a form of escape or an attempt to alleviate emotional pain (27).

Bullying is one of the main risk factors for self-harm behaviour in adolescents. The results of this study show that adolescents who have experienced bullying are 2.8 times more likely to engage in self-harm than those who have never experienced bullying. These findings align with the results of a meta-analysis involving 23,388 adolescents from various countries, which found that bullying victims are 2.15 times more likely to engage in self-harm than those who have not experienced bullying (aOR=2.15; 95% CI=1.61-2.85; p<0.001). This study also confirms that bullying (physical, verbal, or cyber) increases the risk of self-harm and can lead to chronic stress, depression, social isolation, and feelings of worthlessness, all of which are triggers for self-harm (28).

A study in China by Zhang et al. (14) also found that school bullying is directly associated with non-suicidal self-injury (NSSI). In that study, negative affect and sleep quality mediated the relationship between bullying and self-harm. Adolescents who are victims of bullying tend to experience sleep disturbances and negative emotions such as anxiety and depression, which ultimately increase the likelihood of self-harm as a dysfunctional coping strategy. Additionally, a meta-analysis conducted by Holt et al (2015) (29) found that involvement in bullying—whether as a victim, perpetrator, or both—is closely associated with an increased risk of suicidal ideation and suicide attempts among adolescents. The results showed that adolescents who are victims of bullying are more than twice as likely to experience suicidal thoughts or attempt suicide compared to those who are not involved in bullying. The odds ratio (OR) for the association between bullying victimization and suicidal ideation or behavior ranges from 2 to 4, depending on the role and type of bullying experienced. In other words, bullying significantly increases the risk of serious mental health problems in adolescents, including depression, self-harm, and suicide attempts. These findings highlight the importance of prevention and intervention efforts against bullying in schools and communities to reduce the incidence of suicide among adolescents.

Low self-esteem was also found to be significantly associated with self-harm behavior among adolescents. In this study, adolescents with low self-esteem were 3.1 times more likely to engage in self-harm compared to those with moderate to high self-esteem. This finding aligns with research by Delrosso et al (2023) (30), which demonstrated that low self-esteem is a strong predictor of self-harm, especially among female adolescents. Self-esteem refers to an individual's perception of their own value and abilities. Adolescents with low self-esteem tend to have negative self-views, feel worthless, and are easily influenced by social pressures. This condition makes them more vulnerable to stress and more likely to use self-harm as a way to cope with discomfort or to distract themselves from their problems (31).

Anxiety was the most dominant risk factor in this study, with an odds ratio (OR) of 3.7. Adolescents experiencing moderate to severe anxiety were nearly four times more likely to engage in self-harm compared to those without anxiety. This finding is consistent with research by Silva et al. (2022) (32) in Brazil, which found that anxiety and depression are strongly associated with self-harm behavior among adolescents. Adolescents under emotional distress often use self-harm as a coping mechanism to reduce negative feelings such as fear, anxiety, or anger. Research by Chen et al (2024) (33) also showed that social anxiety can mediate the relationship between peer relationship problems and self-harm. Adolescents experiencing social anxiety tend to feel uncomfortable in peer interactions, making them more susceptible to using self-harm as an escape from social pressures.

Problems in peer relationships also significantly contributed to self-harm behavior. In this study, adolescents with peer relationship problems were 1.8 times more likely to engage in self-harm. This finding is supported by research by Zhang et al (2025) (34), which showed that poor social relationships can increase the risk of self-harm through heightened negative affect and sleep disturbances. Adolescents are highly dependent on social support from peers to build self-identity and a sense of security. When peer relationships are disrupted, adolescents tend to feel lonely, isolated, and lack a confidant. This condition can trigger emotional stress that leads to self-harm as a form of expression or escape from emotional pain (35).

The findings of this study have important implications for the prevention and management of self-harm among adolescents. First, school-based interventions should focus on bullying prevention and improving the quality of social relationships among students. Anti-bullying programs involving all school components-including teachers, students, and parents-can help create a safe and supportive environment for adolescents. Second, efforts to enhance adolescent self-esteem should be implemented through self-development programs, counseling, and extracurricular activities that help adolescents recognize their strengths and potential. Support from family and teachers is also crucial in building adolescent confidence and self-worth. Third, early detection and management of anxiety among adolescents should be a primary concern. School counseling services must be able to identify adolescents experiencing anxiety and provide appropriate interventions, such as cognitive-behavioral therapy or stress management training. Fourth, strengthening social support and building positive peer networks can help adolescents cope with social pressures and reduce the risk of self-harm. Group activities, peer support, and social skills training can be effective strategies to improve the quality of peer relationships.

This study has several limitations. First, the cross-sectional design does not allow for causal inference between independent variables and self-harm behavior. Second, data were collected using self-report questionnaires, which are prone to social desirability and recall bias. Third, the study was conducted in a single regency, so the findings may not be generalizable to adolescents in other regions. This study confirms that bullying, low self-esteem, anxiety, and peer relationship problems are significant risk factors for self-harm among high school adolescents. Anxiety is the most dominant risk factor, followed by low self-esteem, bullying, and peer relationship problems. Preventive interventions for self-harm among adolescents should be comprehensive, encompassing efforts to reduce bullying, enhance self-esteem, manage anxiety, and improve the quality of peer relationships within the school environment.

CONCLUSION

This study demonstrates that bullying, low self-esteem, moderate to severe anxiety, and peer relationship problems are all significantly associated with an increased risk of self-harm behavior among high school adolescents in Kampar Regency. Multivariate analysis identified moderate to severe anxiety as the most dominant risk factor, followed by low self-esteem, bullying, and peer relationship problems. These findings highlight the complex interplay of psychosocial factors contributing to self-harm in adolescents and underscore the urgent need for comprehensive preventive interventions. Such interventions should focus on reducing bullying, enhancing self-esteem, managing anxiety, and strengthening positive peer relationships within the school environment to effectively reduce the prevalence of self-harm among adolescents.

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CONFLICTS OF INTEREST

The author reports no conflicts of interest.

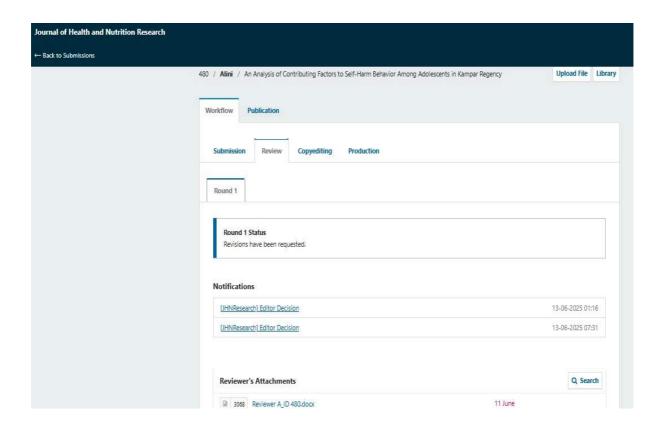
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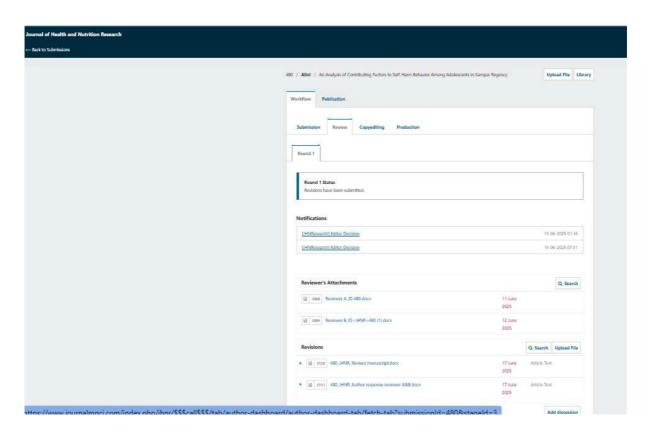
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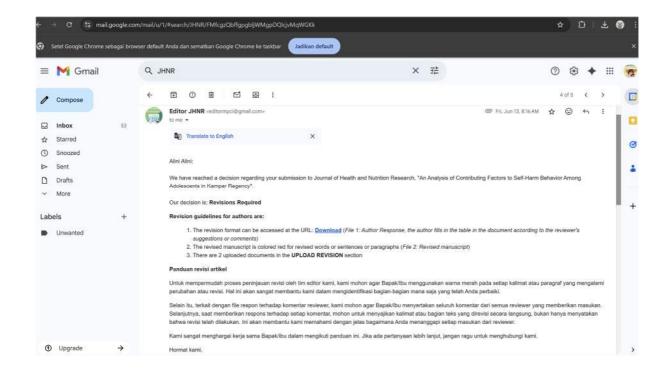
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PROSES REVIEW







SARAN DAN KOMENTAR REVIEWER A



GRAPHICAL ABSTRACT

An Analysis of Contributing Factors to Self-Harm Behavior Among Adolescents in Kampar Regency

- Bullying
- · Self-esteem
- Anxiety
- Peer Problems







Recommendations:

Early detection and support for at-risk students are essential to address the complex psychosocial factors underlying self-harm behavior

INTRODUCTION

Adolescence is a transitional phase from childhood to adulthood, typically ranging from 10 to 19 years of age (1). During this period, adolescents often experience identity conflicts and difficulties in emotional regulation, which can lead to negative behaviors such as self-harm, social deviance, and substance abuse (2). One issue that has received increasing attention among adolescents is self-harm behavior.

The American Psychiatric Association (2022) (3) defines nonsuicidal self-injury (NSSI) as the deliberate, self-inflicted damage of body tissue without suicidal intent. NSSI is often a manifestation of deeper mental health problems, such as depression, anxiety, post-traumatic stress disorder (PTSD), and borderline personality disorder. This behavior frequently serves as a coping mechanism for adolescents to manage or express overwhelming emotional pain, profound sadness, or feelings of isolation. Although NSSI is not intended as a suicide attempt, it can be a strong indicator of more serious suicidal tendencies in the future (4).

Self-harm among adolescents is an escalating mental health concern worldwide. Self-harm is defined as the intentional act of injuring oneself in response to emotional distress, with the aim of alleviating psychological pain (5). Several psychosocial factors, including bullying, low self-esteem, anxiety, and peer relationship problems, have been identified as significant contributors to self-harm behavior in adolescents (6). Data from a survey conducted by the American Psychological Association (2022) (3) indicate that approximately 17% of adolescents in the United States have engaged in self-harm, reflecting a high prevalence.

This phenomenon is also a growing concern in Indonesia, including in Kampar Regency, Riau, where adolescent mental health is receiving increased attention. Research by Setiawan (2024) (7) found that 10% of adolescents in Kampar experience anxiety disorders, and nearly 6% engage in self-harm as a response to social pressures.

Bullying is a particularly troubling social phenomenon with significant psychological impacts on victims, especially adolescents. Data collected by Liu et al (2024) (8) show that about 30% of adolescents in Southeast Asia, including Indonesia, experience bullying at school, which can contribute to increased symptoms of depression and anxiety. Furthermore, research by Wang et al (2023) (9) revealed that adolescents who experience bullying are twice as likely to engage in self-harm compared to those who do



geographic challenges-rural areas often require long travel distances to reach mental health facilities (23). These barriers reduce the effectiveness of prevention and intervention efforts for adolescent selfharm and other mental health problems (24).

In summary, adolescent mental health in Kampar Regency is challenged by high rates of depression, self-harm, and bullying, exacerbated by low parental education and restricted access to mental health care. Addressing these issues requires coordinated efforts involving schools, families, and improved mental health infrastructure

Based on this background, the present study aims to investigate the relationship between bullving. self-esteem, anxiety, and peer relationship problems with self-harm behavior among adolescents in $Kampar\ Regency.\ This\ research\ is\ important\ due\ to\ the\ high\ prevalence\ of\ self-harm\ among\ adolescents\ in$ Kampar and the lack of local studies addressing the psychosocial factors influencing this behavior. Understanding the associations between bullying, low self-esteem, anxiety, and peer relationship problems with self-harm will provide a scientific basis for developing co unity- and school-based mental health interventions.

METHODS

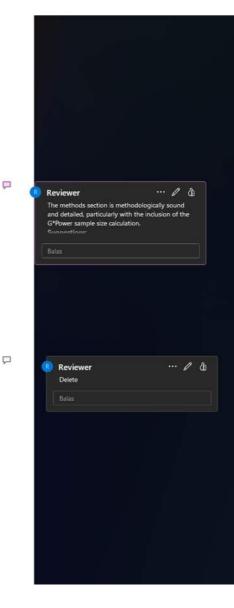
This study employed a cross-sectional design to analyze the relationship between the independent variables (bullying, self-esteem, anxiety, and peer relationship problems) and the dependent variable (self $harm\,behavior).\,The\,study\,population\,comprised\,all\,high\,school\,adolescents\,aged\,15\,to\,18\,years\,in\,Kampar\,aged\,15\,to\,18\,years$ Regency. The sample in this nursing research was determined based on inclusion and exclusion criteria.

The inclusion criteria were as follows: adolescents aged 15 to 18 years; adolescents who were still actively enrolled as high school students in Kampar Regency; adolescents who were able to communicate effectively; and adolescents who had obtained written consent from their parents or guardians to participate in the study. The exclusion criteria were: adolescents who were no longer enrolled or were inactive in high school in Kampar Regency; adolescents with a history of chronic illness requiring prolonged hospitalization; and adolescents in high schools in Kampar Regency who were unwilling to participate as respondents.

