

Loneliness and Substance Use: Investigating Emotion Dysregulation as a Mediator

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ABSTRACT

Objective: This study aimed to investigate the mediating role of emotion dysregulation in the relationship between loneliness and substance use among Indonesian adults.

Methods and Materials: A descriptive correlational design was employed with a sample of 430 participants, selected based on the Morgan and Krejcie table. Participants completed standardized self-report questionnaires: the UCLA Loneliness Scale (Version 3), the Difficulties in Emotion Regulation Scale (DERS), and the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST). Data were analyzed using SPSS-27 and AMOS-21. Pearson correlation analysis examined the bivariate relationships among variables, and Structural Equation Modeling (SEM) was used to test the hypothesized mediating model, including assessments of model fit using chi-square, RMSEA, CFI, TLI, and other indices.

Findings: Pearson correlation analysis showed that loneliness was significantly and positively correlated with emotion dysregulation ($r = .49, p < .001$) and substance use ($r = .38, p < .001$), while emotion dysregulation was strongly associated with substance use ($r = .53, p < .001$). The SEM results confirmed a good model fit ($\chi^2 = 121.38, df = 48, RMSEA = 0.061, CFI = 0.96, TLI = 0.94$), and indicated that emotion dysregulation significantly mediated the relationship between loneliness and substance use. The indirect effect ($\beta = 0.26, p < .001$) was substantial, and the total effect of loneliness on substance use ($\beta = 0.50, p < .001$) exceeded the direct effect ($\beta = 0.24, p < .001$), confirming partial mediation.

Conclusion: The findings suggest that emotion dysregulation is a significant psychological mechanism through which loneliness contributes to substance use. Targeting emotion regulation strategies may be effective in mitigating substance-related risks in emotionally vulnerable individuals, particularly those experiencing chronic loneliness.

Keywords: Loneliness; Substance Use; Emotion Dysregulation.

1. Introduction

Loneliness has emerged as a critical public health issue, with its psychological and behavioral consequences receiving growing attention in recent years. Defined as the distressing experience that occurs when an individual's social relationships are perceived as deficient in quantity or quality, loneliness is distinct from objective social isolation and represents a subjective, often painful, internal state (Rezaei & Saghazadeh, 2022). The global COVID-19 pandemic, with its prolonged social distancing measures, has exacerbated the prevalence and intensity of loneliness across diverse age groups and geographical contexts (Cordaro et al., 2024). This surge in loneliness is not merely a sociocultural concern; rather, it is intricately linked to adverse mental health outcomes such as depression, anxiety, and suicidal ideation (Ahmed, 2024), as well as maladaptive behaviors including substance use and abuse (Strayhorn, 2022).

Empirical evidence increasingly indicates that loneliness is not an isolated phenomenon but a contributing factor to a cascade of mental health risks and behavioral dysfunctions. In one longitudinal population-based study, loneliness in adolescence was significantly associated with increased prescription of psychotropic medications in adulthood, underscoring its long-term psychological impact (Rodríguez-Cano et al., 2024). Similarly, loneliness during the pandemic has been shown to predict heightened stress and coping-related drinking behaviors, particularly among individuals with limited access to emotional support (Vornlocher & Shiota, 2024). Such findings emphasize the need for a deeper investigation into the underlying mechanisms by which loneliness can foster substance use patterns, especially among vulnerable populations.

Substance use, particularly when used as a coping mechanism, is a significant public health concern and often coexists with psychological dysregulation. Recent studies suggest that loneliness may serve as both a precursor and a consequence of substance use, creating a cyclical pattern of emotional vulnerability and dependency (Remesan et al., 2023). Research conducted in Shiraz revealed that university students experiencing high levels of loneliness exhibited more favorable attitudes toward drug use, suggesting that loneliness can influence not only behavior but also cognitive disposition toward addictive substances (Korany et al., 2023). This relationship is not confined to adults alone; among Korean adolescents, loneliness significantly predicted substance use through the mediating role of

depression, indicating that emotional processes are crucial in understanding this link (Kim, 2024).

