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Problem-Solving Skills and Internalizing Problems in Adolescents

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Abstract

Many changes occur during adolescence, including physical, cognitive, and psychological. They must be addressed appropriately to prevent internalizing problems at this developmental stage. Problem-solving is one of the personal skills that eases the adaptation to drastic developmental changes. Additionally, gender has been found to affect internalizing problems. This study aimed to measure the gender differences in internalizing problems and simultaneously examine the role of problem-solving skills and gender in internalizing problems. Based on simple random sampling, 669 students from eight Muhammadiyah high schools in East Java participated in this study. Data were collected using the Problem-Solving Inventory (PSI), the Strengths and Difficulties Questionnaire (SDQ), and demographic questions. The independent sample t-test results indicated significant gender differences in internalizing problems ($t = -5.73, p < .001$), in which female adolescents on average scored higher than their male counterparts. The multiple linear regression showed that problem-solving and gender simultaneously contribute to internalizing problems and account for 14% of the variance in internalizing problems. Incorporating the development of gender-based problem-solving skills among adolescents is likely to help prevent internalizing problems.

Individuals aged 12–18 are categorized as adolescents. Adolescence is often referred to as the “storm and stress period,” during which individuals are experiencing significant physical, cognitive, and psychological changes. These changes can create internal conflict as adolescents struggle to adapt to the transformations while facing societal expectations of adulthood (Papalia et al., 2007). If adolescents fail to cope with these changes, they become more vulnerable to anxiety, social withdrawal, and negative impacts on self-esteem. These symptoms are manifestations of internalizing problems—a type of emotional issue commonly experienced by adolescents, characterized by maladaptive inward-directed negative emotions that can impact attitudes, thoughts, and behaviors (Salavera et al., 2019). According to the Indonesian Ministry of Health’s Basic Health Research (Riskesdas), the prevalence of emotional disorders (e.g., depression and anxiety) among adolescents reaches 6.1%, equivalent to 11 million individuals aged 15 and above. Of this figure, 4.94% are adolescents in East Java (National Institute of Health Research and Development, Ministry of Health, 2018).

Internalizing problems generally represent a subgroup of psychopathology that involves emotional components, and it can lead to emotional dysregulation manifested through negative feelings, such as sadness, guilt, and worry. Mood and emotional experiences are inherent developmental tasks in adolescence, making internalizing problems a common mental health issue among this population (Lerner & Steinberg, 2009; Majid et al., 2023; Sabrina et al., 2022). Previous research indicates that adolescents with internalizing problems exhibit fear and anxiety responses, as they remain hypervigilant to potential threats even in safe and comfortable environments, like among friends, at school, at home, or when alone (Salavera et al., 2019). However, internalizing problems are inwardly directed, thus often remain unnoticed by others (Syakarofath et al., 2021).

Symptoms of internalizing problems, such as stress, depression, and anxiety, can also be influenced by gender-based societal expectations. A study by Kountul et al. (2018) on university students in Manado found that 22.9% of 90 male respondents reported severe stress, compared to 35% of 167 female respondents.



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Similar findings were reported in longitudinal studies on adolescents in China (Gong et al., 2023) and the Netherlands (Luijten et al., 2021), which revealed that the developmental trajectory of internalizing problems is more pronounced in females than in males. A review on trends in internalizing problems also supported these findings, indicating that female adolescents are more vulnerable, particularly when facing additional adversities, such as lower education level and socioeconomic status, than adolescent males (Keyes & Platt, 2024). Collectively, these studies suggest that, on average, females are more susceptible to severe stress than males. The implications of these findings can be observed in gender stereotypes prevalent in Indonesia, where men are often perceived as emotionally resilient and rational, expected to rely on logic rather than feelings. Conversely, Indonesian women are stereotypically associated with emotionality and intuition in social interactions and problem solving.