The sample size was calculated using G-Power Software Version 3.1.9.7 with an assumed α = 0.05 (medium effect size according to Cohen et al., 1995), and a power level of 0.80, based on the study by $Purwandra\ et\ al\ (2022)\ (25).\ The\ estimated\ minimum\ sample\ size\ was\ 616\ participants, with\ an\ additional$ 10% (62) to account for potential dropout, resulting in a total minimum sample of 678 participants.



https://doi.org/10.56303/jhnresearch.v3i3



The sampling technique used in this study involved cluster sampling to determine which high schools would serve as study sites. Subsequently, purposive sampling was applied to select respondents according to the inclusion criteria. This approach was chosen because the selected sample was required to meet specific criteria and have an equal opportunity to be included.

Data were collected using validated structured questionnaires. The questionnaires included scales to measure bullying (Olweus Bullying Scale), self-esteem (Rosenberg Self-Esteem Scale), anxiety (Hamilton Anxiety Rating Scale), and peer relationship problems (Peer Relationship Scale). Univariate analysis was conducted to describe the frequency distribution of the study variables, while bivariate analysis using the chi-square test was performed to examine the relationships between variables. Multivariate logistic regression analysis was conducted to identify the most influential factors associated with self-harm behavior.

CODE OF HEALTH ETHICS

This study did not have direct contact with patients, and did not use animal testing in the study.

RESULTS

Respondent Characteristics

This study involved 678 high school adolescents in Kampar Regency who met the inclusion criteria. The mean age of respondents was 16.5 years (SD \pm 1.0), with 55% being female and 45% male. The class distribution consisted of 33% in grade X, 34% in grade XI, and 33% in grade XII.

Univariate Analysis

The distribution of research variables is presented in Table 1. A total of 40% of respondents reported having experienced bullying, 30% had low self-esteem, 25% experienced moderate to severe anxiety, and 35% reported peer relationship problems. Additionally, 18% of respondents reported having engaged in self-harm behaviors.

Table 1. Distribution of Research Variables among High School Adolescents

in Kampar Regency (n=678)				
n	%			
271	40			
407	60			
203	30			
475	70			
170	25			
508	75			
237	35			
441	65			
122	18			
556	82			
	n 271 407 203 475 170 508 237 441			

Bivariate Analysis

Chi-square test results showed significant associations between all independent variables and self-harm behavior (p < 0.05). Respondents who had experienced bullying, had low self-esteem, experienced moderate to severe anxiety, and had peer relationship problems reported self-harm behaviors more frequently than other groups. Detailed results of the bivariate analysis are presented in Table 2.

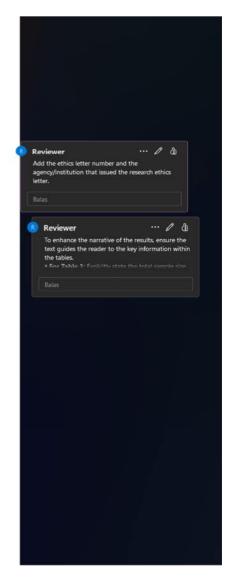


Table 2. Association Between Independent Variables and Self-Harm Behavior

Variable	Self-Harm (%)	No Self- Harm (%)	p-value
Ever Experienced Bullying	32	68	< 0.001
Never Experienced Bullying	9	91	
Low Self-Esteem	36	64	< 0.001
Moderate-High Self-Esteem	11	89	
Moderate-Severe Anxiety	41	59	< 0.001
Mild/No Anxiety	11	89	
Peer Relationship Problems	29	71	0.002
No Peer Problems	13	87	

Multivariate Analysis

Multivariate logistic regression analysis was conducted to determine the most influential factors on self-harm behavior. The analysis showed that moderate to severe anxiety was the strongest predictor of self-harm (OR 3.7; 95% CI: 2.3–5.8; p < 0.001), followed by low self-esteem (OR 3.1; 95% CI: 2.0–4.9; p < 0.001), history of bullying (OR 2.8; 95% CI: 1.9–4.2; p < 0.001), and peer relationship problems (OR 1.8; 95% CI: 1.2–2.9; p = 0.004). All independent variables remained statistically significant after simultaneous adjustment.

Table 3. Multivariate Logistic Regression Analysis of Factors Associated with Self-Harm Behavior

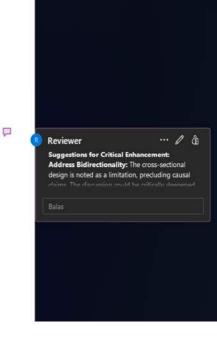
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Variable	OR	95% CI	p-value
Bullying	2.8	1.9-4.2	< 0.001
Low Self-Esteem	3.1	2.0-4.9	< 0.001
Moderate-Severe Anxiety	3.7	2.3-5.8	< 0.001
Peer Relationship Problems	1.8	1.2-2.9	0.004

This study found that bullying, low self-esteem, anxiety, and peer relationship problems significantly increased the risk of self-harm behavior among high school adolescents in Kampar Regency. Moderate to severe anxiety was identified as the most dominant risk factor. These findings highlight the need for psychosocial interventions and mental health support within the school environment to reduce the prevalence of self-harm among adolescents.

DISCUSSION

This study aimed to analyze the relationship between bullying, self-esteem, anxiety, and peer relationship problems with self-harm behavior among high school adolescents in Kampar Regency. The results indicate that all four variables have a significant association with self-harm, both in bivariate and multivariate analyses. These findings contribute important insights into the risk factors for self-harm among adolescents, particularly in the Indonesian context, and reinforce international research findings from the past five years.

The researchers assumed that self-harm behavior among adolescents does not occur suddenly, but is the result of a complex interaction between psychosocial and environmental factors. In this context, bullying, low self-esteem, anxiety, and peer relationship problems are considered the main triggers that can increase the risk of self-harm. This assumption is based on stress and coping theory, which posits that individuals who are unable to manage stress effectively tend to seek maladaptive ways to reduce emotional pressure, including self-harm (26).



The findings of this study have important implications for the prevention and management of self-harm among adolescents. First, school-based interventions should focus on bullying prevention and improving the quality of social relationships among students. Anti-bullying programs involving all school components-including teachers, students, and parents-can help create a safe and supportive environment for adolescents. Second, efforts to enhance adolescent self-esteem should be implemented through self-development programs, counseling, and extracurricular activities that help adolescents recognize their strengths and potential. Support from family and teachers is also crucial in building adolescent confidence and self-worth. Third, early detection and management of anxiety among adolescents should be a primary concern. School counseling services must be able to identify adolescents experiencing anxiety and provide appropriate interventions, such as cognitive-behavioral therapy or stress management training. Fourth, strengthening social support and building positive peer networks can help adolescents cope with social pressures and reduce the risk of self-harm. Group activities, peer support, and social skills training can be effective strategies to improve the quality of peer relationships.

This study has several limitations. First, the cross sectional design does not allow for causal inference between independent variables and self-harm behavior. Second, data were collected using self-report questionnaires, which are prone to social desirability and recall bias. Third, the study was conducted in a single regency, so the findings may not be generalizable to adolescents in other regions. This study confirms that bullying, low self-esteem, anxiety, and peer relationship problems are significant risk factors for self-harm among high school adolescents. Anxiety is the most dominant risk factor, followed by low self-esteem, bullying, and peer relationship problems. Preventive interventions for self-harm among adolescents should be comprehensive, encompassing efforts to reduce bullying, enhance self-esteem, manage anxiety, and improve the quality of peer relationships within the school environment.

CONCLUSION

This study demonstrates that bullying, low self-esteem, moderate to severe anxiety, and peer relationship problems are all significantly associated with an increased risk of self-harm behavior among high school adolescents in Kampar Regency. Multivariate analysis identified moderate to severe anxiety as the most dominant risk factor, followed by low self-esteem, bullying, and peer relationship problems. These findings highlight the complex interplay of psychosocial factors contributing to self-harm in adolescents and underscore the urgent need for comprehensive preventive interventions. Such interventions should focus on reducing bullying, enhancing self-esteem, managing anxiety, and strengthening positive peer relationships within the school environment to effectively reduce the prevalence of self-harm among adolescents.

FUNDING

This research did not obtain external funding.

ACKNOWLEDGMENTS

The author would like to thank all high school principals in Kampar Regency who have allowed this research to be conducted at their schools. The researcher also expressed his gratitude to the Chancellor, Chairperson of the LPPM of Pahlawan Tuanku Tambusai University, Dean of the Faculty of Health Sciences of Pahlawan Tuanku Tambusai University for the support provided during the research process, as well as all those who have helped directly or indirectly in this research.

CONFLICTS OF INTEREST

The author reports no conflicts of interest.

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WHO. Adolescent health. 2022.

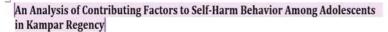
Reviewer

The conclusion is a concise and accurate summary of the study's findings and their importance.

Suggestione:
Reiterate the Main Finding with Museum Rriefly

Balas

SARAN DAN KOMENTAR REVIEWER B



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ORIGINAL ARTICLES

Submitted: Accepted:

Keywords:

Adolescents, Mental Health, Risk Factors, Self Harm





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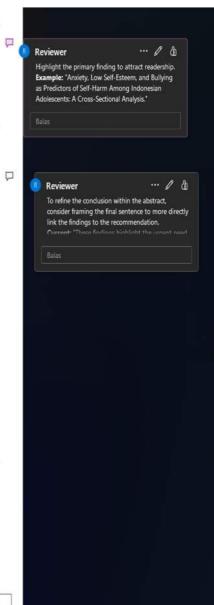
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ABSTRACT

Adolescents are a vulnerable population experiencing significant psychological and social changes, often leading to emotional difficulties and maladaptive behaviors such as self-harm. This study aims to analyze the association between bullying, self-esteem, anxiety, and peer relationship problems with self-harm behavior among high school students in Kampar Regency, Indonesia. A cross-sectional design was employed, involving 678 adolescents aged 15-18 years who met the inclusion criteria. Data were collected using validated structured questionnaires, including the Olweus Bullying Scale, Rosenberg Self-Esteem Scale, Hamilton Anxiety Rating Scale, and Peer Relationship Scale. Univariate analysis showed that 40% of respondents had experienced bullying, 30% had low self-esteem, 25% reported moderate to severe anxiety, and 35% had peer relationship problems. The prevalence of self-harm behavior was 18%. Bivariate analysis using the chi-square test revealed significant associations between all independent variables and self-harm behavior (p < 0.05). Multivariate logistic regression identified moderate to severe anxiety as the strongest predictor (OR 3.7; 95% CI: 2.3-5.8), followed by low self-esteem (OR 3.1; 95% CI: 2.0-4.9), bullying experience (OR 2.8; 95% CI: 1.9-4.2), and peer relationship problems (OR 1.8; 95% CI: 1.2-2.9). These findings highlight the urgent need for comprehensive school-based psychosocial interventions targeting bullying prevention, self-esteem enhancement, anxiety management, and the improvement of peer relationships to reduce the prevalence of self-harm among adolescents in Kampar Regency.

Key Messages:

- Comprehensive psychosocial interventions in schools-targeting bullying prevention, self-esteem enhancement, anxiety management, and peer relationship improvement-are urgently needed to reduce selfharm among adolescents.
- Early identification and support for at-risk students should be prioritized to address the complex interplay of psychosocial factors underlying self-harm behaviors.
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GRAPHICAL ABSTRACT

An Analysis of Contributing Factors to Self-Harm Behavior Among Adolescents in Kampar Regency

- Bullying
- · Self-esteem
- Anxiety
- · Peer Problems



Self Harm in Adolescents



Recommendations:

Early detection and support for at-risk students are essential to address the complex psychosocial factors underlying self-harm behavior

INTRODUCTION

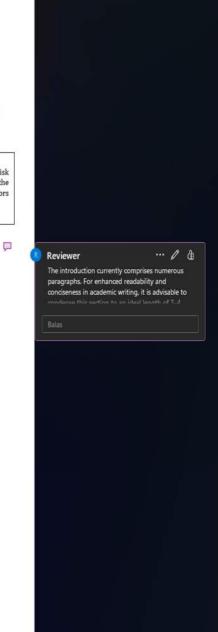
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CODE OF HEALTH ETHICS

This study did not have direct contact with patients, and did not use animal testing in the study,

RESULTS

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Univariate Analysis

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ency (n=6/8)	
n	%
271	40
407	60
203	30
475	70
170	25
508	75
237	35
441	65
122	18
556	82
	n 271 407 203 475 170 508 237 441

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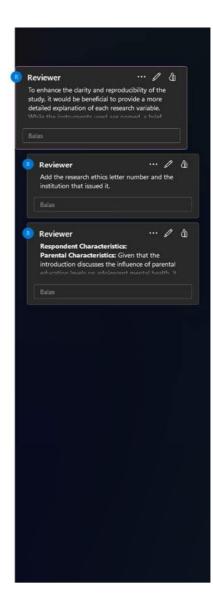


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Table 3. Multivariate Logistic Regression Analysis of Factors Associated

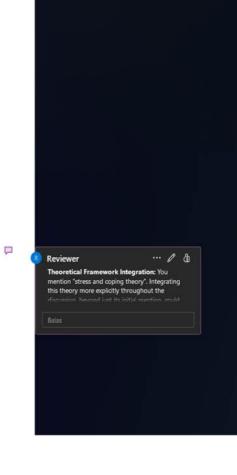
with Sen-Harin Bellavior			
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DISCUSSION

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The researchers assumed that self-harm behavior among adolescents does not occur suddenly, but is the result of a complex interaction between psychosocial and environmental factors. In this context, bullying, low self-esteem, anxiety, and peer relationship problems are considered the main triggers that can increase the risk of self-harm. This assumption is based on stress and coping theory, which posits that individuals who are unable to manage stress effectively tend to seek maladaptive ways to reduce emotional pressure, including self-harm (26).