One particularly relevant theoretical model for understanding the intersection between loneliness and substance use is the self-medication hypothesis. According to this framework, individuals may turn to substances as a means to modulate or escape from distressing internal states, such as the emotional pain associated with loneliness (Grelle et al., 2023). This perspective is supported by research on bereaved adolescents and caregivers, where loneliness was significantly associated with maladaptive coping and substance use tendencies (Muftikhar & Zamroni, 2024; Soetioso & Fithriyah, 2024). Moreover, the association is not limited to Western populations; studies in Ghana found that loneliness was positively correlated with depression and purpose deficits in patients with substance use disorders, suggesting a global pattern of emotional vulnerability (Nkyi & Ninnoni, 2024).

Despite the growing body of literature confirming the link between loneliness and substance use, relatively few studies have explored the psychological mechanisms mediating this relationship. Emotion dysregulation has been posited as a key construct that may account for how loneliness translates into substance use behaviors. Emotion dysregulation refers to maladaptive ways of experiencing, expressing, or controlling emotional responses, often resulting in impulsive behaviors or attempts to numb psychological distress (Domènech-Abella, 2025). Individuals who experience chronic loneliness may lack adequate emotional regulation strategies and thus be more likely to resort to substance use as a compensatory mechanism. This aligns with findings from a multilevel analysis in Scottish schools, where emotion regulation difficulties mediated the relationship between loneliness and both internalizing and externalizing mental health symptoms (Goodfellow et al., 2023).

Furthermore, the workplace has been identified as a critical context for the emergence of loneliness and subsequent emotional difficulties. A recent comparative study among Spanish employees found that non-workplace loneliness significantly contributed to absenteeism and emotional dysregulation, which in turn impacted workplace performance and mental health outcomes (Domènech-Abella, 2025). These findings underscore the pervasive nature of loneliness and its potential to infiltrate various domains of functioning, including affective regulation. Similarly, in the educational context, loneliness among youth was strongly associated with mental health problems such as anxiety, depression, and conduct disorders, mediated

by poor emotion regulation capacities (Goodfellow et al., 2022).

The COVID-19 pandemic has further magnified the psychological consequences of loneliness by reducing access to supportive social environments. In a study examining U.S. adults, those who reported higher loneliness also reported increased levels of stress and greater reliance on substances such as alcohol and sedatives to cope with emotional strain (Strayhorn, 2022). This pattern was echoed in a study from New York, where both young adults and their parents reported worsened mental health due to loneliness and limited emotional support, leading to increased psychological distress and substance-seeking behaviors (Akinkuowo et al., 2024). Likewise, caregivers of individuals with mental illness in Indonesia who received structured family support interventions showed significant reductions in loneliness and stress, reinforcing the idea that emotional regulation and support networks can serve as protective factors (Muftikhar & Zamroni, 2024).

Given the complex interplay between loneliness, emotion dysregulation, and substance use, it is critical to examine these constructs within a coherent framework. The transactional model of stress and coping offers one such framework, suggesting that an individual's appraisal of stressors (e.g., loneliness) and their coping strategies (e.g., substance use) are mediated by psychological factors such as emotion regulation (Maas et al., 2025). Recent findings from the Doetinchem Cohort Study support this model, showing that five-year changes in loneliness were significantly correlated with changes in mental health indicators, particularly among older adults with poor emotion regulation skills (Maas et al., 2025). In African contexts, similar patterns were found among adolescents living with HIV in Zambia, where mental health challenges stemming from stigma and loneliness were mediated by emotional coping mechanisms (Maambo & Nkandu, 2025).

Although the relationship between loneliness and emotion dysregulation has been extensively discussed in Western populations, more research is needed to understand its cultural variations. For example, a recent study on Puerto Ricans found that the loss of loved ones during COVID-19 intensified loneliness and emotional strain, particularly among older adults, suggesting that grief and cultural values around familial closeness may amplify emotional dysregulation (Morgan et al., 2022). In contrast, in Southeast Asia, structured support systems and communal values have shown protective effects, albeit inconsistently, and further

investigation is warranted to contextualize these findings (Soetioso & Fithriyah, 2024).

From a preventive and clinical standpoint, targeting emotion regulation strategies offers promising avenues for mitigating the behavioral consequences of loneliness. Behavioral interventions aimed at enhancing emotional self-awareness, acceptance, and impulse control have shown positive effects in reducing both loneliness and substance use (Kassim & Badayai, 2023). Furthermore, evidence from psychiatric rehabilitation programs during the pandemic underscores the need for integrating peer-based support structures to improve emotional coping and reduce feelings of isolation (Wright et al., 2022). Interdisciplinary approaches that incorporate psychological, sociological, and public health perspectives are thus essential for comprehensively addressing the triad of loneliness, emotion dysregulation, and substance misuse.

