



# Mental disorders and substance abuse among Rwandan university students: the moderating effects of interpersonal violence

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## ABSTRACT

**Background:** There is an abundance of evidence suggesting that interpersonal violence commonly co-occurs with mental disorders and substance abuse. Interpersonal violence is one of the most well-documented and salient factors of mental disorders and substance abuse; however, there are no studies investigating the moderating role of interpersonal violence in post-conflict Rwanda.

**Objective:** The aim of the present study was to explore the relationship between mental disorders and substance abuse among Rwandan university students, and whether the role of interpersonal violence is a moderating factor.

**Method:** A purposive sample of 143 undergraduate university students (mean age = 22.4 years,  $SD = 2.6$ ) from University of Rwanda–Remera Campus were selected for participation in this cross-sectional study. We used linear regression analysis to examine the relationships between mental disorders, substance abuse and interpersonal violence.

**Results:** Substance abuse was significantly associated with post-traumatic stress disorder (PTSD), anxiety, depression and interpersonal violence. Interpersonal violence was a significant moderator of the associations between PTSD symptoms ( $\beta = 0.43, p < 0.001$ ), anxiety symptoms ( $\beta = 0.47, p < 0.001$ ), depressive symptoms ( $\beta = 0.48, p < 0.001$ ) and substance use.

**Conclusion:** The results imply that PTSD, depression and anxiety symptoms are associated with increased risk of substance abuse, and this risk appears to become substantially more elevated when there are also current or historic reports of interpersonal violence.

## Trastornos mentales y abuso de sustancias en estudiantes universitarios: los efectos moderadores de la violencia interpersonal

**Antecedentes:** Existe una gran cantidad de evidencia que sugiere que la violencia interpersonal comúnmente coexiste con los trastornos mentales y el abuso de sustancias. La violencia interpersonal es uno de los factores relativos a los trastornos mentales y el abuso de sustancias más destacado y mejor documentado; sin embargo, no hay estudios que investiguen el papel moderador de la violencia interpersonal posterior al conflicto de Ruanda.

**Objetivos:** El objetivo del presente estudio fue explorar la relación entre los trastornos mentales y el abuso de sustancias entre los estudiantes universitarios ruandeses, y si el papel de la violencia interpersonal es un factor moderador.

**Métodos:** Se seleccionó una muestra intencional de 143 estudiantes universitarios de pregrado (edad media = 22,4,  $DE = 2,6$ ) del Campus de la Universidad de Ruanda-Remera para participar en este estudio transversal. Utilizamos el análisis de regresión lineal para examinar las relaciones entre los trastornos mentales, el abuso de sustancias y la violencia interpersonal.

**Resultados:** El abuso de sustancias se asoció significativamente con TEPT, ansiedad, depresión y violencia interpersonal. La violencia interpersonal fue un moderador significativo de las asociaciones entre los síntomas de TEPT ( $\beta = .43, p < 0.001$ ), síntomas de ansiedad ( $\beta = .47, p < 0.001$ ), síntomas depresivos ( $\beta = .48, p < 0.001$ ) y abuso de sustancias.

**Conclusión:** Los resultados implican que los síntomas de TEPT, depresión y ansiedad están asociados con un mayor riesgo de abuso de sustancias, y estos riesgos parecen ser sustancialmente más elevados cuando también hay reportes actuales o históricos de violencia interpersonal.