Reviewer

Add a column containing the values of n and %, improve the presentation of table 2, the

Alini, Nia Aprilla, Bri Nofrika (2025).

The findings of this study have important implications for the prevention and management of self-harm among adolescents. First, school-based interventions should focus on bullying prevention and improving the quality of social relationships among students. Anti-bullying programs involving all school components-including teachers, students, and parents-can help create a safe and supportive environment for adolescents. Second, efforts to enhance adolescent self-esteem should be implemented through self-development programs, counseling, and extracurricular activities that help adolescents recognize their strengths and potential. Support from family and teachers is also crucial in building adolescent confidence and self-worth. Third, early detection and management of anxiety among adolescents should be a primary concern. School counseling services must be able to identify adolescents experiencing anxiety and provide appropriate interventions, such as cognitive-behavioral therapy or stress management training. Fourth, strengthening social support and building positive peer networks can help adolescents cope with social pressures and reduce the risk of self-harm. Group activities, peer support, and social skills training can be effective strategies to improve the quality of peer relationships.

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CONCLUSION

This study demonstrates that bullying, low self-esteem, moderate to severe anxiety, and peer relationship problems are all significantly associated with an increased risk of self-harm behavior among high school adolescents in Kampar Regency. Multivariate analysis identified moderate to severe anxiety as the most dominant risk factor, followed by low self-esteem, bullying, and peer relationship problems. These findings highlight the complex interplay of psychosocial factors contributing to self-harm in adolescents and underscore the urgent need for comprehensive preventive interventions. Such interventions should focus on reducing bullying, enhancing self-esteem, managing anxiety, and strengthening positive peer relationships within the school environment to effectively reduce the prevalence of self-harm among adolescents.

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CONFLICTS OF INTEREST

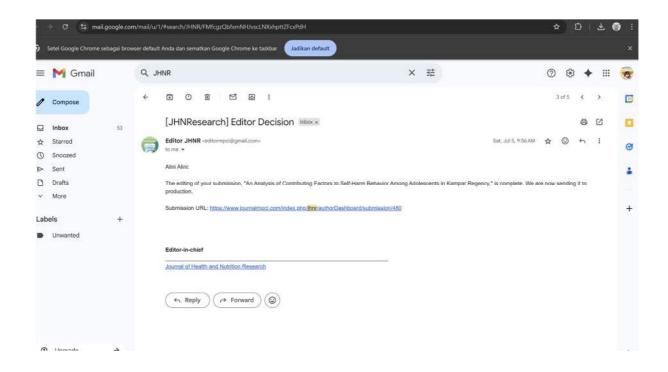
The author reports no conflicts of interest.

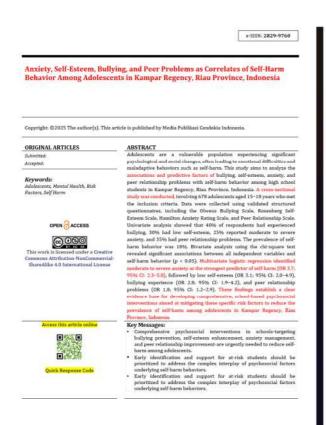
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BUKTI KORESPONDENSI EMAIL REVISI COMPLETE





An Analysis of Contributing Factors to Self-Harm Behavior Among Adolescents in Kampar Regency

- Bullying
- Self-esteem
- Anxiety
- Peer Problems

Self Harm in Adolescents

- Self Harm in Adolescents

- Recommendations:
- Self Jearn Behavior Among Adolescents factors underlying self-harm behavior

INTRODUCTION

Adolescence is a transitional plasse from childhood to adulthood, typically ranging from 10 to 19
years of age ilight period, adolescents often experience identity conflicts and difficulties in emotional regulation, which can lead to negative behaviors such as self-harm, social deviance, and substance abuse (2). Self-harm behavior frequently referred to an one-suicidal self-ingry (NSSI), is defined as the deliberate, self-inflicted damage of body tissue without suicidal intent, often serving as a coping mechanism for overwhelming mentional pins (3). With not as usided self-injury (NSSI), is defined as the deliberate, self-inflicted damage of body tissue without suicidal intent, often serving as a coping mechanism for overwhelming mentional pins (3). With not as a usided attempt, RSSI can indicate future suicidal itendencies (4) and represents an escalating global mental health concern, with approximately 17% of US adolescent employed and office in the search consistently identifies several psychosocial factors significantly associated with adolescent self-harm. These include bullying, which places adolescents at a beignificantly associated with adolescent self-harm. These include bullying, which places adolescents at a beignificantly associated with adolescent self-harm. These include bullying, which places adolescents at a beignificant price in the search consistently identifies several psychosocial factors significantly associated with adolescent self-harm. These include bullying, which places adolescents at a beignificant price in the search pr

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METHODS

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The inclusion criteria.

The inclusion criteria were as follows: adolescents aged 15 to 18 years; adolescents who were still actively enrolled as high school students in Kampar Regency; adolescents who were able to communicate effectively; and adolescents who had obtained written consent from their parents or guardians to participate in the study. The exclusion criteria were adolescents who were no longer sounded or were inactive in high school in Kampar Regency, adolescents with a history of chronic films requiring prolonged in the proposition of t

nospitalization; and adolescents in high actionis in Kampar Regency who were unwilling to participate as respondents, amenating the control of the control o

through purposive sampling to ensure may mix as microscos, sources, consequently that the selected sample met the required conditions while maintaining practical feasibility in a school-based setting.

Data collection utilized validated structured questionnaires, each with clearly defined measurement objectives and classification criteria. Bullying was assessed using the Oliveus Bullying Scale, which measures the frequency and types of bullying experienced unfolding verbal, physical, and social forms. Participants were estagorized as having experienced bullying if they indirected any imministrating the 10-time Research gold of the control of the properties of the proper

RESULTS

RESOLUTION

This study involved a total of 678 high school adolescents in Kampar Regency who met the inclusion criteria, (n = 678). The mean age of respondents was 16.5 years (50 ± 1.0), with 55% female and 45% male. Regarding grade level, 33% were in grade X, 34% in grade XI, and 33% in grade XII.

Univariate Analysis
The distribution of the main study variables is presented in Table 1. Among the 678 particip
4096 (n = 237) proported having experienced bullying, 3096 (n = 203) had low self-esteem, 2596 (n =
experienced moderate to severe anxiety, and 3596 (n = 237) had peer relationship problems. Addition
1896 (n = 122) of respondents reported having engaged in self-harm behaviors.

Table 1. Distribution of Research Variables among High School Adole

in Kampar Regency (n=678)			
Variable	n	96	
Ever Experienced Bullying	271	40	
Never Experienced Bullying	407	60	
Low Self-Esteem	203	30	
Moderate-High Self-Esteem	475	70	
Moderate-Severe Anxiety	170	25	
Mild/No Anxiety	508	75	
Peer Relationship Problems	237	35	
No Peer Relationship Problems	.441	65	
Self-Harm	122	18	
No Self-Harm	556	82	

uni-square tests demonstrated statistically significant associations between all indeed and self-harm behavior (p < 0.05), Self-harm behavior vas reported more frequently and the state of the state of

Table 2. Association Between Independent Variables and Self-Harm Behavio

Independent variable	Category	Self-Harm (n (%))	No Self-Harm (n (%))	p-value
Bullying Experience	Ever Experienced	87 (32%)	184 (68%)	< 0.001
	Never Experienced	35 (9%)	372 (91%)	
Self-Esteem	Low	73 (36%)	130 (64%)	< 0.001
	Moderate-High	49 (11%)	426 (89%)	
Anxiety Level	Moderate-Severe	70 (41%)	100 (59%)	< 0.001
	Mild/No Anxiety	52 (11%)	456 (89%)	
Peer Relationship	Yes	69 (29%)	168 (71%)	0.002
Problems	No	53 (13%)	373 (87%)	

Multivariate Analysis
Multivariate Analysis
Multivariate logistic regression analysis was performed to identify the most influential factors associated
with self-harm behavior among adolescents. All independent variables remained substically significant after
simultaneous adjustment, confirming their independent contributions to self-harming outcomes,
Moderate to severe assistic energies as the strongest predictor, with adolescents experiencing this
condition being 37 times more likely to enegge in self-harm compared to those with mild on on anciety (OR =
3.7, 97% Cl. 23–38, p < 0.001) Low self-esteem was also a stung contributor, with an adjusted odds ratho of
31, (09% Cl. 20–39, p < 0.001), indenting more than threefold increased risk. A history of bullings was
1, (19% Cl. 20–49, p < 0.001), indenting more than threefold increased risk. A history of bullings was

https://doi.org/10.56303/jhmreswarch.v3i3

associated with a 2.8-fold increase in self-harm risk (95% Cl: 1.9-4.2; p < 0.001). Finally, peer relationsh problems were associated with a 1.8 times higher lakelihood of self-harming behavior (95% Cl: 1.2-2.9; p

These findings underscore the multifactorial nature of self-harm behavior among adoles psychological distress and interpersonal adversity playing key roles. Targeted school-based me-interventions addressing anxiety, self-esteem, bullying, and social integration may help reduce the bun-harm in this vulnerable population.

Table 3. Multivariate Logistic Regression Analysis of Factors Associated with Self-Harm Behavior (n =

678)			
Variable	OR	95% CI	p-value
Bullying	2.8	1.9-4.2	< 0.001
Low Self-Esteem	3.1	2.0-4.9	< 0.001
Moderate-Severe Anxiety	3.7	2.3-5.8	< 0.001
Peer Relationship Problems	18	12-29	0.004

Note: Multivariate logistic regression was used to estimate adjusted odds ratios (OR) and 95% confidence intervals (CI). All variables in the model were adjusted simultaneously. OR > 1 indicates increased odds of

This study found that bullying, low self-esteem, moderate to severe anxiety, and peer relationship problems were significant contributing factors to self-harm behavior among high school adolescents in Kampar Regency. Among these, moderate to severe anxiety onerged as the most dominant predictor, followed by Jon welf-steem, a history of bullying, and peer relationship problems. These findings, based on multivariate logistic regression analysis, emphasize the importance of considering the magnitude of risk (effect sizes) rather than relying solely on statistical significance. The results highlight the urgent need for targeted mental health support and school-based psychosocial interventions to address these risk factors and reduce self-harm behaviors among adolescents.

DISCUSSION

DISCUSSION

This study aimed to analyze the relationship between bullying, self-esteem, anxiety, and peer relationship problems with self-harm behavior among high school adolescents in Kampar Regency. The results indicate that all four variables showed significant associations with self-harm in both bivariate and multivariate analyses. These findings contribute valuable insights into the psychosocial risk profile of self-harm in Indonesian adolescents and support global trends reported in recent literature.

Our findings support the tenets of stress and coping theory, which posits that individuals engage in self-harm as a maladaptive coping mechanism when faced with stressors they feel unable to manage effectively (22) Self-harm behavior among adolescents is not a undern occurrence but rather the complex outcome of interacting psychosocial and environmental factors. This complexity is evident in how factors like articley and low self-sattem can internalize the impact of external stressors like bullying and peer problems, intensifying emotional distress and increasing the likelihood of resorting to self-harm as a means of emotional regulation or escape. In this context, bullying, low self-esteem, auxiety, and peer relationship problems are considered significant influences that can increase the risk of self-harm Adolescence, a highly vulnerable age group due to profound biological, psychological, and social changes, often presents various adjustment challenges. The inability to cope with such pressures can trigger self-harming behavior as a form of escape or an attempt to alleviate emotional pain (23). pain (23).

Bullying is one of the main risk factors for self-harm behaviour in adolescents. The results of this study show that adolescents who have experienced bullying are 22 times more likely to engage in self-harm than those who have never experienced bullying. These findings align with the results of a meta-analysis involving 23,188 adolescents from various countries, which found that bullying victims are 2.15 times more likely to engage in self-harm than those who have not experienced bullying (aGR=2.15; 95%

https://del.org/10.56303/jhnressarch.v383

CI-1.61-2.85; p<0.001) (24). Bullying, whether physical, verbal, or cyber, contributes to chronic stress, depression, social isolation, and feelings of worthlessness, all of which are recognized triggers for self-harm. Research in Claim further corroboates this, showing that school bullying is directly associated with non-sacidal self-injury (NSSI), with negative affect and sleep quality mediating this relationship (10). A broader meta-analysis by fold et al. (2015) (25) highlights that are involvement in bullying significantly increases the risk of suicidal ideation and attempts, underscoring the critical need for bullying prevention and intervention. From a stress and coping perspective, bullying sects an severe external stressor that overwhelms an adolescent's usual coping resources, pushing them towards maladaptive responses like self-harm to manage the intense psychological pain.

Low self-eateem was also significantly associated with self-harm behavior, with adolescents esteme. This supports findings by Delizoso et al. (26) that identify low self-eateem as a strong predictor, particularly among female adolescents. Low self-eateem, that the self-harm to self-care as a maladaptive coping mechanism (27). This aligns with stress and coping theory, as low self-eateem can diminish an individually secretived ability to cope with challenges, making stressors feel more overwhelming and self-harm a more rendily accessed, albeit harmful, coping strategy.