In summary, loneliness is a multifaceted psychological construct with significant implications for emotional functioning and behavioral health. The existing literature consistently demonstrates that loneliness predicts maladaptive behaviors such as substance use and is closely linked to deficits in emotion regulation. However, the exact pathways through which loneliness exerts its influence remain underexplored, particularly in diverse cultural settings. This study aims to fill this gap by investigating emotion dysregulation as a potential mediating variable between loneliness and substance use in an Indonesian population.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a descriptive correlational research design to examine the mediating role of emotion dysregulation in the relationship between loneliness and substance use. The target population consisted of individuals aged 18 to 45 residing in various urban areas across Indonesia. A total of 430 participants were selected using stratified random sampling, in accordance with the sample size guidelines proposed by Morgan and Krejcie for a large population. Participants were recruited through online platforms and community outreach programs, and all voluntarily consented to participate in the study. Inclusion criteria included being fluent in Bahasa Indonesia, having internet access to complete the survey online, and not currently undergoing psychiatric treatment.

2.2. Measures

2.2.1. Difficulties in Emotion Regulation Scale (DERS)

The Difficulties in Emotion Regulation Scale (DERS), developed by Gratz and Roemer (2004), is a widely used self-report instrument designed to assess emotion dysregulation across multiple dimensions. It consists of 36 items rated on a 5-point Likert scale ranging from 1 ("almost never") to 5 ("almost always"), with higher scores indicating greater difficulties in regulating emotions. The DERS includes six subscales: Nonacceptance of Emotional Responses, Difficulties Engaging in Goal-Directed Behavior, Impulse Control Difficulties, Lack of Emotional Awareness, Limited Access to Emotion Regulation Strategies, and Lack of Emotional Clarity. The total score provides an overall index of emotion dysregulation. This tool has demonstrated strong internal consistency ($\alpha > .85$), test-retest reliability, and construct validity in diverse populations, including clinical and non-clinical samples, making it suitable for research on psychological mechanisms such as those involved in substance use and loneliness.

2.2.2. UCLA Loneliness Scale (Version 3)

The UCLA Loneliness Scale (Version 3), developed by Russell, Peplau, and Ferguson (1978) and revised in 1996, is a 20-item self-report questionnaire that measures subjective feelings of loneliness and social isolation. Respondents rate each item on a 4-point Likert scale ranging from 1 ("Never") to 4 ("Often"), with higher scores reflecting greater perceived loneliness. The scale includes both positively and negatively worded items to reduce response bias and has been validated across various demographic groups, including adolescents and adults. It is considered a gold standard in loneliness research due to its strong psychometric properties, including high internal consistency (Cronbach's alpha typically above .90) and convergent validity with related constructs such as social support and depression. The UCLA Loneliness Scale is frequently used in both clinical and community settings and is well-suited for studies examining psychosocial variables in relation to emotional and behavioral outcomes.

2.2.3. Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)

The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST), developed by the World Health Organization (WHO ASSIST Working Group, 2002), is a

comprehensive screening tool that assesses substance use and related risks across multiple substances, including alcohol, tobacco, cannabis, cocaine, amphetamines, inhalants, sedatives, hallucinogens, and opioids. The standard version includes 8 items that explore the frequency of use, dependence symptoms, and substance-related problems in the past three months as well as over the lifetime. Each substance is scored separately, and risk levels (low, moderate, high) are derived from a cumulative score that guides intervention needs. The ASSIST has demonstrated good reliability (Cronbach's alpha values ranging from .80 to .90) and validity across diverse cultural and clinical populations. It is endorsed by global health organizations and extensively used in both research and clinical practice to assess substance use behaviors and risk levels.

2.3. Data Analysis

Data were analyzed using both SPSS version 27 and AMOS version 21. Initially, descriptive statistics were used to summarize demographic characteristics, followed by Pearson correlation analysis to examine the bivariate relationships between the dependent variable (emotion dysregulation) and the independent variables (loneliness and substance use). Structural Equation Modeling (SEM) was conducted in AMOS to test the hypothesized mediation model, evaluating both direct and indirect paths among variables. Model fit was assessed using common indices such as the Chi-square (χ^2), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR).