## 大学生精神障碍和物质滥用:人际暴力的调节作用

**背景:**有大量证据表明人际暴力通常与精神障碍和物质滥用并发。人际暴力是精神障碍和物质滥用最有据可查和最突出的因素之一,但是尚无研究考查人际暴力在冲突后卢旺达内部的调节作用。

**目的:**本研究旨在探讨卢旺达大学生中精神障碍与物质滥用之间的关系,以及人际暴力是否起到调节因素的作用。

**方法:**选择卢旺达大学-雷梅拉校区143名本科生的立意样本(平均年龄= 22.4,标准差 = 2.6)参加这项横断面研究。我们使用线性回归分析来考查精神障碍、物质滥用和人际暴力之间的关系。

**结果:**物质滥用与PTSD、焦虑、抑郁和人际暴力显著相关。人际暴力是PTSD症状( $\beta = .43, p < 0.001$ )、焦虑症状( $\beta = .47, p < 0.001$ )、抑郁症状( $\beta = .48, p < 0.001$ )和物质滥用之间关联的显著调节因素。

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## PALABRAS CLAVE

Abuso de sustancias; trastornos mentales; moderación y violencia interpersonal

## 关键词

物质滥用; 精神障碍; 调节和人际暴力

## HIGHLIGHTS

This study investigates the moderating effects of interpersonal violence in the relationship between common mental disorders and substance abuse in a post-conflict country.

**结论：**该结果表明，PTSD、抑郁和焦虑症状与物质滥用风险增加有关，并且在当前具有或历史报告过人际暴力时，这些风险似乎大大增加。

## 1. Introduction

Interpersonal violence is a serious and pervasive problem that is detrimental to the health and well-being of countless individuals across the lifespan. Strong links have been found between interpersonal violence and the co-occurrence of mental disorders and substance abuse. Evidence suggests that interpersonal violence increases the prevalence and severity of mental disorders (Famularo, Kinscheriff, & Fenton, 2001; Rees et al., 2011; World Health Organization [WHO], 2019) and substance abuse (Domino, Morrissey, Nadlicki-Patterson, & Chung, 2005; Rees et al., 2011; Savage, Quiros, Dodd, & Bonavota, 2007). A growing body of population-wide studies have highlighted that these three health problems are closely inter-related (Mason & O'Rinn, 2014; Rivera et al., 2015; Trevillion et al., 2012). It is well documented that the relationships between these factors are complex and bidirectional in nature (Mason & O'Rinn, 2014; Rivera et al., 2015). It has also been suggested that interpersonal violence accounts for an increased level of lasting mental health problems (Beydoun, Beydoun, Kaufman, Lo, & Zonderman, 2012; Jones, Hughes, & Unterstaller, 2001) and substance abuse (Gilbert, El-Bassel, Rajah, Foleno, & Frye, 2001; Martino, Collins, & Ellickson, 2005; Timko, Sutkowi, Pavao, & Kimerling, 2008) in survivors, and this pattern would appear to align with self-medication theory (Khantzian, 1985; Rado, 1933). As such, students may abuse substances as a way to cope with ongoing violence and the symptoms of mental disorders (Martino et al., 2005; Peters, Khondkaryan, & Sullivan, 2012; Sullivan & Cavanaugh, 2009).

It seems likely, but is yet to be demonstrated, that domestic violence may moderate the relationships between mental disorders and substance abuse through self-medication processes (Martino et al., 2005; Mason & O'Rinn, 2014; Peters et al., 2012). Women who reported both interpersonal violence and moderate to severe depressive symptoms were over eight times more likely to report alcohol-related problems than those who reported no interpersonal violence and no depressive symptoms (Paranjape et al., 2007). Consistently, studies indicated that women who reported moderate or severe depressive symptoms, but no interpersonal violence, were 4.3 times more likely to report alcohol-related problems than women who reported no interpersonal violence and no depressive symptoms (Rivera et al., 2015). The same risk was reported for alcohol-related problems among women who experienced interpersonal violence but no depressive symptoms (Rivera et al., 2015).