Anistey emerged as a particularly strong corviate in this study, with an odds rato (OK) of 3.7, indicating adolescents under emotional distress often use self-harm to reduce negative feelings. While amisety demonstrated the largest odds ratio in this specific model (OR-3.7), it is crucial to recognize that the magnitude of an OR can be influenced by the chosen cottoff points for categorization. Thus, while statistically prominent, the findings underscove the importance of understanding anxiety as an integral part of a comprehensive risk profile, rather than an isol

psychosocial factors are important components of a multifaceted risk landscape for adolescent self-harm. Research also indicates that accidal ansiety can mediate the relationship between per problems and eightharm, as discomfort in peer interactions can push adolescents towards self-harm as an escape (29). Within the atrees and coping framework, high succept significant control of the metallic problems of the metallic problems. The metallic problems in peer relationships also significantly contributed to self-harm behavior, with adolescents facing such difficulties being 1.3 times more likely to engage in self-harm. This is supported by studies showing that poor social relationships also significantly contributed to self-harm. This is supported by studies showing that poor social relationships can increase self-harm risk through heightened negative affect and sleep disturbances (30). Adolescents heavily rely on peer support for identity formation and executy. Draviped prever relationships as mong these factors; for instance, while anxiety can predict self-harm that contributes of the contribute of the contribut

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nic dynamics may partially explain the strength of the associations observed in this study and highlight the need for fut re research to include qualitative approaches that explore these lived expe

The study also presents several practical implications for intervention. First, in terms of scho based policies, educational institutions should prioritize the implementation of anti-bullying programs, the based policies, educational institutions should prioritize the implementation of anti-bullying programs, the stablishment of peer-support systems, and the cultivation of inclusive school environments. These initiatives should involve collaboration among teachers, counselors, students, and parents to ensure a comprehensive and sustainable approach. Second, for mental health practitioners, particularly school counselors and psychologists, trageted training is needed to enhance early detection of psychologists underabilities such as anxiety, low self-esteem, and bullying involvement. Evidence-based interventions, valuerabilities such as anxiety, low self-setsem, and bullying involvement. Evidence-based interventions, including cognitive behavioral thespy (DEI), resilience-building programs, and self-estem enhancement modules, should be integrated into school counseling frameworks. Third, future research should adopt longitudinal designs to examine causal pathways underlying adolescent self-barm and explore protective and resilience factors that may buffer at-risk individuals from engaging in such behaviors.

Newertheless, this study is not without limitations. Its cross-sectional design restricts the ability to

establish causality, and the potential for bidirectional or cyclical relationships between key variables—such as self-harm and self-estrem—must be acknowledged. Additionally, reliance on self-reported data introduces risks of recall bias and social desirability bias. Finally, because the study was conducted within a single regency, the generalizability of its findings to adolescents in other geographic or cultural settings should be approached with caution.

CONCLUSION

This study demonstrates that bullying, low self-esteem, moderate to severe anxiety, and peer relationship problems are all significantly associated with an increased risk of self-harm behavior among high school adolescents in Kampar Regency. While all these factors showed significant associations, high school adolescents in Kampar Regency, While all these factors showed significant associations, multivariate analysis identified moderate to severe anxiety as the statistically strongest link in this cohort, followed by low self-esteem, bullying, and peer relationship problems. These findings highlight the complex interplay of psychosocial factors contributing to self-harm in adolescents and underscore the urgent need for comprehensive preventive interventions, given the vulnerability of adolescents during this critical developmental period and the potential for self-harm to lead to severe long-term consequences. Such interventions should focus on reducing bullying, enhancing self-esteem, managing anxiety, and strengthening positive peer relationships within the school environment. Ultimately these findings call for integrated, multi-level interventions within educational systems and broader community support to foster sections. resilience and mitigate the risk of self-harm among adolescents, contributing to their overall well-being and a healthier society

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CONFLICTS OF INTEREST

The author reports no conflicts of interest.

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RESPON REVIEWER A DAN B SETELAH REVISI AKHIR

Title Manuscript: An Analysis of Contributing Factors to Self-Harm Behavior Among Adolescents in Kampar Regency

Responses Reviewer A & Reviewer B

Reviewer A

No	Comment Reviewer	Responses
1	The Tittle: To be more specific: "Anxiety, Self-Esteem,	Thank you for this excellent suggestion.
	Bullying, and Peer Problems as Correlates of Self-	We've updated the title to be more specific,
	Harm in Indonesian Adolescents: A Cross-Sectional	focusing on the key predictors identified in
	Study"	our multivariate analysis
2	Abstract:	Thanks for your valuable feedback on the
	The abstract effectively summarizes the study's core	abstract. We've refined the phrasing to
	components. It is concise and follows a logical structure.	"underscore the necessity for," explicitly
	Suggestions:	stated "A cross-sectional study was
	Refine Phrasing: The phrase "urgent need" is	conducted," and highlighted the main
	impactful but strong. Consider rephrasing to maintain	finding by beginning the results with
	a measured, scientific tone, such as: "These findings	"Multivariate logistic regression identified
	underscore the necessity for comprehensive, school-	moderate to severe anxiety as the strongest predictor of self-harm." We believe these
	based psychosocial interventions" Specify Design: For immediate clarity, explicitly	changes significantly improve the abstract.
	Specify Design: For immediate clarity, explicitly state the study design at the beginning of the methods	changes significantly improve the abstract.
	description. For instance: "A cross-sectional study	
	was conducted"	
	Highlight Key Statistic: To immediately capture the	
	reader's attention, you could state the main finding more	
	prominently. For example: "Multivariate analysis	
	identified moderate to severe anxiety as the strongest	
	correlate of self-harm (OR 3.7)"	
3	Introduction:	Thanks for the comprehensive review of our
	The introduction provides a solid foundation, progressing	introduction. We've synthesized the literature for better flow, ensured
	from the global context of adolescent self-harm to the specific situation in Kampar Regency. The use of recent	consistent terminology for self-harm/NSSI,
	literature strengthens the rationale.	introduced "stress and coping theory" as
	Suggestions:	a conceptual anchor, and restructured the
	Synthesize Literature: In some paragraphs, findings	introduction into four concise paragraphs
	from different studies are presented sequentially. Consider	as suggested, strengthening its overall clarity
	synthesizing these points to demonstrate a deeper	and focus.
	integration of the literature. For example: "A body of	
	research indicates that adolescents who experience	
	bullying are at a heightened risk for self-harm, with	
	studies in Southeast Asia noting that approximately 30%	
	of adolescents report being bullied."	
	Consistency in Terminology: The text uses both "self-	
	harm" and "non-suicidal self-injury (NSSI)". While	
	related, they can have different connotations. It would be	
	beneficial to define both clearly at the outset and then	
	select one primary term for consistent use throughout the	
	manuscript to avoid potential ambiguity.	
	Introduce Theoretical Framework: The discussion	
	mentions "stress and coping theory". Introducing this or	
	The state of the s	1

another relevant theoretical framework (e.g., the Interpersonal Theory of Suicide) in the introduction could provide a stronger conceptual anchor for your hypotheses and the overall study.

Paragraph Structure: To enhance readability and structural flow, consider consolidating the introduction into a more concise format, ideally no more than four paragraphs. A potential structure could be: 1) establishing the broad public health context of self-harm, 2) reviewing specific literature on the key psychosocial factors to identify the research gap, 3) detailing the local context in Kampar Regency that makes this study necessary, and 4) clearly stating the research question, aims, and hypotheses.

4 Methods:

The methods section is methodologically sound and detailed, particularly with the inclusion of the G*Power sample size calculation.

Suggestions:

Clarify Sampling Procedure: The text describes using "cluster sampling" followed by "purposive sampling". To enhance reproducibility, consider clarifying this multistage process. For example: "A multi-stage sampling design was employed. First, a subset of high schools in Kampar Regency was selected via cluster sampling. Second, within these selected schools, participants were recruited through purposive sampling to ensure they met all inclusion criteria."

Detailing of Research Variables: To substantially improve the clarity and replicability of the research, it is advisable to add a subsection dedicated to the operationalization of variables. For each variable (e.g., Bullying, Low Self-Esteem, Moderate-Severe Anxiety, Peer Relationship Problems, and Self-Harm), this section should meticulously describe: The operational definition used in this study.

The **objective criteria** and specific cutoff scores from the respective scales that were used for categorization (e.g., the score range on the Rosenberg Self-Esteem Scale that defined "Low Self-Esteem" or how a response on the Olweus Bullying Scale was classified as "Ever Experienced Bullying").

A clear description of the **data collection and processing method** for each variable, explaining how raw scores from the questionnaires were converted into the final categorical variables used for analysis.

Delete figure in methods

5

CODE OF HEALTH ETHICS

Add the ethics letter number and the agency/institution that issued the research ethics letter.

and provided a detailed description of how each variable was measured, including operational definitions and cutoff scores. The figure in the Methods section has also been removed as recommended.

Thank you for your suggestions. We have

clarified the multi-stage sampling process

This study did not involve clinical interventions, patient treatment, or animal testing. It was observational in nature and conducted using anonymous, self-administered questionnaires with no direct

physical contact or identifiable health information collected. As such, formal ethical clearance was not required by the institutional policies in place at the time of the research. Nonetheless, the study adhered to ethical research principles by obtaining informed consent from both the participants and their parents or guardians. Participation was entirely voluntary, with assurances of confidentiality and anonymity provided to all respondents. The research was conducted in alignment with the principles of the Declaration of Helsinki concerning research involving human subjects.

5 Results:

To enhance the narrative of the results, ensure the text guides the reader to the key information within the tables.

- For Table 1: Explicitly state the total sample size in the text (n=678) when first describing the univariate findings, as this anchors all subsequent percentages.
- For Table 2: The text notes the associations are significant. To add more descriptive power, consider highlighting the most pronounced percentage differences directly in the prose. For instance: "The bivariate results in Table 2 reveal notable disparities; for example, the prevalence of self-harm among adolescents with moderate-severe anxiety (41%) was substantially higher than among those with mild or no anxiety (11%)." This approach effectively draws the reader's attention to the most important patterns that anticipate the multivariate results.

Focus on Effect Sizes: When interpreting the results, continue to emphasize the effect sizes (Odds Ratios) and their confidence intervals, as these are more informative than p-values alone. The current text does this well in the multivariate section.

Table Formatting: Ensure all abbreviations used in the tables (e.g., OR, CI) are defined in the table footnotes. This allows the tables to function as standalone pieces of information.

Thank you for the valuable suggestions. The

Results section has been revised to enhance clarity and narrative flow. The total sample size (n = 678) is now explicitly stated when introducing the univariate findings in Table 1. For Table 2, the most pronounced percentage differences—such as the higher prevalence of self-harm among adolescents with moderate to severe anxiety—have been highlighted in the text to better guide readers to key findings. Additionally, emphasis on effect sizes (Odds Ratios and 95% Confidence Intervals) has been maintained in the multivariate analysis as recommended. All table abbreviations (e.g., OR, CI) have also been clearly defined in the footnotes to ensure each table can stand alone.

6 Discussion:

Suggestions for Critical Enhancement:

Address Bidirectionality: The cross-sectional design is noted as a limitation, precluding causal claims. The discussion could be critically deepened by explicitly addressing the potential for reverse causality or bidirectional relationships. For instance, while the model treats low self-esteem as a predictor of self-harm, it is equally plausible that the act of self-harming subsequently damages an adolescent's self-esteem and social relationships. Acknowledging these complex feedback loops would provide a more sophisticated interpretation of the associations found.

Nuance the Interpretation of "Dominant" Factor: The manuscript identifies anxiety as the "most dominant" risk

Thanks for the excellent and detailed feedback on our discussion section. We've significantly enhanced it by addressing potential bidirectionality of relationships between self-harm and psychosocial factors. We've also nuanced the interpretation of anxiety as a "dominant" factor, emphasizing the interplay of all identified risk factors rather than solely focusing on a single OR. Furthermore, we've deepened the cultural contextualization by discussing how local factors like mental health stigma and limited access to care in Kampar Regency might shape these relationships. Finally, we've structured the implications into distinct subsections for

factor based on its higher odds ratio (OR=3.7). This interpretation should be nuanced. The magnitude of an OR can be influenced by the chosen cutoff points for categorization. The discussion should acknowledge that while anxiety showed the largest effect size *in this specific model*, the focus should remain on the interplay of all identified factors. A more cautious phrasing would be that all four psychosocial factors are important components of a comprehensive risk profile for adolescent self-harm.

clarity, including "Implications for School-Based Policies," "Implications for Mental Health Practitioners and Public Health," and "Directions for Future Research." We believe these revisions significantly strengthen the discussion.

Deepen Cultural Contextualization: The discussion connects findings to international research. To move beyond simple comparison, the interpretation could be enriched by exploring *how* specific cultural factors in Kampar Regency might shape these relationships. For instance, considering the cited issues of mental health stigma and limited access to care in Indonesia, the discussion could theorize how these local barriers might exacerbate the link between internal distress (like anxiety) and externalizing behaviors (like self-harm), offering a culturally-grounded explanation for the findings.

Structure Implications: The implications for prevention are well-articulated. To make them more comprehensive, consider structuring them into distinct subsections, such as "Implications for School-Based Policies," "Implications for Mental Health Practitioners," and "Directions for Future Research."