3. Findings and Results

Among the 430 participants, 247 (57.44%) identified as female and 183 (42.56%) as male. The age distribution showed that 109 participants (25.35%) were between 18–24 years, 173 participants (40.23%) were between 25–34 years, and 148 participants (34.42%) were aged 35–45. Regarding educational background, 62 individuals (14.42%) had completed secondary education, 248 (57.67%) held a bachelor's degree, and 120 (27.91%) had attained postgraduate qualifications. In terms of employment status, 289 participants (67.21%) were employed, 91 (21.16%) were students, and 50 (11.63%) were unemployed or self-employed. These distributions reflect a demographically

diverse sample suitable for generalizing the findings across adult urban populations in Indonesia.

Table 1

Descriptive Statistics for Study Variables (N = 430)

Variable	Mean	Standard Deviation
Loneliness	48.23	8.74
Emotion Dysregulation	89.57	13.21
Substance Use	21.68	6.45

Participants reported a moderate level of loneliness ($M = 48.23$, $SD = 8.74$) based on the UCLA Loneliness Scale. The average score on the Difficulties in Emotion Regulation Scale was 89.57 ($SD = 13.21$), indicating moderate to high emotion regulation difficulties in the sample. Substance use, measured using the ASSIST, had a mean score of 21.68 ($SD = 6.45$), reflecting a moderate risk level across substances (Table 1).

Prior to conducting correlation and SEM analyses, statistical assumptions were tested and confirmed. The normality of the data was assessed using skewness and kurtosis values, which were within acceptable ranges (± 2). For the variable of loneliness, skewness was 0.37 and kurtosis was -0.42 , while emotion dysregulation showed a

skewness of 0.15 and kurtosis of -0.31 . Multicollinearity was examined through tolerance and Variance Inflation Factor (VIF) values, all of which were within acceptable thresholds (tolerance > 0.10 , VIF < 10); for instance, loneliness had a VIF of 1.47 and substance use had a VIF of 1.38. Homoscedasticity was visually inspected through scatterplots of residuals, and no clear pattern of heteroscedasticity was detected. Linearity was also confirmed by evaluating residual plots, and Mahalanobis distance indicated no extreme multivariate outliers, with all values below the critical threshold of 13.82 for $p < .001$. Collectively, these tests confirmed that the assumptions for Pearson correlation and SEM were adequately met.

Table 2

Pearson Correlations Among Variables (N = 430)

Variables	1	2	3
1. Loneliness	—		
2. Emotion Dysregulation	.49** ($p < .001$)	—	
3. Substance Use	.38** ($p < .001$)	.53** ($p < .001$)	—

The correlation matrix revealed significant positive associations among all three variables. Loneliness was significantly correlated with emotion dysregulation ($r = .49$, $p < .001$) and substance use ($r = .38$, $p < .001$). Emotion

dysregulation showed a stronger correlation with substance use ($r = .53$, $p < .001$), suggesting it may serve as a mediator (Table 2).

Table 3

Goodness-of-Fit Indices for the Structural Equation Model

Fit Index	Value	Recommended Cut-off
Chi-Square (χ^2)	121.38	—
Degrees of Freedom (df)	48	—
χ^2/df	2.53	< 3.00
GFI	0.95	≥ 0.90
AGFI	0.91	≥ 0.90
CFI	0.96	≥ 0.90
TLI	0.94	≥ 0.90
RMSEA	0.061	≤ 0.08

The SEM model showed an acceptable fit to the data. The chi-square statistic ($\chi^2 = 121.38$, $df = 48$) yielded a χ^2/df ratio of 2.53, which falls within the acceptable threshold of <3.00 . The comparative fit indices (GFI = 0.95, AGFI = 0.91, CFI

= 0.96, TLI = 0.94) all exceeded the recommended 0.90 cut-off. RMSEA was 0.061, indicating a good model fit with minimal approximation error (Table 3).

