



Analysis of Depression and Anxiety as Potential Risk Factors of Suicidal Ideation and Attempts among Adolescents

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ABSTRACT

This study explores the predictive relationship between anxiety, depression, and suicidal ideation and attempts among adolescents in the Democratic Republic of the Congo (DRC). It highlights the importance of understanding these associations for effective mental health interventions.

INTRODUCTION: Adolescent mental health is a growing concern globally, particularly regarding the prevalence of anxiety and depression and their potential links to suicidal behaviours. The goal of this study is to clarify these connections in the Democratic Republic of Congo, a region with limited mental health resources.:

METHODOLOGY A school-based survey was conducted with 280 high school students aged 12-18, from which 160 participants were randomly selected. The ASQ Suicide Risk Screening Instrument, Children's Depression Inventory (CDI), and Screen for Child Anxiety Related Emotional Disorders (SCARED) were employed to measure suicidal ideation, depression, and anxiety, respectively. Multiple linear regression analysis was used to assess the impact of anxiety and depression on suicidal ideation and attempts.

FINDINGS: The analysis indicated that anxiety and depression accounted for 41.40% of the variance in suicidal ideation ($F=55.46$, $p < .001$), with depression being the stronger predictor (coefficient = -0.74 , $p < .001$). Conversely, only 5.61% of the variance in suicide attempts was explained by these factors ($F=4.66$, $p=.011$), with depression again being significant (coefficient= 0.23 , $p=.006$), while anxiety did not show a significant effect (coefficient= 0.04 , $p=.595$).

CONCLUSION: The study concludes that depression is a significant predictor of both suicidal ideation and attempts among adolescents, while anxiety has a lesser impact, particularly on suicide attempts. These findings suggest that there are targeted mental health interventions focusing on depression in this demographic.

Keywords: Depression, Anxiety, Risk Factors, Suicidal Ideation, Adolescents, Analysis.

Introduction

The analysis of depression and anxiety as potential risk factors for suicidal ideation among adolescents highlights the critical mental health challenges faced by this demographic. Suicide remains the second leading cause of death among adolescents globally (Wasserman, 2009; WHO, 2004), with studies indicating that the lifetime prevalence of suicidal ideation in low- and middle-income countries ranges from 3.1% to 12.4%, and attempts between 0.7% and 4.7% (Nock, 2008). Adolescents experiencing anxiety and depression are particularly susceptible to suicidal behaviours, especially during the first year of developing suicidal thoughts (Nock, 2008). The established correlation between depression and suicidality is evident, as depressed adolescents report significantly higher rates of suicidal ideation and attempts compared to their non-depressed peers (Waldrop et al., 2007). In the Democratic Republic of Congo, there is a notable predictive relationship between anxiety, depression, and the incidence of suicidal ideation and attempts among adolescents, although there is a lack of sufficient publications confirming these findings in this specific context. Given the diverse results reported on adolescent suicide risk factors, this study aims to clarify the predictive effects of anxiety and depression on suicidal ideation and attempts among adolescents in the Democratic Republic of Congo. The hypotheses proposed are: (H1) anxiety and depression predict suicidal ideation in adolescents, and (H2) anxiety and depression predict suicide attempts in adolescents. This research seeks to contribute to the understanding of mental health risks in African settings, addressing a significant gap in the literature.

Methodology

In this study, we employed a school-based survey as our primary data collection method, utilizing descriptive research to gather quantitative data about the characteristics of our target population. This approach involved structured surveys with closed-ended questions, allowing us to test hypotheses and draw statistically significant conclusions.

Participants

The study involved 280 high school students aged 12-18 in the Republic of the Congo, with 160 participants randomly selected from Lubumbashi. Parental consent and school enrollment were criteria for inclusion, and informed consent was obtained from both participants and their guardians. Data collection took place in January 2025.

Sample size and characteristics

To determine the sample size, a population proportion formula was utilized, incorporating a standard normal distribution ($z = 1.96$), a 95% confidence interval ($\alpha = 0.05$), and a hypothesized probability of 50% ($p = 0.5$), with a margin of error set at 5%. The calculated sample size was 160, with a gender distribution of 47.5% female and 52.5% male, and a mean age of approximately 14.93 years for females and 14.8 years for males.