7 Conclusions:

The conclusion is a concise and accurate summary of the study's findings and their importance.

Suggestions:

Reiterate the Main Finding with Nuance: Briefly reiterate that while all factors were associative, anxiety demonstrated the strongest statistical link to self-harm in this cohort.

Final Call to Action: Frame the final sentence to emphasize a systems-level approach. For example: "These findings call for integrated, multi-level interventions within educational systems to foster resilience and mitigate the risk of self-harm among adolescents" Thanks for your valuable feedback on the conclusion. We've reiterated the main findings with added nuance, highlighting anxiety as the statistically strongest link. We also expanded on the "why" for urgent intervention by emphasizing adolescent vulnerability and long-term consequences. Finally, we've strengthened the call to action by advocating for integrated, multi-level interventions for broader societal benefit.

Reviewer B

No	Comment Reviewer	Responses
1	The Title:	We completely agree with highlighting the
	Highlight the primary finding to attract readership.	primary findings. Our revised title now
	Example: "Anxiety, Low Self-Esteem, and Bullying as	emphasizes Anxiety, Self-Esteem, and
	Predictors of Self-Harm Among Indonesian Adolescents:	Bullying as Key Predictors to attract
	A Cross-Sectional Analysis."	readership, directly reflecting our study's
		most impactful results.
2	Abstract:	Thanks for the excellent feedback. We've
		refined the abstract's aim to "associations
		and predictive factors" for consistency.

To refine the conclusion within the abstract, consider framing the final sentence to more directly link the findings to the recommendation.

Current: "These findings highlight the urgent need for comprehensive school-based psychosocial interventions..."

Proposed Alternative: "These findings establish a clear evidence base for developing comprehensive, schoolbased psychosocial interventions aimed at mitigating these specific risk factors to reduce the prevalence of self-harm among adolescents."

Clarity on "Contributing Factors": While the title uses "contributing factors," the abstract accurately states "association" and "predictors". Maintain consistent terminology throughout.

Strengthen Implications: The abstract highlights the urgent need for interventions. Consider framing the implications slightly more assertively, perhaps by stating that the findings *provide a basis* for such interventions

Crucially, the concluding sentence is now "These findings establish a clear evidence base for developing comprehensive, school-based psychosocial interventions aimed at mitigating these specific risk factors to reduce the prevalence of self-harm among adolescents in Kampar Regency," directly linking our findings to the recommended interventions and strengthening the implications.

3 Introduction:

The introduction currently comprises numerous paragraphs. For enhanced readability and conciseness in academic writing, it is advisable to condense this section to an ideal length of 3-4 paragraphs. Each paragraph should focus on a distinct aspect, ensuring a logical flow of information. The introduction should generally cover the following key elements:

Background and Problem Statement: Briefly introduce the topic of self-harm in adolescents, establishing its global and local relevance and highlighting the problem's scope.

Literature Review (Synthesized): Synthesize existing research on the identified psychosocial factors (bullying, self-esteem, anxiety, peer relationship problems) and their known associations with self-harm. Instead of detailing each study in a separate sentence, aim to present the collective understanding derived from multiple sources. Gap in the Literature/Justification for the Study: Clearly articulate what is not yet fully understood or what specific context (e.g., Kampar Regency) warrants this research. This section should explicitly state why the study is necessary and what new insights it aims to

Study Aim/Objectives: Conclude the introduction by clearly stating the specific aim or objectives of the present study.

Thanks for the excellent review of our introduction. We've significantly condensed it into four focused paragraphs as suggested. We also synthesized the literature more effectively, ensured consistent terminology for selfharm/NSSI, and strengthened the justification for our study by clearly articulating the local context and research gap. The aim is now concisely stated at the end, providing a clearer roadmap for the reader.

4 Methods:

To enhance the clarity and reproducibility of the study, it would be beneficial to provide a more detailed explanation of each research variable. While the

Thank you for your insightful feedback. We have revised the Methods section to include detailed operational definitions for each variable, along with descriptions of the

instruments used are named, a brief description of what each scale measures and how the variables were operationalized in this study would be valuable. Specifically, for each independent variable (bullying, self-esteem, anxiety, and peer relationship problems) and the dependent variable (self-harm behavior), consider adding: **Definition:** A concise operational definition of the variable as understood and measured within the scope of this study.

scores for categorization. These changes aim to enhance the clarity, replicability, and interpretability of our study.

instruments used and the specific cutoff

Measurement: A brief explanation of what aspects or dimensions of the variable the specific scale (e.g., Olweus Bullying Scale, Rosenberg Self-Esteem Scale) is designed to assess. This clarifies what specific aspects of bullying, self-esteem, etc., were captured.

Categorization (if applicable): If variables were categorized (e.g., "low self-esteem," "moderate-severe anxiety"), briefly explain the criteria or cutoff points used for these classifications, as this information is crucial for interpreting the univariate analysis results.

Add the research ethics letter number and the institution that issued it.

5 CODE OF HEALTH ETHICS

Add the ethics letter number and the agency/institution that issued the research ethics letter.

This study did not involve clinical interventions, patient treatment, or animal testing. It was observational in nature and conducted using anonymous, administered questionnaires with no direct physical contact or identifiable health information collected. As such, formal ethical clearance was not required by the institutional policies in place at the time of the research. Nonetheless, the study adhered to ethical research principles by obtaining informed consent from both the participants and their parents or guardians. Participation was entirely voluntary, with assurances of confidentiality and anonymity provided to all respondents. The research was conducted in alignment with the principles of the Declaration of Helsinki concerning research involving human subjects.

5 Results:

Respondent Characteristics:

Parental Characteristics: Given that the introduction discusses the influence of parental education levels on adolescent mental health, it would be highly beneficial to include descriptive statistics for parental characteristics (e.g., parental education level, occupation, or socioeconomic status) if such data were collected. Presenting this information would provide important

We appreciate the reviewer's valuable suggestion. However, we respectfully note that parental characteristics such as education level and occupation were not collected in this study and therefore cannot be included in the results. For Table 2, we have revised the presentation by including the number and percentage values for each group and expanded the independent variable categories to provide more detailed subgroup comparisons. These improvements aim to

context for the study's findings and align with the background presented.

enhance the clarity and interpretability of the findings.

For Table 2, add a column containing the values of n and %.

Improve the presentation of table 2, the Independent variable should not only contain 1 category, but should be more detailed based on the category for each variable

6 Discussion:

Theoretical Framework Integration: You mention "stress and coping theory". Integrating this theory more explicitly throughout the discussion, beyond just its initial mention, could strengthen the theoretical underpinning of your interpretations. How do the specific findings about bullying, self-esteem, anxiety, and peer problems relate back to the tenets of stress and coping theory?

Nuance in "Complex Interaction": You state that selfharm is a "complex interaction between psychosocial and environmental factors". While true, consider briefly elaborating on the nature of this complexity based on your findings. For example, how do anxiety and low selfesteem potentially mediate or moderate the effects of bullying or peer problems?

Policy and Practice Recommendations: The recommendations are practical and clearly derived from the findings. You could consider suggesting specific stakeholders beyond schools (e.g., local health authorities, community organizations) who might play a role in implementing these interventions

Thanks for the excellent and detailed feedback on our discussion section. We've significantly strengthened it by integrating "stress and coping theory" more explicitly throughout, showing how each finding relates to its tenets. We also nuanced the interpretation of "complex interaction," elaborating on how anxiety and low selfesteem might mediate the effects of other factors. Finally, we've broadened our policy and practice recommendations to include specific stakeholders beyond schools, such as local health authorities and community organizations. We believe these revisions significantly enhance the discussion's theoretical depth and practical implications.

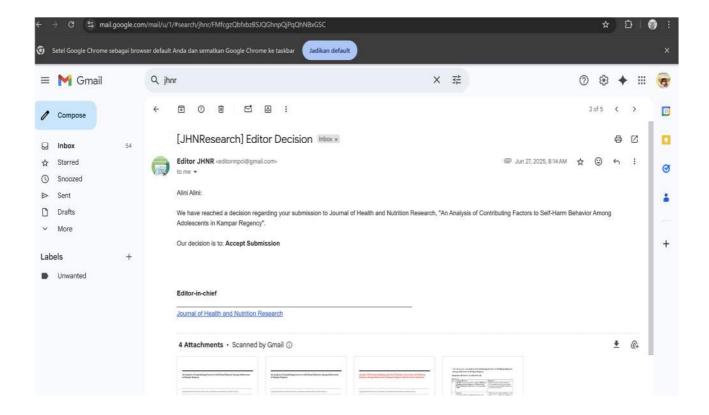
7 Conclusion :

The conclusion concisely summarizes the main findings and reiterates the need for comprehensive interventions. Suggestions:

Reiterate Key Message: While succinct, consider slightly expanding on the "why" behind the urgent need for interventions, perhaps by briefly re-emphasizing the vulnerability of adolescents and the potential long-term consequences of self-harm.

Future Outlook: Briefly touch upon the broader societal benefit of addressing these issues, reinforcing the study's contribution. Thanks for your valuable feedback on the conclusion. We've reiterated the main findings with added nuance, highlighting anxiety as the statistically strongest link. We also expanded on the "why" for urgent intervention by emphasizing adolescent vulnerability and long-term consequences. Finally, we've strengthened the call to action by advocating for integrated, multi-level interventions for broader societal benefit.

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Dear Authors

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We are pleased to inform you that your manuscript:

Anxiety, Self-Esteem, Bullying, and Peer Problems as Correlates of Self-Harm Behavior Among Adolescents in Kampar Regency, Riau Province, Indonesia

has been accepted for publication in The Journal of Health and Nutrition Research (ISSN: 2829-9760).

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Thank you for your kind contribution. On behalf of the Editors of The Journal of Health and Nutrition Research, we look forward to your continued contributions to the Journal



Best regards

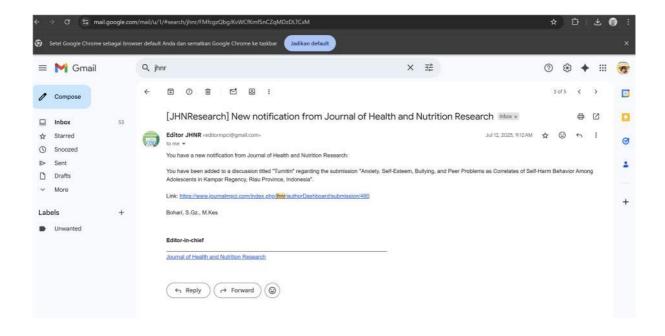


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Anxiety, Self-Esteem, Bullying, and Peer Problems as Correlates of Self-Harm Behavior Among Adolescents in Kampar Regency, Riau Province, Indonesia

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ORIGINAL ARTICLES

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ARSTRACT

Adolescents are a vulnerable population experiencing significant psychological and social changes, often leading to emotional difficulties and maladaptive behaviors such as self-harm. This study aims to analyze the associations and predictive factors of bullying, self-esteem, anxiety, and peer relationship problems with self-harm behavior arging high school students in Kampar Regency, Riau Province, Indonesia. A cross-sectional study was conducted, involving 678 adolescents aged 15-18 years who met the inclusion criteria. Data were collected using validated structured questionnaires, including the Olweus Bullying Scale, Rosenberg Self-Esteem Scale, Hamilton Anxiety Rating Scale, and Peer Relationship Scale. Univariate analysis showed that 40% of respondents had experienced bullying, 30% had low self-esteem, 25% reported moderate to severe anxiety, and 35% had peer relationship problems. The prevalence of selfharm behavior was 18%. Bivariate analysis using the chi-square test revealed significant associations between all independent variables and self-harm behavior (p < 0.55). Multivariate logistic regression identified moderate to severe anxiety as the strongest predictor of self-harm (OR 3.7; 95% CI: 2.3-5.8), followed by low self-esteem (OR 3.1; 95% CI: 2.0-4.9), bullying experience (OR 2.8; 95% CI: 1.9-4.2), and peer relationship problems (OR 1.8; 95% CI: 1.2-2.9). These findings establish a clear evidence base for developing comprehensive, school-based sychosocial interventions aimed at mitigating these specific risk factors to reduce the prevalence of self-harm among adolescents in Kampar Regency, Riau Province, Indonesia.

Key Messages:

- Comprehensive psychosocial interventions in schools, targeting bullying prevention, self-esteem enhancement, anxiety management, and peer relationship improvement, are urgently needed to reduce selfharm among adolescents.
- Early identification and support for at-risk students should be prioritized to address the complex interplay of psychosocial factors underlying self-harm behaviors.
- Early identification and support for at-risk students should be prioritized to address the complex interplay of psychosocial factors underlying self-harm behaviors.

GRAPHICAL ABSTRACT

Anxiety, Self-Esteem, Bullying, and Peer Problems as Correlates of Self-Harm Behavior Among Adolescents in Kampar Regency, Riau Province, Indonesia

- Bullying
- Self-esteem
- Anxiety
- · Peer Problems



Self Harm in Adolescents



Recommendations:

Early detection and support for atrisk students are essential to address the complex psychosocial factors underlying self-harm behavior

INTRODUCTION

Adolescence is a transitional phase from childhood to adulthood, typically ranging from 10 to 19 years of age (1). During this period, adolescents often experience identity conflicts and difficulties in emotional regulation, which can lead to negative behaviors of has self-harm, social deviance, and substance abuse (2). Self-harm behavior, frequently referred to as non-suicidal self-injury (NSSI), is defined as the deliberate, self-inflicted damage of body tissue without suicidal intent, often serving as a coping mechanism for overwhelming emotional pain (3). While not a suicide attempt, NSSI can indicate future suicidal tendencies (4) and represents an escalating global mental health concern, with approximately 17% of U.S. adolescents engaging in it (3).