Table 4

Standardized Path Coefficients in the Structural Equation Model

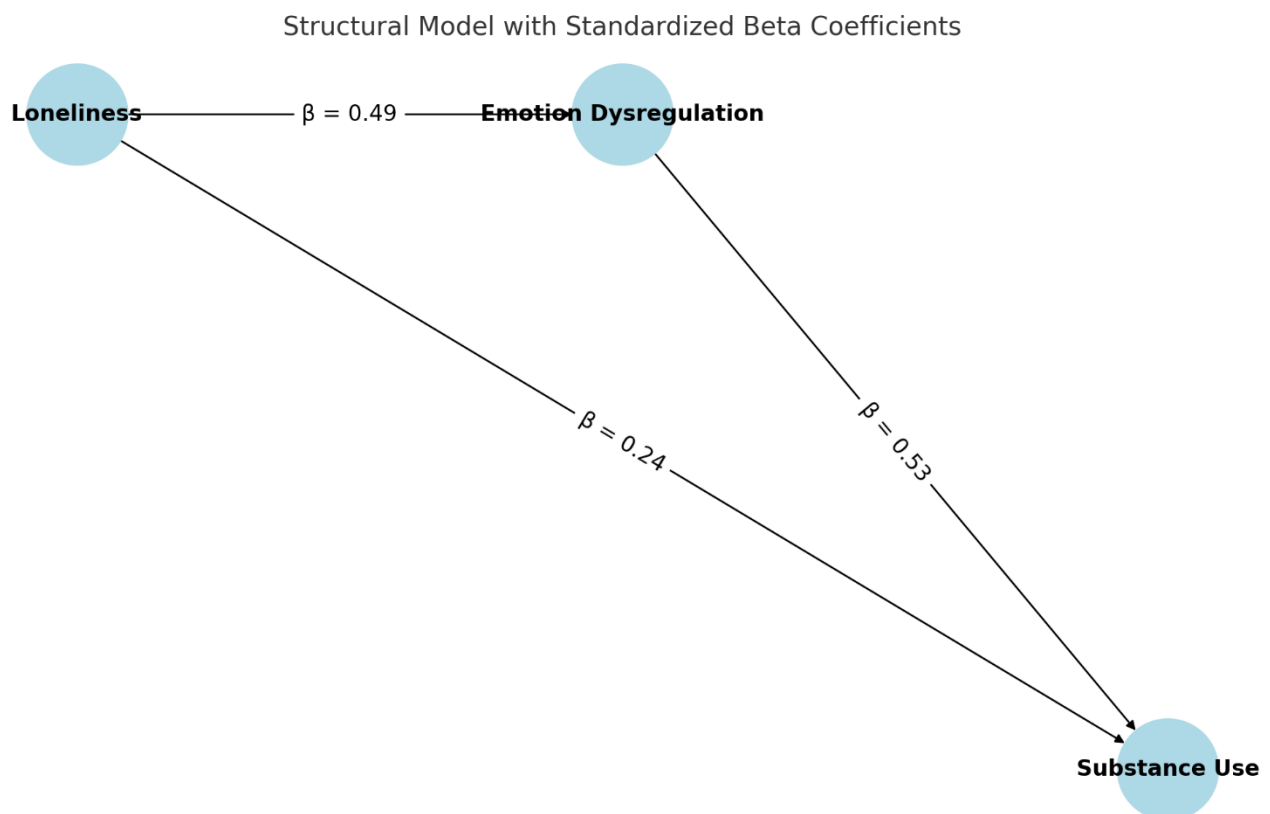
Path	B	S.E	Beta	p
Loneliness → Emotion Dysregulation	0.62	0.07	0.49	< .001
Emotion Dysregulation → Substance Use	0.48	0.06	0.53	< .001
Loneliness → Substance Use (Direct)	0.26	0.05	0.24	< .001
Loneliness → Substance Use (Indirect via Emotion Dysregulation)	0.30	0.04	0.26	< .001
Loneliness → Substance Use (Total Effect)	0.56	0.05	0.50	< .001

The SEM results confirmed that loneliness significantly predicted emotion dysregulation ($\beta = 0.49$, $p < .001$), and emotion dysregulation significantly predicted substance use ($\beta = 0.53$, $p < .001$). The direct path from loneliness to substance use remained significant ($\beta = 0.24$, $p < .001$),

while the indirect path via emotion dysregulation ($\beta = 0.26$, $p < .001$) also contributed significantly. The total effect of loneliness on substance use was substantial ($\beta = 0.50$, $p < .001$), confirming partial mediation (Table 4).