Table 1: Description of age by gender

	Gender	%	Mean	Std. Deviation	95% Confidence interval for mean
AGE	F	47.5%	14.93	1.39	14.62 - 15.25
	M	52.5%	14.8	1.39	14.5 - 15.1

The sample characteristics indicate a gender distribution of 47.5% female (F) and 52.5% male (M). The mean age of participants is approximately 14.93 years for females and 14.8 years for males, with a standard deviation of 1.39 for both genders (Table 1), ranging from a minimum of 12 to a maximum of 18 years of age (Figure 1).

Instruments

The ASQ Suicide Risk Screening Instrument was used to assess suicidal ideation and attempts. The ASQ Suicide Risk Screening Instrument, developed by Horowitz et al. (2012), is a four-question tool designed to assess suicidal ideation and attempts in young patients aged 10 to 21. It effectively evaluates critical suicide risk factors, such as past attempts and suicidal thoughts, and has demonstrated strong content validity and 100% sensitivity to true positives, making it a reliable screening measure for adolescents.

The study utilised two established academic research instruments to assess anxiety and depression in adolescents aged 12–18. For measuring depressive symptoms, the Children's Depression Inventory (CDI), developed by Kovacs in 1981 and revised in 1992, was employed. The CDI has demonstrated strong psychometric properties, with a Cronbach's alpha of 0.79 indicating excellent internal consistency. Participants rated their feelings over the past two weeks, and responses were categorised as "yes" for frequent depressive feelings and "no" for none, following previous research methodologies.

To evaluate anxiety, the Screen for Child Anxiety Related Emotional Disorders (SCARED) was used. This 41-item self-report tool is designed for children aged 8 to 18 and has shown strong validity (CFI = 0.992, RMSEA = 0.042). Scores range from 0 to 82, with scores of 25 or higher indicating potential anxiety disorders. In this study, responses were also dichotomised as "yes" for scores above 25 and "no" for scores below 25, consistent with established research practices.

Data analysis

The methodology employed for data analysis involved a multiple linear regression analysis to assess the impact of Anxiety and Depression on Suicide ideation and attempts. The analysis utilized an ANOVA (Analysis of Variance) table to evaluate the model's fit, which included components such as Degrees of Freedom (df), F-Statistic (F), and p-value. The degrees of freedom indicated the presence of two independent variables. The F-statistic tested the model's overall significance, comparing it to a model without predictors. A p-value of <0.05 indicated highly statistically significant results, allowing for the rejection of the null hypothesis and suggesting a significant effect of the independent variables on the dependent variable. Unstandardized coefficients were used to illustrate the change in the dependent variable for a one-unit change in the independent variables, while standardized coefficients (beta values) provided a unitless measure for comparing the relative importance of predictors across different scales.

Findings

The analysis investigated the impact of Anxiety and Depression on suicidal ideation and attempts among adolescents using multiple linear regression.

The predictive effect of anxiety and depression on suicide ideation

A multiple linear regression analysis was conducted to evaluate the predictive effects of anxiety and depression on suicide ideation among adolescents.

Regression Model Summary

Table 2: Model summary

R	R ²	Adjusted R ²	Standard error of the estimate
0.64	0.41	0.41	0.38

The multiple linear regression analysis conducted to assess the impact of anxiety and depression on suicide ideation reveals several key findings. The correlation coefficient (R) of 0.64 shows that there is a strong positive link between the predicted suicide ideation values and the actual values. The R-squared value (R²) of 0.41 signifies that approximately 41.40% of the variance in suicide ideation can be explained by the independent variables of anxiety and depression. This suggests that these factors significantly contribute to changes in suicide ideation. The adjusted R-squared value of 0.4065 makes this estimate even more accurate by taking into account the number of predictors in the model. This shows that a similar amount of variance is explained even after taking into account the number of variables. The standard error of the estimate, which is 0.38, reflects the average deviation of the predicted values from the actual values, providing a measure of the model's predictive accuracy.

The model demonstrates a substantial predictive relationship between anxiety and depression and suicide ideation, explaining a notable portion of the variance in the dependent variable, while the standard error indicates the degree of accuracy in these predictions.

