The Association between Sexual Violence Victimization, Prescription Drug Misuse, Bullying Experience and Suicidal Behaviors in a National Sample of Adolescents

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Abstract: Suicide is a global public health concern. The interplay of the multiple risk factors (sexual violence victimization, prescription drug misuse, bullying experience) with adolescents' suicidal behaviors has not been studied extensively. The purpose of this study is to examine the association between sexual violence victimization, prescription drug misuse, bullying experience, and suicidal behaviors in adolescents in the United States, by using the 2019 National Youth Risk Behavior Survey (YRBS) data. The national YRBS, conducted by the Centers for Disease Control and Prevention (CDC), provides nationally representative data on adolescents from public and private schools. Students from 9th to 12th grade are included in the YRBS survey. In this study, 8266 usable questionnaires from the 2019 National YRBS were analyzed. Descriptive statistics were used to analyze all pertinent demographic variables. Multiple regression analyses were conducted to detect the association between sexual violence victimization, prescription drug misuse, bullying, and suicidal attempts among adolescents. Regression analysis indicated a strong association between sexual abuse and suicide attempts. Moreover, the interactive impact of prescription drug misuse with sexual abuse experience is highly correlated with suicide attempts. However, the experience of cyberbullying along with prescription drug misuse decreases suicide attempts. Significant gender differences were also observed in regression analysis.

Keywords: *Adolescents, Suicide, Sexual Violence, Cyberbullying, Prescription Drug Misuse*

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Introduction

Suicide is a significant global public health concern with detrimental mental, social, and economic consequences (Baiden et al., 2020). Globally, suicide poses a health challenge with over 700,000 deaths annually (World Health Organization [WHO], 2021). In the United States, suicide rates have increased by approximately 30% between 2000 and 2017. The term 'suicide' was coined in 1643, derived from the Latin words SUI, meaning self, and CIDE, meaning murder, reflecting the act of self-murder (Guo, 2013). Suicidal behavior often accompanies with feeling of hopelessness, depression, and self-destructive behaviors (Castle & Kreipe, 2007). The severity of one's suicidal behavior increases the likelihood of death by suicide (Mazza & Reynolds, 2008). The interpersonal-psychological theory of suicide suggested that intense pain, violence, accidents, or injuries can contribute to the development of deliberate self-injury (Joiner, 2009; Karaman, 2013).

Suicidal thoughts and attempts are more prevalent than actual deaths by suicide (Centers for Disease Control and Prevention [CDC], 2022a; Miller & Prinstein, 2019). In 2020, 1.2 million people attempted suicide, resulting in 45, 979 deaths (CDC, 2022a). Furthermore, suicide not only leads to death but also causes injuries, self-harm, poisonings, or overdoses, resulting in visits to the Emergency Department (Yard et al., 2021). Importantly, the actual number of suicide attempts may be underestimated if no medical treatment is sought. These trends highlight the urgent need for comprehensive strategies to address and prevent suicide, particularly among at-risk populations, adolescents.

Suicide among Adolescents

Adolescents and young adults undergo a challenging transitional period characterized by new identities, independence, and dynamic social circumstances (Xiao et al., 2021). This transition, combined with biological, hormonal, and psychological changes leads to increased stress. The shifting social positions during this phase also raise the risk of anxiety and depression in teenagers (Karaman, 2013; Miller & Prinstein, 2019). In the United States, adolescents and young adults aged 10–24 years are particularly vulnerable to suicidal behavior (Ivey-Stephenson et al., 2020). Suicide was the second leading cause of teen deaths in the US in 2020 (National Institute of Mental Health [NIMH], 2022).

The prevalence of suicide attempts among youths has increased from 6.3% to 8.9% between 2009 and 2019 (Ivey-Stephenson et al., 2020). Youth who attempt suicide are more likely to repeat their attempts, increasing the risk of eventual death (Berman et al.2006; WHO, 2021). Recent national data shows that 18.8% of high school students seriously considered suicide, and 8.9% of them attempted it (Ivey-Stephenson et al.). In 2018 alone, 95,000 youths aged 14 to 18 years sought emergency care for self-harm injuries resulting from suicide attempts (CDC, 2020a).

Suicidal behavior in adolescents can be influenced by various risk factors, including biological, psychosocial,

economic, political, and cultural factors (Banyard & Cross, 2008; Xiao et al., 2021). Individual-level risk factors for adolescent suicide include mental disorders, depressive symptoms, physical trauma, emotional abuse, bullying, substance use disorders, and sleep disturbances (Basile et al., 2020; Bounds et al., 2019; CDC, 2022a; Hill et al., 2018). Previous suicide attempts, emotional reactivity, and aggressive-impulsive behavior can also trigger suicidal tendencies (Baiden, Kuuire et al., 2019). Family processes like parental depression, parental suicidal behavior, poor communication, or family violence can also contribute to suicide (Bilsen, 2018; Youth Report, n.d.). Specific life events like interpersonal losses, adverse childhood experiences, as well as experiencing any stressful event can initiate suicidal thoughts in adolescents (Bilsen, 2018; Cash & Bridge, 2009; Liu et al., 2019). Societal risk factors include socio-economic changes, inequality, and political impact (Youth Report, n.d.; Xiao et al., 2021). Furthermore, the age or maturity of adolescents plays a role, as students in higher grades have higher suicide attempt rates compared to those in lower grades (CDC, 2020b).