Despite abundant evidence that interpersonal violence commonly co-occurs with mental disorders and substance abuse (Mason & O'Rinn, 2014; Paranjape

et al., 2007; Peters et al., 2012; Rivera et al., 2015; Schumacher & Holt, 2012; Sullivan & Cavanaugh, 2009), no studies have investigated the moderating role of interpersonal violence between these two diagnoses, especially in post-conflict Rwanda. The aim of the current study was to explore the interconnectedness of the relationship between mental disorders, substance abuse and interpersonal violence, within our sample group of university students. Based on previous research, we hypothesized that there would be a link between mental disorders and substance abuse within our sample. In addition, we anticipated that interpersonal violence was a moderating factor within the relationship between mental disorders and substance abuse.

## 2. Methods

### 2.1. Participants

Initially, 247 students were invited to participate in this cross-sectional study. The number of students that participated was 143 (56% females, mean age = 22.4 years,  $SD = 2.6$ ), giving a response rate of 58%. Participants were undergraduate students aged 18–28 years attending the College of Medicine and Health Sciences of University of Rwanda at Remera Campus. An additional 10% refused participation ( $n = 25$ ) and 32% did not respond ( $n = 79$ ). We found that conflict with study time was the most common reason for non-response. The inclusion criteria included being Rwandan and an undergraduate student at the University of Rwanda, Remera Campus.

### 2.2. Procedure

The participants were contacted individually through their class representatives. The study was explained in full to potential participants, and consent was obtained from those willing to take part. No financial or other incentives were provided for taking part in the study. Measures for assessing mental disorders, substance abuse and interpersonal violence were administered by four clinical psychologists. The study protocol was reviewed and approved by the committee of the Clinical Psychology Department under the command of the institutional review board of the College of Medicine and Health Sciences (2019/21) prior to going ahead with the study. In addition, participants were free to withdraw if they did not want to take part or if they changed their minds.

### 2.3. Data collection tools

All measures were translated into Kinyarwanda. Translation was performed by six clinical psychologists who spoke English, French and Kinyarwanda, and the Kinyarwanda version was reverse translated by four clinical psychologists who spoke English, French and Kinyarwanda. All tools had a satisfactory level of reliability, ranging from 0.70 to 0.95 (Bland & Altman, 1997; Nunnally & Bernstein, 1994).

The PTSD Checklist for DSM-5 (PCL-5) consists of 20 items scored on a five-point Likert scale ranging from not at all (0) to extremely (4) (Weathers et al., 2013). A PCL-5 cut-off score range of 31–33 is indicative of probable post-traumatic stress disorder (PTSD) across samples (Weathers et al., 2013). The Cronbach's alpha was 0.75 in the current sample.

The Hopkins Symptoms Checklist Scale (HSCL-25) consists of 25 items scored on a five-point Likert scale ranging from not at all (1) to extremely (5): the first 10 items are for anxiety and the last 15 items for depression screening (Nettelbladt, Hansson, Stefansson, & Borgquist, 1993). A mean score  $\geq 1.75$  on any HSCL-25 subscale indicates a psychiatric case of depression or anxiety. The Cronbach's alpha was 0.92 for the total scale, 0.92 for the Depression subscale and 0.87 for the Anxiety subscale in the current sample.

The Simple Screening Instrument for Alcohol and Other Drugs (SSI-AOD) consists of 16 items scored on a dichotomous scale (Center for Substance Abuse Treatment, 1994). Participants who score  $\geq 4$  meet the diagnosis of substance abuse, while a score of 1–3 indicates substance use. The Cronbach's alpha was 0.82 in the current sample.

Interpersonal violence was measured by the revised Conflict Tactics Scales short form (CTS2S) (Straus & Douglas, 2004). The CTS2S consists of 20 items scored on an eight-point Likert scale ranging from once in the past year (1) to this has never happened (8) (Straus & Douglas, 2004). The Cronbach's alpha was 0.94 in the current sample.