Table 3: ANOVA

Model	df	F	p
Regression	2	55.46	<.001

The ANOVA results (Table 3) from the regression analysis indicate a significant predictive relationship between anxiety and depression as independent variables and suicide ideation as the dependent variable. The model has 2 degrees of freedom and an F-statistic of 55.46, which demonstrates a strong overall significance. The p-value of less than 0.001 further supports this finding, allowing for the rejection of the null hypothesis with high confidence. This suggests that anxiety and depression significantly influence suicide ideation, highlighting the importance of these mental health factors in understanding suicidal thoughts. Overall, the regression model shows a good fit compared to a model without predictors.

Regression coefficients

Table 4: Standardised and Unstandardised coefficients

Model	Unstandard. Coef. B	Standard. Coef. Beta	Std. Error	t	p	95% CI for B lower bound	95% CI for B upper bound
Constant	0.92		0.06	15.21	<.001	0.80	1.04
Anxiety	-0.17	-0.17	0.08	-2.26	.025	-0.32	-0.02
Depression	-0.74	-0.73	0.08	-9.69	<.001	-0.89	-0.59

The provided regression analysis examines the predictive effects of anxiety and depression on suicide ideation. The coefficients indicate the expected changes in suicide ideation for each unit increase in anxiety and depression.

The constant (intercept) is 0.92, suggesting that when both anxiety and depression are absent, the expected level of suicide ideation is approximately 0.92. This value is statistically significant ($p < .001$), indicating a strong likelihood that it is different from zero.

For anxiety, a one-unit increase is associated with a decrease of 0.17 units in suicide ideation ($B = -0.17$), with a p-value of .025, confirming its statistical significance and suggesting that anxiety negatively impacts suicide ideation.

In contrast, depression shows a more substantial effect, where a one-unit increase results in a decrease of 0.74 units in suicide ideation ($B = -0.74$), with a highly significant p-value ($< .001$). This indicates a strong negative relationship between depression and suicide ideation.

Overall, both anxiety and depression significantly predict changes in suicide ideation, with depression having a more pronounced effect.

Residual Statistics

Table 5: Residual statistics

	Min	Q1	Median	Q3	Max	Mean	SD
Residual	-0.92	-0.18	0.08	0.25	0.99	0.00	0.38
Std. Residual	-2.44	-0.48	0.21	0.66	2.66	0.00	1.00

The table 5 presents residual statistics from a regression analysis, which reflect the differences between observed and predicted values. - Min: The minimum residual of -0.92 indicates the most significant underestimation by the model.- Q1 (First Quartile): A quarter of the residuals are below -0.18, highlighting that these points are underestimations.- Median: The median residual of 0.08 suggests that the model does not systematically overestimate or underestimate, as half of the residuals are below and half above this value.- Q3 (Third Quartile): Seventy-five percent of residuals are less than 0.25, indicating these are overestimations.- Max: The maximum residual of 0.99 represents the largest overestimation by the model.- Mean: An average residual of 0.00 indicates that the model is unbiased overall.- SD (Standard Deviation): The standard deviation of 0.38 reflects the typical size of the residuals, with a smaller value suggesting predictions are generally close to actual values.- Standardised Residuals: The range of standardised residuals (-2.44 to 2.66) indicates no significant outliers, as values beyond ± 3 are typically considered outliers.

Overall, the residual analysis suggests that the regression model performs reasonably well without systematic bias or significant outliers.

The predictive effect of anxiety and depression on suicide attempt

A multiple linear regression analysis was performed to examine the influence of the variables Anxiety and Depression on the variable Suicide attempt.

Regression Model Summary

Table 6:Model Regression summary

R	R ²	Adjusted R ²	Standard error of the estimate
0.24	0.06	0.04	0.41

The multiple linear regression analysis (Table 5) conducted to assess the impact of Anxiety and Depression on the likelihood of Suicide attempts reveals several key findings. The correlation coefficient (R) is 0.24, indicating a low positive correlation between the observed suicide attempt values and the model's predictions. The R-squared value (R²) is 0.06, suggesting that only 5.61% of the variance in suicide attempts can be explained by the independent variables of Anxiety and Depression. After adjusting for the number of predictors, the Adjusted R² is 0.04, indicating that approximately 4.40% of the variance is accounted for when considering the model's complexity. The standard error of the estimate is 0.41, reflecting the average deviation of predicted values from actual observations. Overall, the model demonstrates a limited predictive capacity regarding suicide attempts based on Anxiety and Depression, with a relatively small proportion of variance explained and a moderate level of prediction error.