Sexual Violence and Suicide among Adolescents

Sexual violence has negative effects on the physical and mental well-being of adolescents, leading to various negative behaviors (CDC, 2022b). Research indicates that victims of sexual violence, both male and female, are more likely to engage in harmful habits such as smoking, alcohol consumption, drug misuse, and marijuana abuse (Basile et al., 2020; Champion et al., 2004; Cho et al., 2021). They are also prone to misusing prescription pain medication and experiencing persistent feelings of sadness, hopelessness, and suicidal thoughts. Furthermore, sexual violence impacts adolescents' sexual health behaviors, with victims being more likely to engage in risky practices, including having multiple sex partners and engaging in unprotected sexual activities (Haynie et al., 2013). Academic performance, sports participation, and cognitive abilities also suffer as a result of sexual violence. Survivors of sexual violence face physical, psychological, and societal trauma, putting them at risk of developing affective disorders such as PTSD, depression, substance abuse, anxiety, and engaging in suicidal behavior (Basile et al., 2020; CDC, 2022a).

The desire to escape the suffering and trauma caused by the abusive experience increases the likelihood of suicidal attempts among adolescents (Miller & Prinstein, 2019). Childhood sexual abuse is particularly associated with suicidal behavior in this age group (Serafini et al., 2015; Brockie et al., 2015). Recent studies have found a significant correlation between experiences of sexual victimization and later suicide behavior, with victims exhibiting higher rates of suicidal thoughts and attempts in their middle age (Thompson et al., 2019). Overall, sexual violence has profound and long-lasting consequences on the lives of adolescents, affecting their physical and mental health, as well as their overall well-being.

NUPD (Nonmedical use of prescription drugs) and Suicide among Adolescents

Prescription drug misuse (PDM) refers to the improper use of prescription drugs, such as taking them in higher doses or more frequently than prescribed or using them to experience euphoria (National Institute of Drug Abuse [NIDA], 2018; Substance Abuse and Mental Health Services Administration, [SAMHSA], 2020).

Commonly misused prescription drugs include Codeine, Vicodin, OxyContin, Hydrocodone, and Percocet. Among young adults, prescription drug misuse often occurs in social settings (Baiden & Tadeo, 2020). The misuse of prescription drugs has been on the rise, with the number of prescriptions doubling between 1999 and 2011. In 2019, about 2.3% of adolescents (approximately 567,000 individuals) misused prescription pain relievers (SAMHSA, 2020). Opioid-related suicides have also doubled over the past 15 years (Esang & Ahmed, 2018). In 2020, overdose involving opioids killed nearly 69,000 people and over 82% of those deaths involved syntheic opioids (Hedegaard et all., 2021). The self-medication hypothesis suggests that substance use is driven by an inability to cope with strong negative emotions (Espelage et al, 2018). Accordingly, individuals who have experienced sexual violence or teen dating violence often turn to prescription drugs to cope with the trauma. Substance abuse can lead to negative psychological effects and impair decision-making abilities. The misuse of prescription drugs has serious consequences, including drowsiness, unconsciousness, overdose, and death (Jessell et al., 2017).

Bullying and Suicide among Adolescents

Bullying is unwanted aggressive behavior that involves a power imbalance and is repeated or likely to be repeated (Gladden et al., 2014). Traditional bullying includes verbal abuse, physical acts, and spreading rumors in settings like schools (Yang et al., 2021). Cyberbullying, which occurs through digital devices, intentionally irritates someone using technology platforms like social media (Hinduja & Patchin, 2019). Both school bullying and cyberbullying contribute to increased substance use among adolescents, including binge drinking and cannabis use. They also predict negative outcomes such as cigarette smoking, alcohol use, marijuana use, illicit drugs, suicide ideation, suicide attempts, and poorer psychological adjustment (Baiden & Tadeo, 2020; Kuehn et al, 2018). Cyberbullying victimization is strongly linked to substance use, supporting the self-medication theory that substances are used as a coping mechanism for bullied adolescents (Baiden & Tadeo). Research has emphasized the connection between bullying and suicidal behaviors, as well as the correlation between bullying and psychological adjustment issues globally (Hinduja & Patchin, 2019).