### 2.4. Statistical analysis

All statistical analyses were computed using SPSS version 22 for the Social Sciences, and Pearson's  $r$  coefficient was used to identify correlations between variables. In addition, regression analysis was performed to identify the contribution of each independent variable to substance uses. The unique contribution of each independent variable was shown by considering the  $\beta$  coefficient, the  $t$ -statistic and the  $p$ -value. Significant  $\beta$  values were retained at an  $\alpha$  threshold of  $p < 0.05$  with an intensity of  $\geq 0.20$ . For the moderation analysis, the interaction terms were mean-centred to minimize the problem of multicollinearity. The

predictor variable had tolerance values  $> 0.4$  excluding multicollinearity.

## 3. Results

The participants had clinically significant levels of PTSD (28%), anxiety (29%), depression (9%) and substance abuse (28%). The results showed that substance abuse was significantly correlated with PTSD, anxiety, depression and interpersonal violence (Table 1).

### 3.1. Moderating effect of interpersonal violence on the relationships between PTSD, anxiety and depression symptoms, and substance abuse

The interaction effects of each mental disorder and interpersonal violence on the severity of substance abuse were assessed by three linear regression analyses. First, the interaction between PTSD symptoms and interpersonal violence ( $B = 0.006$ ,  $\beta = 0.431$ ,  $p < 0.001$ ) was a significant predictor, explaining 28.4% of the variance in substance abuse (Table 2 and Figure 1). Secondly, the interaction between anxiety symptoms and interpersonal violence ( $B = 0.021$ ,  $\beta = 0.465$ ,  $p < 0.001$ ) was a significant predictor, explaining 37.7% of the variance in substance abuse (Table 3 and Figure 2). Thirdly, the interaction between depressive symptoms and interpersonal violence ( $B = 0.015$ ,  $\beta = 0.478$ ,  $p < 0.001$ ) was a significant predictor, explaining 35.7% of the variance in substance abuse (Table 4 and Figure 3).

## 4. Discussion

This study explored the associations between substance use and the common mental health conditions PTSD,

**Table 1.** Descriptive statistics and correlation between variables ( $N = 143$ ).

	<i>M</i>	<i>SD</i>	HSCL-A	HSCL-D	PCL-5	SSI-AOD	IPV
HSCL-A	15.1	5.70	–	0.849**	0.650**	0.437**	0.352**
HSCL-D	24.4	9.4		–	0.702**	0.372**	0.314**
PCL-5	21.0	19.0			–	0.331**	0.418**
SSI-AOD	3.4	4.7				–	0.366**
IPV	40.6	13.8					–

HSCL-A, Hopkins Symptom Checklist Anxiety subscale; HSCL-D, Hopkins Symptom Checklist Depression subscale; PCL-5, PTSD Checklist for DSM-5; SSI-AOD, Simple Screening Instrument for Alcohol and Other Drugs; IPV, interpersonal violence.

\*\* $p < 0.01$ .

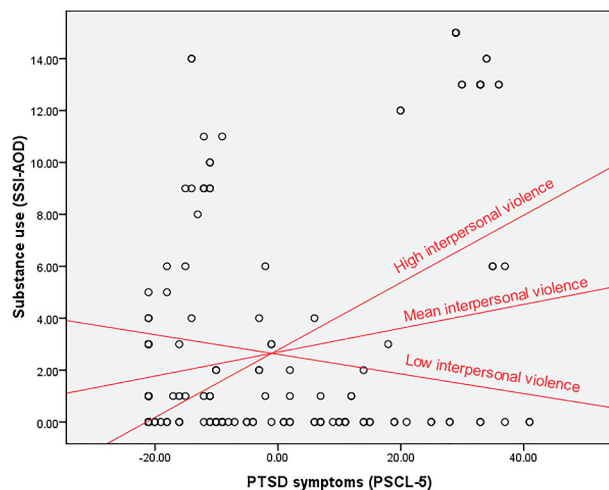
**Table 2.** Moderating effect of interpersonal violence (IPV) in the relationship between post-traumatic stress disorder (PTSD) symptoms and substance abuse.