In addition to gender, cognitive factors also influence internalizing problems, one of which is intelligence. Adolescents with lower intelligence tend to be more vulnerable to internalizing problems than those with higher intelligence (Zulnida, 2020). This is linked to their ability to regulate emotions when faced with undesirable situations—adolescents with higher intellectual potential generally exhibit better emotional regulation than those with lower potential. Supporting Zulnida (2020)'s findings, cognitive development in adolescence also encompasses abstract thinking, enabling them to formulate various possibilities that influence their thought processes (Steinberg, 2002).

The inwardly directed nature of internalizing problems can be managed by optimizing cognitive factors, such as enhancing problem-solving skills to help adolescents regulate emotions more effectively (Isnawati, 2020). Anderson (1993) emphasized that problem solving is a crucial skill that helps adolescents anticipate, analyze, and independently resolve problems and conflicts through both attitudinal and behavioral approaches. These two dimensions of problem solving, as proposed by Anderson (1993), enable adolescents to evaluate challenges, adapt, and formulate effective solutions in daily situations. By developing strong problem-solving skills, adolescents adopt a solution-oriented mindset, reducing excessive anxiety, unfounded worries, and self-blame, as these are common manifestations of internalizing problems.

The continuous development of problem-solving skills has been found to have a critical role in mental health outcomes, beginning in childhood and extending into young adulthood, with notable gender differences. Research on elementary school children demonstrates that problem-solving skills can predict emotional and behavioral issues, such as anxiety and aggression (Uzun & Avcı, 2021). Similarly, a study by Novindari and Mursidi (2019) on junior high school students in Banyuwangi found that adolescents with stronger problem-solving skills exhibited greater adaptability to their environments.

Gender may further influence the development of problem-solving skills. Research has suggested that

problem-solving skills in female university students serve as a key mediator between daily stressors and adaptation to the environment, significantly reducing their susceptibility to internalizing problems than male students (Bell & D'Zurilla, 2009). Consistent findings from Spain highlight that women demonstrate superior problem-solving skills under stress (Trives et al., 2016) and exhibit greater maturity in executing problem-solving plans (Davita, 2020). These studies collectively suggest that strong problem-solving skills enhance objective problem evaluation and the effectiveness of solution implementation to address challenges, thereby mitigating the risk of emotional or internalizing problems.

While prior studies indicate that females are at a greater risk of internalizing problems than males, they also reveal that females typically outperform males in problem-solving. This skill may aid adolescents in analyzing situations, adapting, and formulating solutions in contexts prone to internalizing symptoms. The current study examined the role of problem-solving skills in internalizing problems, hypothesizing that: 1) gender differences are linked to the level of internalizing problems; and 2) problem-solving skills and gender simultaneously influence the level of internalizing problems in adolescents.

Methods

Participants

This study involved 669 students (65% female, 35% male) of eight Muhammadiyah high schools in East Java, aged 14–18 years old at the time of data collection. Participants were obtained using a simple random sampling technique. A more detailed explanation of the characteristics of the participants can be seen in the following demographic data table 1.

Table 1
Demographic Characteristics of Participants (N = 669)

Characteristics	N	Percentage (%)
Age Group		
14 years old	4	1
15 years old	155	23
16 years old	287	43
17 years old	169	26
18 years old	52	7
Gender		
Male	234	35
Female	435	65
Total	669	100

Eight schools participated in this study, which were two schools in Gresik, one in Sidoarjo, three in Surabaya, and two in Lamongan.

Measurements

Problem solving was measured with Heppner and Petersen (1982)'s Problem Solving Inventory (PSI), which consists of 33 items ($\alpha = .81$). We used an Indonesian

translation of the instrument by Hartoni (2016). A sample item in the PSI is: "When a solution to a problem fails, I am not sure why it was not successfully used". The PSI has a 6-point Likert scale response: 1 = "Strongly Disagree" to 6 = "Strongly Agree" for unfavorable items and 1 = "Strongly Agree" to 6 = "Strongly Disagree" for favorable items. There are categories based on scores obtained from the scale: very low (≤ 42), low (≤ 84), medium (≤ 126), high (≤ 168), and very high (≤ 210).