Figure 1

Model with Beta Coefficients



4. Discussion and Conclusion

The findings of this study demonstrate a significant positive relationship between loneliness and substance use,

with emotion dysregulation acting as a partial mediator in this association. Pearson correlation coefficients indicated that both loneliness and emotion dysregulation were positively correlated with substance use, and the Structural Equation Modeling (SEM) results confirmed that emotion dysregulation significantly mediated the effect of loneliness on substance use. These findings support the theoretical proposition that loneliness contributes to maladaptive coping mechanisms, particularly through impaired emotional regulation capacities, which in turn heighten the risk of substance-related behaviors.

This result is consistent with prior literature asserting the psychological vulnerability that loneliness imposes on individuals, particularly in contexts lacking adequate emotional support. For instance, the mediating role of emotional variables in the link between loneliness and health-compromising behaviors has been emphasized in multiple studies conducted in the wake of the COVID-19 pandemic. Cordaro et al. (2024) observed that loneliness was strongly associated with increased stress and substance use during pandemic restrictions, especially among individuals with limited emotional resilience (Cordaro et al., 2024). Similarly, Akinkuowo et al. (2024) identified that both young adults and their parents in New York who experienced high levels of loneliness during the pandemic reported greater psychological distress and emotional dysregulation, which contributed to an increased reliance on maladaptive coping strategies such as substance use (Akinkuowo et al., 2024).

Emotion dysregulation, as a mediating construct, reflects the inability to modulate internal affective experiences in adaptive ways. Our results echo those from Domènech-Abella (2025), who found that individuals facing workplace and non-workplace loneliness reported heightened emotional reactivity and absenteeism, suggesting that unmanaged emotional responses may extend beyond mental health and impact daily functioning (Domènech-Abella, 2025). In the current study, Indonesian participants experiencing loneliness were more likely to demonstrate high emotion dysregulation scores, which then predicted greater engagement in substance use. This indicates that emotional dysregulation is not just a consequence of loneliness, but a functional bridge through which behavioral issues such as substance misuse manifest.

The model tested in this study aligns closely with the self-medication hypothesis, which posits that individuals often resort to substance use in order to escape or dull unpleasant emotional states. This is particularly relevant for populations

with elevated emotional reactivity and limited regulatory strategies. The results corroborate findings by Vornlocher and Shiota (2024), who distinguished between stress-induced drinking and coping-motivated drinking, noting that individuals with higher emotional distress were more likely to use alcohol as a means of emotional regulation (Vornlocher & Shiota, 2024). Similarly, Grelle et al. (2023) highlighted how different generations, particularly younger adults, reported increased maladaptive coping strategies, including substance use, in response to pandemic-related loneliness and anxiety (Grelle et al., 2023).

Furthermore, our findings contribute to an expanding body of evidence emphasizing the need to consider emotional variables when examining loneliness and its behavioral outcomes. Goodfellow et al. (2023) demonstrated that loneliness among adolescents in Scotland was significantly related to poor emotion regulation and subsequent mental health issues (Goodfellow et al., 2023). This developmental perspective finds resonance in our study, which includes a wide age range and demonstrates that emotion regulation is a central psychological mechanism across life stages.

An additional implication of our results pertains to gender and cultural differences in emotion regulation and social interaction. Research by Kim (2024) in Korean adolescents found that the effect of loneliness on substance use was mediated by depressive symptoms, which are themselves often closely related to emotion regulation capacities (Kim, 2024). This convergence suggests a universal emotional mechanism operating across distinct cultural settings, including East Asia and Southeast Asia. It also emphasizes the global relevance of interventions targeting emotion regulation to reduce substance-related harm in lonely individuals.

Culturally, studies in African and Middle Eastern regions also affirm the pathways revealed in the current study. For example, Nkyi and Ninnoni (2024) found that patients with substance use disorders in Ghana exhibited higher levels of loneliness, which was closely tied to depressive states and emotional disengagement (Nkyi & Ninnoni, 2024). Similarly, Korany et al. (2023) observed that university students in Iran who experienced loneliness held more positive attitudes toward drug use, especially in the absence of emotional and social coping strategies (Korany et al., 2023). These findings provide cross-cultural validation for the mediational role of emotion dysregulation.