Variable	<i>B</i>	<i>SE</i>	$\beta$
IPV	0.006	0.033	0.018
PTSD symptoms (PCL-5)	0.046	0.020	0.185*
(PCL-5) * IPV	0.006	0.001	0.431**

$R^2 = 0.284$  ( $p < 0.00$ ).

\* $p < 0.05$ , \*\* $p < 0.01$ .

PCL-5, PTSD Checklist for DSM-5.



**Figure 1.** Substance use versus post-traumatic stress disorder (PTSD) symptoms. SSI-AOD, Simple Screening Instrument for Alcohol and Other Drugs; PSCL-5, PTSD Checklist for DSM-5.

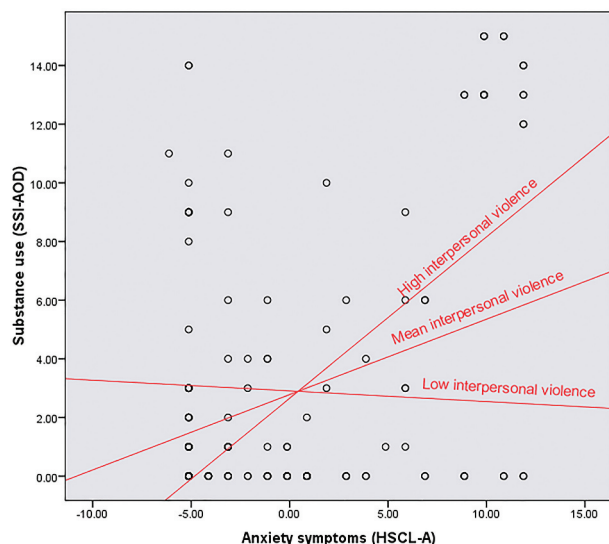
**Table 3.** Moderating effect of interpersonal violence (IPV) in the relationship between anxiety symptoms and substance abuse.

Variable	<i>B</i>	<i>SE</i>	$\beta$
IPV	-0.009	0.030	-0.025
Anxiety symptoms (HSCL-A)	0.257	0.060	0.307**
HSCL-A * IPV	0.021	0.004	0.465**

$R^2 = 0.377$  ( $p < 0.00$ ).

\*\* $p < 0.01$ .

HSCL-A, Hopkins Checklist Anxiety subscale.



**Figure 2.** Substance use versus anxiety symptoms. SSI-AOD, Simple Screening Instrument for Alcohol and Other Drugs; HSCL-A, Hopkins Symptom Checklist Anxiety subscale.

anxiety and depression, as well as how interpersonal violence plays a moderating role within these relationships. As hypothesized and consistent with previous studies, the results support the proposition that PTSD (Read et al., 2012; Stappenbeck, Bedard-Gilligan, Lee, & Kaysen, 2013), anxiety (Cranford, Eisenberg, & Serras, 2009; Kendler, Prescott, Myers, & Neale, 2003) and depression

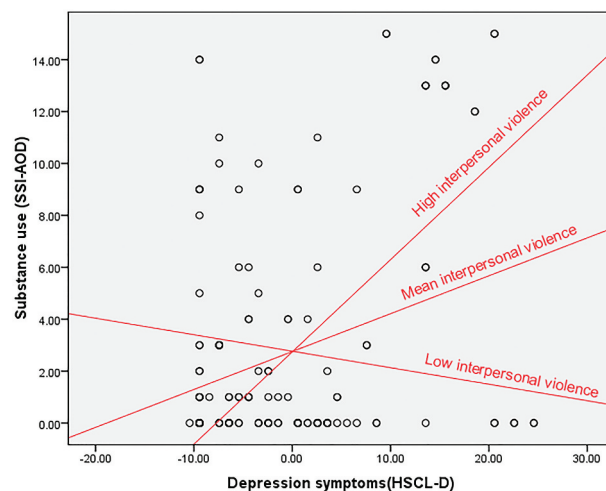
**Table 4.** Moderating effect of interpersonal violence (IPV) in the relationship between depression symptoms and substance abuse.