Internalizing problems was measured using the Strength & Difficulties Questionnaire (SDQ) from Goodman (1997). The instrument ($\alpha = .66$) has a total of 25 items and is divided into three subscales, namely internalizing problems (10 items), externalizing problems (10 items), and prosocial behavior (5 items). However, this study only used the internalizing problems subscale. The instrument, which is an open-access scale and can be obtained from the SDQ official website, was presented in Indonesian. A sample item in the internalizing problems subscale is: "I often have headaches, stomachaches, or other kinds of pain". The SDQ uses a 3-point Likert scale, in which "True" is scored 2, "Somewhat True" is scored 1, and "Not True" is scored 0, for favorable statements. Conversely, for unfavorable statements, "True" is scored 0, "Somewhat True" is scored 1, and "Not True" is scored 2. The results are obtained by summing up all the items, and the total score is then interpreted into mental emotional levels, which are categorized into three different levels: normal (0–8), borderline (9–11), and abnormal (12–20). The normal category shows that there is no indication of internalizing problems. The borderline category shows that an individual is indicated to have experienced symptoms of internalizing problems, and the abnormal category shows that someone has experienced symptoms of internalizing problems and requires further diagnosis.

Procedure

The study began with the preparatory stage, where the researchers identified psychological problems in the adolescent population. We reviewed the literature and identified adolescent internalizing problems and problem-solving skills that might help adolescents minimize the impact of these problems. Also, gender has consistently been found to differentiate vulnerability to internalizing problems between male and female adolescents in previous research.

In the implementation stage, the researcher identified 85 Muhammadiyah high schools in East Java Province through the Primary and Secondary Education Assembly (Majelis Dikdasmen PP Muhammadiyah, 2021). The list was then shortened randomly using the random.org website to obtain ten schools, which the researcher then applied for research permits. Eight schools agreed to participate in this study. The consideration of using a sample of students from Muhammadiyah high schools is that the community organization houses a large number of educational institutions and has schools across Indonesia, including at the high school level, so that it is expected to represent students from private/non-government schools.

The data collection was carried out by a paper-and-pencil survey in class according to the schedule determined by the school. Data collection was carried out during the pandemic in 2021, when health protocols were being eased in East Java, and the researchers ensured to follow each school's health protocols. However, the research team also prepared an online version of the instrument via Google Forms to anticipate the ever-changing pandemic situation. The two measuring instruments used were the Problem Solving Inventory (PSI) to measure problem-solving skills and the Strengths & Difficulties Questionnaire (SDQ) internalizing problems subscale to measure the level of internalizing problems in adolescents.

Data Analysis

The data analysis stage uses IBM SPSS Statistics 25 software to test the research hypothesis. We used multiple linear regression tests to examine the role of two independent variables (X1 and X2) in the dependent variable (Y). We also used an independent sample t-test to test differences in internalizing problems based on gender. After that, the data was interpreted, discussed, and compiled into conclusions. The assumptions of normality, linearity, multicollinearity, and homoscedasticity were tested. Kolmogorov-Smirnov test showed normal distribution ($p = .06$). The linearity test in male ($p < .05$) and female adolescents ($p = -.36$) together showed that the data were linear. The multicollinearity test showed the correlation between independent variables ($p = .08$), and the homoscedasticity test showed the same error variance at each level of the variable ($p = .34$).

Results

The following are the problem-solving skills and internalizing problems data of the participants, categorized based on gender See Table 2

Table 2 shows the comparison of problem-solving skills and internalizing problems by gender. An abnormal level of internalizing problems was seen among 24% of female participants, as opposed to 13% of the male participants. As for problem solving, 48% of female and 40% of male respondents showed a high level of problem solving.