Grief-related loneliness, a unique form of social-emotional disruption, has also been associated with emotion

regulation problems and substance use. Benítez-Manzanas et al. (2022) showed that individuals grieving the loss of a loved one during the pandemic were more likely to develop maladaptive emotion regulation strategies and engage in avoidant coping behaviors, including substance use (Benítez-Manzanas et al., 2022). Our findings align with this, suggesting that emotionally unresolved loneliness, whether resulting from bereavement or social disconnection, can foster unhealthy behavioral patterns through regulatory dysfunction.

Loneliness is not only psychologically distressing but physiologically destabilizing. Rezaei and Saghazadeh (2022) synthesized evidence linking loneliness to poor cardiovascular, immune, and neuroendocrine functioning, all of which can be exacerbated by substance abuse (Rezaei & Saghazadeh, 2022). Hence, our study underscores the importance of recognizing the emotional underpinnings of loneliness that lead to risky health behaviors, further validating the call for integrated mental health interventions.

The data from this study also resonate with evidence on the utility of support networks in reducing loneliness and its emotional consequences. For instance, Muftikhar and Zamroni (2024) demonstrated that structured family support programs reduced loneliness and enhanced emotional regulation among caregivers of mentally ill patients (Muftikhar & Zamroni, 2024). Similarly, Kassim and Badayai (2023) found that perceived social support and coping strategies mediated the effect of loneliness on mental health outcomes, thereby validating the model used in the present study (Kassim & Badayai, 2023). These findings support a preventive approach that strengthens both external resources (social support) and internal processes (emotion regulation).

Moreover, the longitudinal implications of these findings should be considered. Rodríguez-Cano et al. (2024) reported that loneliness in adolescence predicted psychotropic medication usage in adulthood, underscoring the long-term trajectory of emotionally rooted behavioral issues (Rodríguez-Cano et al., 2024). Maas et al. (2025) similarly documented a five-year change in mental health among adults aged 41–85, with loneliness serving as a key driver of emotional decline (Maas et al., 2025). Such studies highlight the necessity of early interventions aimed at bolstering emotion regulation skills as a means of preventing chronic substance use.

In line with this, Maambo and Nkandu (2025) emphasized the vulnerability of HIV-positive adolescents in Zambia to mental health challenges stemming from

emotional isolation, which were exacerbated by their inability to manage internal distress (Maambo & Nkandu, 2025). The relevance of this to the Indonesian context lies in its shared developmental risks and similar barriers to emotional health resources.

Finally, the broader social context cannot be ignored. The study by Wright et al. (2022) indicated that peer specialists, often frontline workers in mental health settings, faced intensified loneliness and emotional burnout during the pandemic, with some resorting to substance use to manage their distress (Wright et al., 2022). These findings underscore the ecological validity of the current study and the need for emotional regulation training across sectors.

5. Limitations & Suggestions

While this study provides valuable insights, several limitations must be acknowledged. First, the cross-sectional design precludes causal inferences regarding the directionality of the relationships among loneliness, emotion dysregulation, and substance use. Second, the reliance on self-report instruments may introduce social desirability bias and limit the accuracy of the responses, particularly regarding substance use. Third, although the sample was diverse in age and background, it was limited to urban areas of Indonesia, which may not fully capture the experiences of rural populations or other cultural subgroups. Additionally, unmeasured variables such as trauma history, socioeconomic status, or mental health diagnoses could also influence the observed relationships.

Future studies should adopt longitudinal or experimental designs to better understand the causal pathways between loneliness, emotion dysregulation, and substance use. Investigating whether interventions targeting emotional regulation can mitigate the impact of loneliness on substance-related outcomes would be particularly valuable. Further, cross-cultural comparisons involving Southeast Asian, Middle Eastern, and Western samples may reveal important cultural moderating variables that influence these dynamics. It is also recommended that future work incorporate physiological or behavioral measures of emotion regulation to supplement self-report tools and improve measurement validity.

The findings of this study have important implications for public health policy and clinical practice. Interventions aimed at reducing substance use should not only target behavioral change but also address underlying emotional difficulties, particularly among individuals experiencing

loneliness. Mental health professionals should incorporate emotion regulation training into preventive and therapeutic programs. Community-level interventions that promote social connection, peer support, and emotional literacy could play a critical role in breaking the cycle between loneliness and maladaptive coping. Moreover, tailoring these interventions to the cultural context of Indonesian communities will enhance their effectiveness and long-term sustainability.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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