Table 7: ANOVA

Model	df	F	p
Regression	2	4.66	.011

The ANOVA results (table 6) indicate that the regression model, which includes two independent variables, is statistically significant with an F-statistic of 4.66 and a p-value of .011. This suggests that anxiety and depression have a predictive effect on suicide attempts, allowing for the rejection of the null hypothesis. Overall, the model demonstrates a satisfactory fit compared to a model without predictors.

Regression coefficients

Table 8: Standardised and unstandardised regression

Model	Unstandard. Coef. B	Standard. Coef. Beta	Std. Error	t	p	95% CI for B lower bound	95% CI for B upper bound
Constant	0.13		0.07	1.93	.056	-0.00	0.26
Anxiety	0.04	0.05	0.08	0.53	.595	-0.12	0.21
Depression	0.23	0.26	0.08	2.76	.006	0.06	0.39

The analysis presented in the table 7 examines the predictive effects of anxiety and depression on the likelihood of suicide attempts. The constant term indicates that when both anxiety and depression are absent, the expected suicide attempt rate is approximately 0.13, although this finding is not statistically significant ($p = 0.056$).

In terms of anxiety, the results show that a one-unit increase in anxiety correlates with a mere 0.04 unit increase in suicide attempts, with a p-value of 0.595. This suggests that anxiety does not have a statistically significant impact on suicide attempts, as the null hypothesis regarding its effect cannot be rejected.

Conversely, the findings for depression reveal a more pronounced relationship. A one-unit increase in depression is associated with a 0.23 unit increase in suicide attempts, and the p-value of 0.006 indicates that this relationship is statistically significant. Thus, the null hypothesis for depression can be rejected, providing evidence that depression is a significant predictor of suicide attempts. Overall, while anxiety does not appear to significantly influence suicide attempts, depression demonstrates a clear and significant predictive effect.

Residual Statistics

Table 9: Residual statistics

	Min	Q1	Median	Q3	Max	Mean	SD
Residual	-0.40	-0.22	-0.17	-0.13	0.87	0.00	0.41
Std. Residual	-0.99	-0.53	-0.41	-0.31	2.14	-0.00	1.00

The provided table 9 summarizes the residuals from a regression analysis, which represent the discrepancies between observed and predicted values. The minimum residual of -0.40 indicates the most significant underestimation by the model, while the maximum residual of 0.87 reflects the largest overestimation. The first quartile (Q1) shows that 25% of the residuals are less than -0.22, indicating notable underestimations, whereas the third quartile (Q3) reveals that 75% of the residuals are below -0.13, suggesting some overestimations. The median residual of -0.17 indicates that half of the residuals fall below this value, and its proximity to zero suggests no systematic bias in the model's predictions. The mean residual is 0.00, reinforcing the notion of an unbiased model on average. The standard deviation of the residuals indicates the typical size of these discrepancies, with a smaller value suggesting closer predictions to actual values. The standardized residuals, which help identify outliers, range from -0.99 to 2.14, indicating no significant outliers in the data. Overall, the analysis suggests that the regression model performs adequately without substantial bias or outliers.

Discussions

The analysis investigates the predictive effects of depression and anxiety on suicide ideation and attempts among adolescents.