Table 3 shows a significant difference in internalizing problems between male and female adolescents ($p < .001$), where the mean score of female adolescents is higher than their male counterparts. See Table 3

Based on Table 4, it can be concluded that problem-solving plays a significant role in internalizing problems ($p < .001$). Gender was also found to significantly predict the level of internalizing problems ($p < .001$). Both variables explained the variance of internalizing problems by 14%.

Discussion

The present study yielded two key findings regarding adolescent mental health. First, consistent with previous research, female adolescents demonstrated significantly higher levels of internalizing problems than their male

Table 2*Internalizing Problems and Problem-Solving Based on Gender*

	Gender	Category	Interval	N	Percentage (%)	Mean	SD
Internalizing Problems	Male	Normal	0-8	135	58	1.5	.71
		Borderline	9-11	68	29		
		Abnormal	12-20	31	13		
	Female	Normal	0-8	179	41	1.8	.80
		Borderline	9-11	149	34		
		Abnormal	12-20	125	24		
Problem Solving	Male	Moderate		140	60	1.4	.49
		High		94	40		
	Female	Moderate		225	52	1.4	.50
		High		210	48		

Table 3*Gender Differences in Internalizing Problems*

Variable	Gender	M	t	df	SD	p
Internalizing problems	Male	7.62	-5.73	667	3.4	.000
	Female	9.22			3.5	

counterparts. Second, and more importantly, our regression analysis revealed that problem-solving skills and gender collectively predict internalizing problems, with problem-solving ability showing a particularly strong negative correlation. This suggests that while gender plays a role in vulnerability to internalizing problems, the development of strong problem-solving skills may serve as a protective factor for both male and female adolescents.

This aligns with Santrock (2012)'s conceptualization of adolescent cognitive development, where the emergence of formal operational thinking leads to enhanced hypothetical reasoning and social comparison. Without adequate problem-solving skills, adolescents may become overwhelmed by these cognitive demands, potentially leading to internalizing problems. Rahayu and Adistana (2018) noted that problem-solving represents a critical higher-order cognitive skill that develops through experience and practice (Miner et al., 2018). Our results underscore the practical importance of incorporating problem-solving training into adolescent mental health interventions, as enhanced problem-solving skills may help mitigate the risk of internalizing problems regardless of gender. Future research should explore the effectiveness of targeted problem-solving interventions in school settings, particularly for female adolescents who appear to be at greater risk.

The study revealed significant gender disparities in internalizing problems, with 13% of male adolescents and 24% of female adolescents exhibiting abnormal levels. The remaining participants, both male and female adolescents, fell within the borderline or normal range. These findings align with previous research by Gao et al. (2020), which demonstrated that female university students reported higher anxiety levels than their male counterparts during their first and second years of under-

graduate study. Additionally, longitudinal studies in the United Kingdom (Gutman & Codiroli McMaster, 2020), China (Gong et al., 2023), and Australia (Bista et al., 2024) consistently show that girls are more vulnerable to internalizing problems throughout childhood and adolescence.

Several perspectives may account for these differences: 1) gender role expectation, male adolescents who conform to stereotypical "masculine" traits (e.g., assertiveness, ambition) tend to exhibit lower internalizing problems (Exner-Cortens et al., 2021); 2) academic anxiety, girls often experience heightened anxiety about academic performance, whereas males adopt a more exploratory approach (Rohmatillah & Kholifah, 2021); and 3) societal perceptions, persistent societal norms that position women as subordinate contribute to difficulties in self-positioning within family and community settings (Utami & Sholihah, 2021). The gender disparity creates a ripple effect; longitudinal data indicate that the increase of internalizing problems among girls from childhood to adolescence negatively impacts academic achievement (Okano et al., 2020). This finding underscores the need for gender-sensitive mental health interventions to address these systemic vulnerabilities.