A substantial body of research consistently identifies several psychosocial factors significantly associated with adolescent self-harm. These include bullying, which places adolescents at a heightened risk (5), with prevalence rates around 30% in Southeast Asia (6) and a clear link to increased self-injury risk in Indonesia (7). Low self-esteem also plays a critical role, as negative self-perceptions make adolescents more vulnerable to emotional stress and often lead to self-harm as a coping mechanism (8). Furthermore, anxiety and emotional distress are key triggers (9), evidenced by meta-analyses showing over half of depressed adolescents (often with co-occurring anxiety) have a history of self-harm (10). Poor peer relationships, fostering loneliness and lack of support, likewise contribute to self-harm risk (11). These factors often interact, aligning with the stress and coping fleory where self-harm emerges when conventional coping is overwhelmed by stressors (12, 13, 14). Bullying victims suffer from negative self-concept, prejudice toward the perpetrator, and fear of being hurt, leading to emotional and psychological disturbances (15). Despite this collective understanding, there remains a critical research gap in comprehensively understanding the combined impact of these specific psychosocial challenges on adolescent self-harm within localized contexts.

This phenomenon is also a growing concern in Indonesia, particularly in Kampar Regency, Riau Province. Recent local data highlight a rising prevalence of adolescent mental health disorders, including anxiety and self-harm (15, 16). For instance, 10% of Kampar adolescents experience anxiety disorders, and nearly 6% engage in self-harm as a response to social pressures (16). Bullying also persists as a significant problem, affecting approximately 20% of adolescents in Kampar (18). These challenges are compounded by barriers such as lower parental education influencing mental health literacy (19) and limited access to mental health services due to stigma, lack of support, professional scarcity, and geographical hurdles in

rural areas (19, 20). These local contextual factors underscore the urgent need for targeted research to inform effective interventions.

Based on this background, the present study aims to investigate the associations between bullying, self-esteem, anxiety, and peer relationship problems as contributing factors to self-harm behavior among adolescents in Kampar Regency, Riau Province, Indonesia. This research is crucial given the notable local prevalence of self-harm and the identified dearth of studies specifically addressing these psychosocial influences within the region. Understanding these relationships will provide a robust, scientifically-driven basis for developing tailored community- and school-based mental health interventions.

METHODS

This study employed a cross-sectional design to analyze the relationship between the independent variables (bullying, low self-esteem, moderate to severe anxiety, and peer relationship problems) and the dependent variable (self-harm behavior). The study population comprised in his problems are to 18 years in Kampar Regency. The sample in this nursing research was determined based on inclusion and exclusion criteria.

The inclusion criteria were as follows: adolescents aged 15 to 18 years; adolescents who were still actively enrolled as high school students in Kampar Regency; adolescents who were able to communicate effectively; and adolescents who had obtained written consent from their parents or guardians to participate in the study. The exclusion criteria were: adolescents who were no longer enrolled or were inactive in high school in Kampar Regency; adolescents with a history of chronic illness requiring prolonged hospitalization; and adolescents in high schools in Kampar Regency who were unwilling to participate as responding ts.

The sample size was calculated using G*Power Software Version 3.1.9.7 with an assumed $\alpha = 0.05$ (medium effect size according to Cohen et al., 1995), and a power level of 0.80, based on the study by (22). The required minimum sample was 616, with an additional 10% (62) for anticipated dropout, resulting in a final target of 678 participants.

A multi-stage sampling design was employed. First, a subset of high schools in Kampar Regency was selected via cluster sampling. Second, within these selected schools, participants were recruited through purposive sampling to ensure they met all inclusion criteria. This approach was chosen to ensure the selected sample met the required conditions while maintaining practical feasibility in a school-based setting.

Data collection utilized validated structured questionnaires, each with clearly defined measurement objectives and classification criteria. Bullying was assessed using the Olweus Bullying Scale, which measures the frequency and types of bullying experiences—including verbal, physical, and social forms. Participants were categorized as having experienced bullying if the endorsed any item indicating victimization according to the scale's established frequency thresholds. Self-esteem was measured using the 10-item Rosenberg Self-Esteem Scale, which evaluates global self-worth through both positive and negative self-perprines; scores below 15 were classified as indicating low self-esteem. Anxiety was evaluated with the Hamilton Anxiety Rating Scale (HAM-A), a 14-item instrument assessing both psychic and somatic symptoms of anxiety, where a total score of 18 or above indicated moderate to severe anxiety. Peer relationship problems were measured using the Peer Relationship Scale, which examines issues related to social interaction, trust, and peer acceptance; scores exceeding the threshold for social maladjustment were categorized as having peer relationship problems. Lastly, self-harm behavior was assessed through a self-report question inquiring whether participants had ever intentionally engaged in self-injurious actions such as cutting, burning, or hitting themselves, with responses categorized dichotomously as "yes" or "no."

All raw scores were transformed into categorical variables according to validated cut-off points vided by each instrument's scoring manual. This allowed for consistent analysis and interpretation. Descriptive statistics were used in univariate analysis to present the distribution of study variables. Chisquare tests were applied for bivariate analysis to examine the relationships among variables. Finally, multivariate logistic regression identified the most significant predictors of self-harm behavior.

RESULTS

Respondent Characteristics

This study involve total of 678 high school adolescents in Kampar Regency who met the inclusion criteria (n = 678). The mean age of respondents was 16.5 years (SD \pm 1.0), with 55% female and 45% male. The distribution of the main study variables is presented in Table 1. Among the 678 participants, 40% (n = 271) reported having experienced bullying, 30% (n = 203) had low self-esteem, 25% (n = 170) experienced moderate to severe anxiety, and 35% (n = 237) had peer relationship problems. Additionally, 18% (n = 122) of respondents reported having engaged in self-harm behaviors.

Table 1. Distribution of Research Variables among High School Adolescents in Kampar Regency

(-	(11-678)			
Variable	n	%		
Ever Experienced Bullying	271	40		
Never Experienced Bullying	407	60		
Low Self-Esteem	203	30		
Moderate-High Self-Esteem	475	70		
Moderate-Severe Anxiety	170	25		
Mild/No Anxiety	508	75		
Peer Relationship Problems	237	35		
No Peer Relationship Problems	441	65		
Self-Harm	122	18		
No Self-Harm	556	82		

Bivariate Analysis

Chi-square tests demonstrated statistically significant associations between all independent variables and self-harm behavior (p < 0.05). Self-harm behavior was reported more frequently among adolescents with negative psychosocial characteristics. For instance, 32% of those who had experienced bullying reported self-harm, compared to only 9% among those who had not. Similarly, 36% of adolescents with low self-esteem engaged in self-harm, while the rate was only 11% among those with moderate to high self-esteem. The highest prevalence was observed among respondents with moderate to severe anxiety, at 41%, versus 11% among those with mild or no anxiety. Peer relationship problems also showed a substantial effect, with 29% of affected adolescents reporting self-harm, compared to 13% among those without such problems. These findings suggest strong bivariate associations between each psychosocial factor and self-harming behavior, setting the foundation for multivariate analysis.

Table 2. Association Between Independent Variables and Self-Harm Behavior

Independent variable	Category	Self-Harm (n (%))	No Self-Harm (n (%))	p-value
Bullying Experience	Ever Experienced	87 (32%)	184 (68%)	< 0.001
3 5 5	Never Experienced	35 (9%)	372 (91%)	
Self-Esteem	Low	73 (36%)	130 (64%)	< 0.001
	Moderate-High	49 (11%)	426 (89%)	
Anxiety Level	Moderate-Severe	70 (41%)	100 (59%)	< 0.001
innamente s tore source	Mild/No Anxiety	52 (11%)	456 (89%)	
Peer Relationship	Yes	69 (29%)	168 (71%)	0.002
Problems	No	53 (13%)	373 (87%)	

Note: $\frac{\text{Chi-square test was used to assess}}{\text{chi-square test was used to assess}}$ associations. Percentages represent the proportion within each subgroup. n = 678.

Multivariate Analysis

Multivariate logistic regression analysis was performed to identify the most influential factors associated with self-harm behavior among adolescents. All independent variables remained statistically

significant after simultaneous adjustment, confirming their independent contributions to self-harming outcomes.

Moderate to severe anxiety emerged as the strongest predictor, with adolescents experiencing this didition being 3.7 times more likely to engage in self-harm compared to those with mild or no anxiety R = 3.7, 95% Cl: 2.3-5.8; p < 0.001). Low self-esteem was also a strong contributor, with an adjusted odds rate of 3.1 (95% Cl: 2.0-4.9; p < 0.001), indicating more than threefold increased risk. A history of bullying was associated with a 2.8-fold increase in self-harm risk (95% Cl: 1.9-4.2; p < 0.001). Finally, peer relationship problems were associated with a 1.8 times higher likelihood of self-harming behavior (95% Cl: 1.2-29; p = 0.004).

These findings underscore the multifactorial nature of self-harm behavior among adolescents, with psychological distress and interpersonal adversity playing key roles. Targeted school-based mental health interventions addressing anxiety, self-esteem, bullying, and social integration may help reduce the burden of self-harm in this vulnerable population.

Table 3. Multivariate Logistic Regression Analysis of Factors Associated with Self-Harm Behavior

(n = 678)				
Variable	OR	95% CI	p-value	
Bullying	2.8	1.9-4.2	< 0.001	
Low Self-Esteem	3.1	2.0-4.9	< 0.001	
Moderate-Severe Anxiety	3.7	2.3-5.8	< 0.001	
Peer Relations ip Problems	1.8	1.2-2.9	0.004	

Note: Multivariate logistic regression was used to estimate adjusted odds ratios (OR) and 95% confidence intervals (CI). All variables in the model were adjusted simultaneously. OR > 1 indicates increased odds of self-harm behavior.

This study found that bullying, low self-esteem, moderate to severe anxiety, and peer relationship problems were significant contributing factors to self-harm behavior among high school adolescents in Kampar Regency. Among these, moderate to severe anxiety emerged as the most dominant precent, followed by low self-esteem, a history of bullying, and peer relationship problems. These findings, based on multivariate logistic regression analysis, emphasize the importance of considering the magnitude of risk (effect sizes) rather than relying solely on statistical significance. The results highlight the urgent need for targeted mental health support and school-based psychosocial interventions to address these risk factors and reduce self-harm behaviors among adolescents.

DISCUSSION

This study aimed to analyze the relationship between bullying, self-esteem, anxiety, and peer relationship problems with self-harm behavior among high school adolescents in Kampar Regency. The results indicate that all four variables showed significant associations with self-harm in both bivariate and multivariate analyses. These findings contribute valuable insights into the psychosocial risk profile of self-harm in Indonesian adolescents and support global trends reported in recent literature 26

Our findings support the tenets of stress and coping theory, which posits that individuals engage in self-harm as a maladaptive coping mechanism when faced with stressors they feel unable to manage effectively (23). Self-harm behavior among adolescents is not a sudden occurrence but rather the complex outcome of interacting psychosocial and environmental factors. This complexity is evident in how factors like anxiety and low self-esteem can internalize the impact of external stressors like bullying and peer problems, intensifying emotional distress and increasing the likelihood of resorting to self-harm as a means of emotional regulation or escape. In this context, bullying, low self-esteem, anxiety, and peer relationship problems are considered significant influences that can increase the risk of self-harm. Adolescence, a highly vulnerable age group due to profound biological, psychological, and social changes, often presents various adjustment challenges. The inability to cope with such pressures can trigger self-harming behavior as a form of escape or an attempt to alleviate emotional pain (24).

Bullying is one of the main risk factors for self-harm behavio 12 n adolescents. The results of this study show that adolescents who have experienced bullying are 2.8 times more likely to engage in self-harm than those who have never experienced bullying. These findings align with the results of a meta-analys 30 nvolving 23,388 adolescents from various countries, which found that bullying 2 times are 2.15 times more likely to engage in self-harm than those who have not experienced bullying (a0R=2.15; 95% Cl=1.61-2.85; p<0.001) (25). Bullying, whether physical, verbal, or cyber, contributes to chronic stress, depression, social isolation, and feelings of worthlessness, all of which are recognized triggers for 23f-harm. Research in China further corroborates this, showing that school bullying is directly associated with non-suicidal self-injury (NSSI), with negative affect and sleep quality mediating this relation 32 p (10). A broader meta-analysis by Holt et al. (2015) (26) highlights that any involvement in bullying significantly increases the risk of suicidal ideation and attempts, underscoring the critical need for bullying prevention and intervention. From a stress and coping perspective, bullying acts as a severe external stressor that overwhelms an adolescent's usual coping resources, pushing them towards maladaptive responses like self-harm to manage the intense psychological pain.

Low self-esteem was also significantly associated with self-harm behavior, with adolescents experiencing low self-esteem 3.1 times more likely to self-harm than those with moderate to high self-esteem. This supports findings by Delrosso et al. (27), that identify low self-esteem as a strong predictor, particularly among female adolescents. Low self-esteem, characterized by negative self-views and feelings of worthlessness, increases vulnerability to stress and can lead to self-harm as a malageative coping mechanism (28). This aligns with stress and coping theory, as low self-esteem can diminish an individual's perceived ability to cope with challenges, making stressors feel more overwhelming and self-harm a more readily accessed, albeit harmful, coping strategy.