Variable	<i>B</i>	<i>SE</i>	$\beta$
IPV	0.000	0.030	-0.003
Depression symptoms (HSCL-D)	0.146	0.036	0.287**
HSCL-D * IPV	0.015	0.003	0.478**

$R^2 = 0.358$  ( $p < 0.00$ ).

\*\* $p < 0.01$ .

HSCL-D, Hopkins Symptom Checklist Depression subscale.



**Figure 3.** Substance use versus depression symptoms. SSI-AOD, Simple Screening Instrument for Alcohol and Other Drugs; HSCL-D, Hopkins Symptom Checklist Depression subscale.

(Cranford et al., 2009; Wang et al., 2007) are associated with substance abuse. The results went on to show that interpersonal violence moderated the relationships between PTSD, anxiety and depression, and substance abuse. These results support the view that individuals reporting both interpersonal violence and symptoms of severe mental illnesses are at elevated risk for a range of substance use problems (Mulvey, 1994; Paranjape et al., 2007; Rivera et al., 2015).

Our results are in line with the self-medication hypothesis first elaborated by psychoanalysts (Rado, 1933) and summarized by Khantzian (1985). As such, Rwandan students may use drugs/alcohol as a coping strategy to regulate painful affects, most often those of moderate to severe depression, PTSD, anxiety and interpersonal violence. Related to this, there is currently an alarming rate of substance use in Rwandan youth, with up to 52.5% of those aged 14–35 years having used or abused at least one substance in their lifetime (Kanyoni, Gishoma & Ndahindwa, 2015). Students who meet the criteria for any mental disorders and for substance abuse are almost always subject to mental illness first and substance abuse subsequently (Deykin, Levy, & Wells, 1986).

## 5. Strengths and limitations

The strengths of our study include its being conducted in a post-conflict country, Rwanda, where mental health



problems, interpersonal violence and substance abuse are highly prevalent, and studies are scarce owing to financial constraints as well as the impacts of the genocide against the Tutsi in 1994. Given that the sample represents one in which the risks of mental disorders, substance abuse and interpersonal violence are high, the findings presented here should be generalizable across other similar clinical samples.

The cross-sectional research design was the study's biggest limitation, as well as the lack of exploration of other factors that could have theoretical importance to the study variables and the relationships discovered, but were not investigated under the scope of this study. Other factors that could be important and warrant future study include attachment styles (Kassel, Wardle, & Roberts, 2007), genetic and epigenetic vulnerabilities (Kendler et al., 2003; Perroud et al., 2014), and environmental factors such as early exposure to stress or trauma (Kelly & Daley, 2013). Other unaccounted socioeconomic factors, such as parental income and parental education status, could also contribute to the relationships between study variables (Davis-Kean, 2005). Thus, future studies would be beneficial, in which these factors are further investigated. To support the need to enhance the healthcare responses and the need for specific targeted programmes of care, longitudinal studies on the long-term implications of interpersonal violence would be highly beneficial. In addition, this was an opportunistic sample in that it was readily available for study, but we believe that this could be translated to situations outside this group to consider other vulnerable groups that may need assistance and may not be recognized at other times.

## 6. Conclusion

Our findings highlight that PTSD, depression and anxiety symptoms are associated with an increased risk of substance use, and the risk is substantially elevated when there are also current or historic reports of interpersonal violence. These findings highlight the importance of prevention and intervention programmes, particularly within the post-conflict population of Rwanda. These programmes should consider prioritizing the assessment of active or historic interpersonal violence and consider working with these important issues when offering treatment programmes for individuals with mental disorders and substance abuse problems.

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## Authors' contribution

All authors contributed to research design, data collection, data analysis, drafting and revising the article, gave final

approval of the version to be published, and agree to be accountable for all aspects of the work.

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## Data availability statement

The authors declare that no data are available for this article.

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