The results also show a negative relationship between problem-solving skills and internalizing problems, in which higher problem-solving skills can lead to lower internalizing problems in adolescents. This is in line with the research of Abdollahi et al. (2016), which stated that problem-solving skills have a negative relationship with stress in students. Problem solving is linked to the real world, where these skills can be integrated to solve real conditions that sometimes do not match expectations. Adolescents who are accustomed to facing problems while undergoing their developmental period can prepare better mentally and be more resilient in facing reality (Cahyono, 2017).

The present study found that problem-solving and gender simultaneously explain 14% of internalizing problems in adolescents. This result is in line with a study by Rocchino et al. (2017), which reported that gender acts as a predictor of internalizing problems. However, the study also explained that gender is not a strong factor in influ-

Table 4*Multiple Linear Regression Analysis of Problem Solving, Gender, and Internalizing Problems*

Factor	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>	<i>R</i> ²	<i>F</i> (sig.)
Model 1							
Problem Solving	-0.070	0.009	-0.289	-7.788	.000	–	–
Model 2							
Problem Solving	-0.075	0.009	-0.309	-9.791	.000	.142	55.027 (.000)
Gender	1.794	0.266	0.309	6.916	.000		

encing the level of internalizing problems due to inconsistencies in previous research findings. Meanwhile, teaching problem-solving skills has been empirically proven to be an integral part of intervention programs to reduce emotional problems, such as anxiety and depression, in adolescents (Michelson et al., 2022), regardless of gender. This reinforces the rationale for incorporating problem-solving skills in interventions that address the challenges and changing developmental tasks of both male and female adolescents.

This study offers an outlook on the simultaneous effects of problem-solving and gender on internalizing problems in adolescents. This study examined the differences between male and female adolescents in internalizing problems as a consideration for preventive interventions based on gender. The number of participants in this study is also quite large, coming from Muhammadiyah high school students from several cities/districts in East Java Province, so that it is expected to provide a picture of the real condition of the mental health of adolescents who attend private/non-government high schools in East Java.

The limitation in this study is that it did not consider external factors that may impact problem-solving skills, such as learning methods at school. Problem-based learning has been shown to improve students' problem-solving skills (Rahayu & Adistana, 2018). In addition, this study is correlational, meaning that the results only show whether problem-solving and gender have a role in internalizing problems.

Conclusions

The present study concluded that there is a significant difference between male and female adolescents in internalizing problems. It also found that there is a negative relationship between problem-solving and internalizing problems, meaning adolescents with better problem-solving are less prone to internalizing problems, and vice versa. Based on the study's findings, problem-solving skills and gender simultaneously predict up to 14% of internalizing problems in adolescents.

Recommendations

The study implies that adolescents should improve the attitudinal and action aspects of problem solving to avoid or minimize the potential for internalizing problems. Female adolescents can learn to be more systematic when evaluating a problem, while their male counterparts should

develop more empathetic and proactive problem evaluation and problem-solving planning. Schools can facilitate the student problem-solving improvement by considering gender and using case study-based learning. Meanwhile, parents or families can take an active role in problem-solving development by opening discussions with children or doing activities to explore children's problem-solving skills.

This finding shows the urgency to take preventive measures for internalizing problems in particular and other mental health disorders in general. Given the many factors that influence internalizing problem tendency, future research can involve cognitive, social, personality, or other factors in understanding the etiology of internalizing problems in Indonesian adolescents. Future researchers can also further examine how effective the development of problem-solving skills is in reducing internalizing problems.

Declaration

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Author's Contributions

AZ established the objectives of this study, developed the methodology, conducted data collection and analysis, and drafted the manuscript. DCW managed the project, providing methodological guidance and critical reviews. DK offered conceptual feedback, while NAS also managed the project and contributed edits. All authors approved the final manuscript version.

Conflict of Interest


All authors hereby declare that there is no conflict of interest in the research process, writing of the manuscript, and/or publication of this research.

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