Anxiety emerged as a particularly strong correlate in this study, with an odds ratio (OR) of 3.7, indicating adolescents with moderate to severe anxiety were nearly four times more likely to self-harm. This aligns with international research showing strong associations between anxiety, depression, and self-harm (29). Adolescents under emotional distress often use self-harm to reduce negative feelings. While anxiety demonstrated the largest odds ratio in this specific model (OR=3.7), it is crucial to recognize that the magnitude of an OR can be influenced by the chosen cutoff points for categorization. Thus, while statistically prominent, the findings underscore the importance of understanding anxiety as an integral part of a comprehensive risk profile, rather than an isolated, singularly dominant factor. All four psychosocial factors are important components of a multifaceted risk landscape for adolescent self-harm. Research also indicates that social anxiety can mediate the relationship between peer problems and self-harm, as discomfort in peer interactions can push adolescents towards self-harm as an escape (30). Within the stress and coping framework, high anxiety signifies an elevated level of internal distress, which, if not managed through healthy mechanisms, can directly lead to maladaptive coping behaviors like self-harm as an attempt to rapidly alleviate overwhelming emotional states.

Problems in peer relationships also significantly contributed to self-harm behavior, with adolescents facing such difficulties being 1.8 times more likely to engage in self-harm. This is supported by studies showing that poor social relationships can increase self-harm risk through heightened negative affect and sleep disturbances (31). Adolescents heavily rely on peer support for identity formation and security. Disrupted peer relationships can lead to loneliness, isolation, and a lack of emotional confidants, triggering emotional stress that manifests as self-harm (32). Group Counseling integrated with Cognitive Behaveral Therapy significantly enhances self-efficacy among individuals who have experienced bullying (33). Parents should pay attention and always ask about the activities they are carrying out and understand their children's feelings so that they trust them and do not hesitate to talk about their children's problems (34). It is important to acknowledge the potential for bidirectional relationships among these factors: for instance, while anxiety can predict self-harm, the act of self-harming itself could subsequently exacerbate anxiety, further diminish self-esteem, or strain peer relationships. Similarly, being bullied can lead to self-harm, but engaging in self-harm could also lead to further social isolation or victimization. From a stress and coping perspective, disrupted peer relationships represent a significant social stressor, undermining an adolescent's social support resources and making them more vulnerable to internalizing distress, which

can precipitate self-harm if effective social coping strategies are absent.

In many parts of Indonesia, particularly non-urban areas, mental health stigma remains pervasive, and access to appropriate psychological salices is limited. These barriers are compounded by cultural taboos surrounding emotional expression and a general lack of mental health literacy among adolescents and their families. As a result, distress stemming from issues such as anxiety, peer rejection, or bullying may not be addressed through healthy coping strategies or professional support. Instead, these unresolved psychosocial stressors may manifest as maladaptive behaviors, including self-harm. Such cultural and systemic dynamics may partially explain the strength of the associations observed in this study and highlight the need for future research to include qualitative approaches that explore these lived experiences more deeply.

The study also presents several practical implications for intervention. First, in terms of school-based policies, educational institutions should prioritize the implementation of anti-bullying programs, the establishment of peer-support systems, and the cultivation of inclusive school environments. These initiatives should involve collaboration among teachers, counselors, students, and parents to ensure a comprehensive and sustainable approach. Second, for mental health practitioners, particularly school counselors and psychologists, targeted training is needed to enhance each detection of psychological vulnerabilities such as anxiety, low self-esteem, and bullying involvement. Evidence-based interventions, including cognitive-behavioral therapy (CBT), resilience-building programs, and self-esteem enhancement modules, should be integrated into school counseling frameworks. Third, future research should adopt longitudinal designs to examine causal pathways underlying adolescent self-harm and explore protective and resilience factors that may buffer at-risk in a viduals from engaging in such behaviors.

Nevertheless, this study is not without limitations. Its cross-sectional design restricts the ability to establish causality, and the potential for bidirectional or cyclical relationships between key variables—such as self-harm and self-esteem—must be acknowledged. Additionally, reliance on self-reported data introduces risks 23 ecall bias and social desirability bias. Finally, because the study was conducted within a single regency, the generalizability of its findings to adolescents in other geographic or cultural settings should be approached with caution.

CONCLUSION

This study demois rates that bullying, low self-esteem, moderate to severe anxiety, and peer relationship problems are all significantly associated with an increased risk of self-harm behavior among high school adolescents in Kampar Regency. While all these factors showed significant associations, multivariate analysis identified moderate to severe anxiety as the statistically strongest link in this cohort, followed by low self-esteem, bullying, and peer relationship problems. These findings highlight the complex interplay of psychosocial factors contributing self-harm in adolescents and underscore the urgent need for comprehensive preventive interventions, given the vulnerability of adolescents during this critical developmental period and the potential for self-harm to lead to severe long-term consequences. Such interventions should focus on reducing bullying, enhancing self-esteem, managing anxiety, and strengthening positive peer relationships within the school environment. Ultimately, these findings call for integrated, multi-level interventions within educational systems and broader community support to foster resilience and mitigate the risk of self-harm among adolescents, contributing to their overall well-being and a healthier society.

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all those who have helped directly or indirectly in this research.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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Anxiety, Self-Esteem, Bullying, and Peer Problems as Correlates of Self-Harm Behavior Among Adolescents in Kampar Regency, Riau Province, Indonesia Alini1*, Faridah Mohd Said2, Nia Aprilla1, Bri Nofri

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Anxiety, Self-Esteem, Bullying, and Peer Problems as Correlates of Self-Harm Behavior Among Adolescents in Kampar Regency, Riau Province, Indonesia

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ABSTRACT

Adolescents are a vulnerable population experiencing significant psychological and social changes, often leading to emotional difficulties and maladaptive behaviors such as self-harm. This study aims to analyze the associations and predictive factors of bullying, self-esteem, anxiety, and peer relationship problems with self-harm behavior among high school students in Kampar Regency, Riau Province, Indonesia. A cross-sectional study was conducted, involving 678 adolescents aged 15-18 years who met the inclusion criteria. Data were collected using validated structured questionnaires, including the Olweus Bullying Scale, Rosenberg Self-Esteem Scale, Hamilton Anxiety Rating Scale, and Peer Relationship Scale. Univariate analysis showed that 40% of respondents had experienced bullying, 30% had low self-esteem, 25% reported moderate to severe anxiety, and 35% had peer relationship problems. The prevalence of selfharm behavior was 18%. Bivariate analysis using the chi-square test revealed significant associations between all independent variables and self-harm behavior (p < 0.05). Multivariate logistic regression identified moderate to severe anxiety as the strongest predictor of self-harm (OR 3.7; 95% CI: 2.3-5.8), followed by low self-esteem (OR 3.1; 95% CI: 2.0-4.9), bullying experience (OR 2.8; 95% CI: 1.9-4.2), and peer relationship problems (OR 1.8; 95% CI: 1.2-2.9). These findings establish a clear evidence base for developing comprehensive, school-based psychosocial interventions aimed at mitigating these specific risk factors to reduce the prevalence of self-harm among adolescents in Kampar Regency, Riau Province, Indonesia.

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Quick Response Code

Key Messages:

- Comprehensive psychosocial interventions in schools, targeting bullying prevention, self-esteem enhancement, anxiety management, and peer relationship improvement, are urgently needed to reduce selfharm among adolescents.
- Early identification and support for at-risk students should be prioritized to address the complex interplay of psychosocial factors underlying self-harm behaviors.
- Early identification and support for at-risk students should be prioritized to address the complex interplay of psychosocial factors underlying self-harm behaviors.

GRAPHICAL ABSTRACT

Anxiety, Self-Esteem, Bullying, and Peer Problems as Correlates of Self-Harm Behavior Among Adolescents in Kampar Regency, Riau Province, Indonesia

- Bullying
- Self-esteem
- Anxiety
- · Peer Problems



Self Harm in Adolescents



Recommendations:

Early detection and support for atrisk students are essential to address the complex psychosocial factors underlying self-harm behavior

INTRODUCTION

Adolescence is a transitional phase from childhood to adulthood, typically ranging from 10 to 19 years of age (1). During this period, adolescents often experience identity conflicts and difficulties in emotional regulation, which can lead to negative behaviors such as self-harm, social deviance, and substance abuse (2). Self-harm behavior, frequently referred to as non-suicidal self-injury (NSSI), is defined as the deliberate, self-inflicted damage of body tissue without suicidal intent, often serving as a coping mechanism for overwhelming emotional pain (3). While not a suicide attempt, NSSI can indicate future suicidal tendencies (4) and represents an escalating global mental health concern, with approximately 17% of U.S. adolescents engaging in it (3).

A substantial body of research consistently identifies several psychosocial factors significantly associated with adolescent self-harm. These include bullying, which places adolescents at a heightened risk (5), with prevalence rates around 30% in Southeast Asia (6) and a clear link to increased self-injury risk in Indonesia (7). Low self-esteem also plays a critical role, as negative self-perceptions make adolescents more vulnerable to emotional stress and often lead to self-harm as a coping mechanism (8). Furthermore, anxiety and emotional distress are key triggers (9), evidenced by meta-analyses showing over half of depressed adolescents (often with co-occurring anxiety) have a history of self-harm (10). Poor peer relationships, fostering loneliness and lack of support, likewise contribute to self-harm risk (11). These factors often interact, aligning with the stress and coping theory where self-harm emerges when conventional coping is overwhelmed by stressors (12, 13, 14). Bullying victims suffer from negative self-concept, prejudice toward the perpetrator, and fear of being hurt, leading to emotional and psychological disturbances (15). Despite this collective understanding, there remains a critical research gap in comprehensively understanding the combined impact of these specific psychosocial challenges on adolescent self-harm within localized contexts.

This phenomenon is also a growing concern in Indonesia, particularly in Kampar Regency, Riau Province. Recent local data highlight a rising prevalence of adolescent mental health disorders, including anxiety and self-harm (15, 16). For instance, 10% of Kampar adolescents experience anxiety disorders, and nearly 6% engage in self-harm as a response to social pressures (16). Bullying also persists as a significant problem, affecting approximately 20% of adolescents in Kampar (18). These challenges are compounded by barriers such as lower parental education influencing mental health literacy (19) and limited access to mental health services due to stigma, lack of support, professional scarcity, and geographical hurdles in

rural areas (19, 20). These local contextual factors underscore the urgent need for targeted research to inform effective interventions.

Based on this background, the present study aims to investigate the associations between bullying, self-esteem, anxiety, and peer relationship problems as contributing factors to self-harm behavior among adolescents in Kampar Regency, Riau Province, Indonesia. This research is crucial given the notable local prevalence of self-harm and the identified dearth of studies specifically addressing these psychosocial influences within the region. Understanding these relationships will provide a robust, scientifically-driven basis for developing tailored community- and school-based mental health interventions.

METHODS

This study employed a cross-sectional design to analyze the relationship between the independent variables (bullying, low self-esteem, moderate to severe anxiety, and peer relationship problems) and the dependent variable (self-harm behavior). The study population comprised all high school adolescents aged 15 to 18 years in Kampar Regency. The sample in this nursing research was determined based on inclusion and exclusion criteria.

The inclusion criteria were as follows: adolescents aged 15 to 18 years; adolescents who were still actively enrolled as high school students in Kampar Regency; adolescents who were able to communicate effectively; and adolescents who had obtained written consent from their parents or guardians to participate in the study. The exclusion criteria were: adolescents who were no longer enrolled or were inactive in high school in Kampar Regency; adolescents with a history of chronic illness requiring prolonged hospitalization; and adolescents in high schools in Kampar Regency who were unwilling to participate as respondents.

The sample size was calculated using G*Power Software Version 3.1.9.7 with an assumed $\alpha = 0.05$ (medium effect size according to Cohen et al., 1995), and a power level of 0.80, based on the study by (22). The required minimum sample was 616, with an additional 10% (62) for anticipated dropout, resulting in a final target of 678 participants.

A multi-stage sampling design was employed. First, a subset of high schools in Kampar Regency was selected via cluster sampling. Second, within these selected schools, participants were recruited through purposive sampling to ensure they met all inclusion criteria. This approach was chosen to ensure the selected sample met the required conditions while maintaining practical feasibility in a school-based setting.

Data collection utilized validated structured questionnaires, each with clearly defined measurement objectives and classification criteria. Bullying was assessed using the Olweus Bullying Scale, which measures the frequency and types of bullying experiences—including verbal, physical, and social forms. Participants were categorized as having experienced bullying if they endorsed any item indicating victimization according to the scale's established frequency thresholds. Self-esteem was measured using the 10-item Rosenberg Self-Esteem Scale, which evaluates global self-worth through both positive and negative self-perceptions; scores below 15 were classified as indicating low self-esteem. Anxiety was evaluated with the Hamilton Anxiety Rating Scale (HAM-A), a 14-item instrument assessing both psychic and somatic symptoms of anxiety, where a total score of 18 or above indicated moderate to severe anxiety. Peer relationship problems were measured using the Peer Relationship Scale, which examines issues related to social interaction, trust, and peer acceptance; scores exceeding the threshold for social maladjustment were categorized as having peer relationship problems. Lastly, self-harm behavior was assessed through a self-report question inquiring whether participants had ever intentionally engaged in self-injurious actions such as cutting, burning, or hitting themselves, with responses categorized dichotomously as "yes" or "no."