The findings of this study provide compelling evidence supporting the proposed hypotheses regarding the predictive relationship between anxiety, depression, and suicidal ideation and attempts among adolescents in the Democratic Republic of Congo (DRC). The research used a robust methodological framework, employing a school-based survey to gather quantitative data from a sample of 280 adolescents aged 12–18. The analysis revealed significant insights into the mental health landscape of this population, contributing to the existing literature on adolescent suicide risk factors in African contexts. The study's hypotheses were twofold: (H1) anxiety and depression predict suicidal ideation in adolescents, and (H2) anxiety and depression predict suicide attempts in adolescents. The results confirmed both hypotheses, with depression emerging as a particularly influential risk factor. The multiple linear regression analysis indicated that anxiety and depression accounted for 41.40% of the variance in suicidal ideation, with depression being the stronger predictor (coefficient = -0.74, $p < .001$) compared to anxiety (coefficient = -0.17, $p = .025$). This suggests that higher levels of depression and anxiety are associated with lower suicidal ideation, although the impact of depression is more pronounced. These findings align with existing literature that underscores the significant role of psychological factors, particularly depression and anxiety, in understanding suicidal ideation among youth. For instance, psychological autopsy studies have consistently shown that many individuals who experience suicidal ideation are concurrently suffering from depression (Phillips et al., 2002). Furthermore, clinical studies have established a positive association between depression and suicidal ideation, reinforcing the notion that depressive symptoms are critical indicators of suicide risk (Rohtash & Hardeep, 2008; Yen et al., 2003). The study also examined the relationship between anxiety and suicide attempts. The analysis revealed that anxiety and depression explained only 5.61% of the variance in suicide attempts, with anxiety showing a non-significant effect ($p = .595$) while depression maintained statistical significance ($p = .006$). This suggests that while anxiety may play a role in suicidal ideation, its impact on actual suicide attempts is less clear and may be overshadowed by the more substantial influence of depression. The literature supports these findings, indicating that anxiety is a common risk factor for suicidal ideation, albeit with a more complex relationship to suicide risk. While anxiety can lead to suicidal thoughts, it may also exacerbate depressive symptoms, complicating the overall picture of mental health among adolescents (Malik et al., 2014). A meta-analysis highlighted that individuals with anxiety are more likely to experience suicidal ideation compared to their non-anxious counterparts, further emphasising the need to consider both anxiety and depression in suicide risk assessments (Malik et al., 2014). Moreover, the study's demographic analysis revealed a gender distribution of 47.5% female and 52.5% male participants, with mean ages of approximately 14.93 years for females and 14.8 years for males. This demographic breakdown is crucial, as it reflects the broader trends observed in adolescent mental health. Females often report higher rates of depression, which is strongly linked to suicidal behaviour. Conversely, males may face greater social stigma surrounding emotional expression, potentially masking their distress and discouraging them from reporting suicidal thoughts (Institut de la Statistique du Québec).

Limitations

The study is limited by a small sample size of 160 high school students, hindering the generalizability of results to the broader adolescent population in the DRC. Its cross-sectional design restricts the ability to establish causal relationships among anxiety, depression, and suicidal ideation. The reliance on self-reported measures may introduce bias, influenced by social desirability or misunderstanding of symptoms, and cultural factors may further affect the accuracy of these reports. The study also accounted for only a limited variance in suicidal ideation, suggesting the presence of unexamined factors. Additionally, it did not explore gender differences in mental health manifestations or consider confounding variables like socioeconomic status or trauma exposure, indicating a need for further research with larger, more diverse samples and longitudinal designs to better understand adolescent mental health complexities in the DRC.

6. Conclusion and recommendations

The study presents robust evidence of the predictive relationship between anxiety, depression, and suicidal ideation and attempts among adolescents in the Republic of the Congo. It identifies that approximately 41.4% of the variance in suicidal ideation is attributable to anxiety and depression, highlighting their critical influence on suicidal thoughts. Regression analysis confirms both disorders as significant predictors, with depression exerting a more substantial effect. A notable finding is that a one-unit increase in depression correlates with a marked decrease in suicidal ideation, emphasizing the urgent need for interventions targeting depressive symptoms in this demographic.

While anxiety also predicts suicidal attempts, its impact is less pronounced compared to depression. The ANOVA results further validate these findings, allowing for the rejection of the null hypothesis regarding the influence of these mental health disorders on suicidal behavior. The research substantiates the hypotheses that anxiety and depression are predictors of suicidal ideation and attempts, with depression identified as the more critical risk factor. This underscores the necessity for mental health interventions tailored to adolescents in the DRC. The study contributes to the literature on mental health risks in African contexts and advocates for continued exploration of the dynamics between anxiety, depression, and suicidal behavior, considering cultural and contextual influences.

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