All raw scores were transformed into categorical variables according to validated cut-off points provided by each instrument's scoring manual. This allowed for consistent analysis and interpretation. Descriptive statistics were used in univariate analysis to present the distribution of study variables. Chisquare tests were applied for bivariate analysis to examine the relationships among variables. Finally, multivariate logistic regression identified the most significant predictors of self-harm behavior.

RESULTS

Respondent Characteristics

This study involved a total of 678 high school adolescents in Kampar Regency who met the inclusion criteria (n = 678). The mean age of respondents was 16.5 years (SD \pm 1.0), with 55% female and 45% male. Regarding grade level, 33% were in grade X, 34% in grade XI, and 33% in grade XII. The distribution of the main study variables is presented in Table 1. Among the 678 participants, 40% (n = 271) reported having experienced bullying, 30% (n = 203) had low self-esteem, 25% (n = 170) experienced moderate to severe anxiety, and 35% (n = 237) had peer relationship problems. Additionally, 18% (n = 122) of respondents reported having engaged in self-harm behaviors.

Table 1. Distribution of Research Variables among High School Adolescents in Kampar Regency (n=678)

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Variable	n	%
Ever Experienced Bullying	271	40
Never Experienced Bullying	407	60
Low Self-Esteem	203	30
Moderate-High Self-Esteem	475	70
Moderate-Severe Anxiety	170	25
Mild/No Anxiety	508	75
Peer Relationship Problems	237	35
No Peer Relationship Problems	441	65
Self-Harm	122	18
No Self-Harm	556	82

Bivariate Analysis

Chi-square tests demonstrated statistically significant associations between all independent variables and self-harm behavior (p < 0.05). Self-harm behavior was reported more frequently among adolescents with negative psychosocial characteristics. For instance, 32% of those who had experienced bullying reported self-harm, compared to only 9% among those who had not. Similarly, 36% of adolescents with low self-esteem engaged in self-harm, while the rate was only 11% among those with moderate to high self-esteem. The highest prevalence was observed among respondents with moderate to severe anxiety, at 41%, versus 11% among those with mild or no anxiety. Peer relationship problems also showed a substantial effect, with 29% of affected adolescents reporting self-harm, compared to 13% among those without such problems. These findings suggest strong bivariate associations between each psychosocial factor and self-harming behavior, setting the foundation for multivariate analysis.

Table 2. Association Between Independent Variables and Self-Harm Behavior

Independent variable	Category	Self-Harm (n (%))	No Self-Harm (n (%))	p-value
Bullying Experience	Ever Experienced	87 (32%)	184 (68%)	< 0.001
	Never Experienced	35 (9%)	372 (91%)	
Self-Esteem	Low	73 (36%)	130 (64%)	< 0.001
	Moderate-High	49 (11%)	426 (89%)	
Anxiety Level	Moderate-Severe	70 (41%)	100 (59%)	< 0.001
•	Mild/No Anxiety	52 (11%)	456 (89%)	
Peer Relationship	Yes	69 (29%)	168 (71%)	0.002
Problems	No	53 (13%)	373 (87%)	

Note: Chi-square test was used to assess associations. Percentages represent the proportion within each subgroup. n = 678.

Multivariate Analysis

Multivariate logistic regression analysis was performed to identify the most influential factors associated with self-harm behavior among adolescents. All independent variables remained statistically

significant after simultaneous adjustment, confirming their independent contributions to self-harming outcomes

Moderate to severe anxiety emerged as the strongest predictor, with adolescents experiencing this condition being 3.7 times more likely to engage in self-harm compared to those with mild or no anxiety (OR = 3.7, 95% CI: 2.3–5.8; p < 0.001). Low self-esteem was also a strong contributor, with an adjusted odds ratio of 3.1 (95% CI: 2.0–4.9; p < 0.001), indicating more than threefold increased risk. A history of bullying was associated with a 2.8-fold increase in self-harm risk (95% CI: 1.9–4.2; p < 0.001). Finally, peer relationship problems were associated with a 1.8 times higher likelihood of self-harming behavior (95% CI: 1.2–2.9; p = 0.004).

These findings underscore the multifactorial nature of self-harm behavior among adolescents, with psychological distress and interpersonal adversity playing key roles. Targeted school-based mental health interventions addressing anxiety, self-esteem, bullying, and social integration may help reduce the burden of self-harm in this vulnerable population.

Table 3. Multivariate Logistic Regression Analysis of Factors Associated with Self-Harm Behavior (n = 678)

()		
OR	95% CI	p-value
2.8	1.9-4.2	<0.001
3.1	2.0-4.9	< 0.001
3.7	2.3-5.8	< 0.001
1.8	1.2-2.9	0.004
	2.8 3.1 3.7	2.8 1.9-4.2 3.1 2.0-4.9 3.7 2.3-5.8

Note: Multivariate logistic regression was used to estimate adjusted odds ratios (OR) and 95% confidence intervals (CI). All variables in the model were adjusted simultaneously. OR > 1 indicates increased odds of self-harm behavior.

This study found that bullying, low self-esteem, moderate to severe anxiety, and peer relationship problems were significant contributing factors to self-harm behavior among high school adolescents in Kampar Regency. Among these, moderate to severe anxiety emerged as the most dominant predictor, followed by low self-esteem, a history of bullying, and peer relationship problems. These findings, based on multivariate logistic regression analysis, emphasize the importance of considering the magnitude of risk (effect sizes) rather than relying solely on statistical significance. The results highlight the urgent need for targeted mental health support and school-based psychosocial interventions to address these risk factors and reduce self-harm behaviors among adolescents.

DISCUSSION

This study aimed to analyze the relationship between bullying, self-esteem, anxiety, and peer relationship problems with self-harm behavior among high school adolescents in Kampar Regency. The results indicate that all four variables showed significant associations with self-harm in both bivariate and multivariate analyses. These findings contribute valuable insights into the psychosocial risk profile of self-harm in Indonesian adolescents and support global trends reported in recent literature.

Our findings support the tenets of stress and coping theory, which posits that individuals engage in self-harm as a maladaptive coping mechanism when faced with stressors they feel unable to manage effectively (23). Self-harm behavior among adolescents is not a sudden occurrence but rather the complex outcome of interacting psychosocial and environmental factors. This complexity is evident in how factors like anxiety and low self-esteem can internalize the impact of external stressors like bullying and peer problems, intensifying emotional distress and increasing the likelihood of resorting to self-harm as a means of emotional regulation or escape. In this context, bullying, low self-esteem, anxiety, and peer relationship problems are considered significant influences that can increase the risk of self-harm. Adolescence, a highly vulnerable age group due to profound biological, psychological, and social changes, often presents various adjustment challenges. The inability to cope with such pressures can trigger self-harming behavior as a form of escape or an attempt to alleviate emotional pain (24).

Bullying is one of the main risk factors for self-harm behaviour in adolescents. The results of this study show that adolescents who have experienced bullying are 2.8 times more likely to engage in self-harm than those who have never experienced bullying. These findings align with the results of a meta-analysis involving 23,388 adolescents from various countries, which found that bullying victims are 2.15 times more likely to engage in self-harm than those who have not experienced bullying (aOR=2.15; 95% CI=1.61-2.85; p<0.001) (25). Bullying, whether physical, verbal, or cyber, contributes to chronic stress, depression, social isolation, and feelings of worthlessness, all of which are recognized triggers for self-harm. Research in China further corroborates this, showing that school bullying is directly associated with non-suicidal self-injury (NSSI), with negative affect and sleep quality mediating this relationship (10). A broader meta-analysis by Holt et al. (2015) (26) highlights that any involvement in bullying significantly increases the risk of suicidal ideation and attempts, underscoring the critical need for bullying prevention and intervention. From a stress and coping perspective, bullying acts as a severe external stressor that overwhelms an adolescent's usual coping resources, pushing them towards maladaptive responses like self-harm to manage the intense psychological pain.

Low self-esteem was also significantly associated with self-harm behavior, with adolescents experiencing low self-esteem 3.1 times more likely to self-harm than those with moderate to high self-esteem. This supports findings by Delrosso et al. (27), that identify low self-esteem as a strong predictor, particularly among female adolescents. Low self-esteem, characterized by negative self-views and feelings of worthlessness, increases vulnerability to stress and can lead to self-harm as a maladaptive coping mechanism (28). This aligns with stress and coping theory, as low self-esteem can diminish an individual's perceived ability to cope with challenges, making stressors feel more overwhelming and self-harm a more readily accessed, albeit harmful, coping strategy.

Anxiety emerged as a particularly strong correlate in this study, with an odds ratio (OR) of 3.7, indicating adolescents with moderate to severe anxiety were nearly four times more likely to self-harm. This aligns with international research showing strong associations between anxiety, depression, and self-harm (29). Adolescents under emotional distress often use self-harm to reduce negative feelings. While anxiety demonstrated the largest odds ratio in this specific model (OR=3.7), it is crucial to recognize that the magnitude of an OR can be influenced by the chosen cutoff points for categorization. Thus, while statistically prominent, the findings underscore the importance of understanding anxiety as an integral part of a comprehensive risk profile, rather than an isolated, singularly dominant factor. All four psychosocial factors are important components of a multifaceted risk landscape for adolescent self-harm. Research also indicates that social anxiety can mediate the relationship between peer problems and self-harm, as discomfort in peer interactions can push adolescents towards self-harm as an escape (30). Within the stress and coping framework, high anxiety signifies an elevated level of internal distress, which, if not managed through healthy mechanisms, can directly lead to maladaptive coping behaviors like self-harm as an attempt to rapidly alleviate overwhelming emotional states.

Problems in peer relationships also significantly contributed to self-harm behavior, with adolescents facing such difficulties being 1.8 times more likely to engage in self-harm. This is supported by studies showing that poor social relationships can increase self-harm risk through heightened negative affect and sleep disturbances (31). Adolescents heavily rely on peer support for identity formation and security. Disrupted peer relationships can lead to loneliness, isolation, and a lack of emotional confidants, triggering emotional stress that manifests as self-harm (32). Group Counseling integrated with Cognitive Behavioral Therapy significantly enhances self-efficacy among individuals who have experienced bullying (33). Parents should pay attention and always ask about the activities they are carrying out and understand their children's feelings so that they trust them and do not hesitate to talk about their children's problems (34). It is important to acknowledge the potential for bidirectional relationships among these factors; for instance, while anxiety can predict self-harm, the act of self-harming itself could subsequently exacerbate anxiety, further diminish self-esteem, or strain peer relationships. Similarly, being bullied can lead to self-harm, but engaging in self-harm could also lead to further social isolation or victimization. From a stress and coping perspective, disrupted peer relationships represent a significant social stressor, undermining an adolescent's social support resources and making them more vulnerable to internalizing distress, which

can precipitate self-harm if effective social coping strategies are absent.

In many parts of Indonesia, particularly non-urban areas, mental health stigma remains pervasive, and access to appropriate psychological services is limited. These barriers are compounded by cultural taboos surrounding emotional expression and a general lack of mental health literacy among adolescents and their families. As a result, distress stemming from issues such as anxiety, peer rejection, or bullying may not be addressed through healthy coping strategies or professional support. Instead, these unresolved psychosocial stressors may manifest as maladaptive behaviors, including self-harm. Such cultural and systemic dynamics may partially explain the strength of the associations observed in this study and highlight the need for future research to include qualitative approaches that explore these lived experiences more deeply.

The study also presents several practical implications for intervention. First, in terms of school-based policies, educational institutions should prioritize the implementation of anti-bullying programs, the establishment of peer-support systems, and the cultivation of inclusive school environments. These initiatives should involve collaboration among teachers, counselors, students, and parents to ensure a comprehensive and sustainable approach. Second, for mental health practitioners, particularly school counselors and psychologists, targeted training is needed to enhance early detection of psychological vulnerabilities such as anxiety, low self-esteem, and bullying involvement. Evidence-based interventions, including cognitive-behavioral therapy (CBT), resilience-building programs, and self-esteem enhancement modules, should be integrated into school counseling frameworks. Third, future research should adopt longitudinal designs to examine causal pathways underlying adolescent self-harm and explore protective and resilience factors that may buffer at-risk individuals from engaging in such behaviors.

Nevertheless, this study is not without limitations. Its cross-sectional design restricts the ability to establish causality, and the potential for bidirectional or cyclical relationships between key variables—such as self-harm and self-esteem—must be acknowledged. Additionally, reliance on self-reported data introduces risks of recall bias and social desirability bias. Finally, because the study was conducted within a single regency, the generalizability of its findings to adolescents in other geographic or cultural settings should be approached with caution.

CONCLUSION

This study demonstrates that bullying, low self-esteem, moderate to severe anxiety, and peer relationship problems are all significantly associated with an increased risk of self-harm behavior among high school adolescents in Kampar Regency. While all these factors showed significant associations, multivariate analysis identified moderate to severe anxiety as the statistically strongest link in this cohort, followed by low self-esteem, bullying, and peer relationship problems. These findings highlight the complex interplay of psychosocial factors contributing to self-harm in adolescents and underscore the urgent need for comprehensive preventive interventions, given the vulnerability of adolescents during this critical developmental period and the potential for self-harm to lead to severe long-term consequences. Such interventions should focus on reducing bullying, enhancing self-esteem, managing anxiety, and strengthening positive peer relationships within the school environment. Ultimately, these findings call for integrated, multi-level interventions within educational systems and broader community support to foster resilience and mitigate the risk of self-harm among adolescents, contributing to their overall well-being and a healthier society.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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