Aim

Problem-behavior theory suggests that engaging in one problem behavior increases the likelihood of involvement in other problem behaviors, explaining the overlap between substance use, sexual violence, suicide, and other risky behaviors (Jessor et al.,1977; Karaman, 2013). Correlations have been found between sexual violence victimization and prescription drug misuse, as well as between bullying and substance use disorder (Ashrafioun et al., 2017; Baiden & Tadeo, 2020; Jessell et al., 2017). However, the relationship between these co-occurring behaviors and suicide attempts remains relatively unexplored. The study aims to examine this correlation guiding by the following hypothesis:

1. Adolescents with experience of both sexual violence and non-medical use of prescription drugs for self-medication will exhibit either a lower or higher number of suicide attempts.

2. Adolescents who have experienced bullying and engage in non-medical use of prescription drugs for self-medication will either have a lower or higher number of suicide attempts.

Method

The National Youth Risk Behavior Survey (YRBS) conducted by the CDC, along with state-level, local, territorial, and school-based surveys. Established in 1990, YRBS has been gathering data biennially since 1991. The objectives of YRBS include determining the prevalence of health risk behaviors, tracking changes over time, examining the co-occurrence of behaviors, and providing comparable data at various levels (CDC, 2020b). In this study, secondary data were collected from the 2019 National YRBS.

Sampling Method and Questionnaire

The YRBS used a three-stage cluster sampling design to ensure a diverse and representative sample of adolescents. In the first stage, 1,257 primary sampling units (PSUs) were selected in county level. The second stage involved selecting a physical school that offered grades nine to twelve. In the third stage, one or two classrooms were randomly selected from each grade (Underwood et al., 2020; Kann et al., 2018).
A computer-scannable, self-administered anonymous questionnaire was used in this survey. The completion of srvey takes approximately one class period. The survey questions have undergone test-retest analysis and demonstrated good reliability (Underwood et al.).

Data Collection and Response Rate

The YRBS protocol was approved by the CDC's Institutional Review Board, privacy of students was safeguarded, and their participation was voluntary. As the participants were minors, parental permission was also obtained for the completion of the survey. In the 2019 YRBS, 136 schools participated, providing 13,677 completed questionnaires (CDC, 2020b).

Measures and Weighting

The 2019 National YRBS consisted of 99 questions, all categorized as nominal or ordinal variables. It collects information on six categories of health behaviors like injury and violence, tobacco use, drug use, risky sexual behaviors, dietary behaviors, and physical inactivity (CDC, 2020a). This research focused on five specific questions, one measured sexual violence experience, two measured bullying behavior (on-site bullying in school and electronic bullying), one measured misuse of prescription pain medicine (lifetime use), and one measured suicide attempts (CDC, 2020b).

YRBS data were weighted to ensure representation of all students in grades 9-12 attending U.S. schools. A

weight based on sex, race, and grade was applied to survey responses (Brener et al., 2013). The weighted sample was adjusted to match the total sample size while maintaining proportional representation of students across different grades, aligning with the U.S. population (CDC, 2020a; Kann et al., 2018).

Analysis

In this quantitative study, nominal data were translated into coded numeric format. Descriptive statistics were used to analyze demographic variables, while multiple regression analysis was employed to examine the association between sexual victimization, bullying, NUPD use, and suicide attempts. Correlational statistics were used to explore the impact of various health risk behaviors on overall suicide attempts, considering gender and racial effects in the association.

Results

In this study, 8,266 usable questionnaires were analyzed. It was a cross sectional, correlational study. The average age of students was 15.94 years. About 25.74% adolescents selected “yes” for Hispanic/Latino. Rest of the study participants selected no for Hispanic/Latino. Descriptive statistics shows the mean, standard deviation, minimum and maximum values of each of the variables (see Table 1). The suicide attempt percentage has a mean of 0.150 with a standard deviation of 0.533 and ranges from 0 to 4. The mean percentage of sexual violence experience is 0.021, the mean percentage of lifetime use of the prescription drug is 0.288, the mean percentage of being a bully victim physically is 0.193 and the mean percentage of cyberbully victims is 0.148.

Table 1: Descriptive Statistics of Viarriables

Variable	Mean	Standard Deviation	Min	Max
Suicide Attempt	0.151	0.535	0	4
Forced sex	0.210	0.691	0	4
Pd use lifetime	0.289	0.866	0	5
Bullied school	0.194	0.395	0	1
Cyberbully	0.149	0.356	0	1
Age (12=0, 13=1….18=6)	3.991	1.211	0	6
White	0.500	0.500	0	1
Female	0.513	0.500	0	1

The correlation statistics has shown that all risky health behaviors have a particular relation with suicidal behavior (see Table 2). Being a victim of sexual abuse had a positive correlation with a suicide attempt. Similarly, misuse of PD showed progressive relation with attempting suicide among adolescents. However, the

incidence of bullying that happened in school areas had a negative correlation with age. Additionally, female adolescents had a positive coefficient, indicating a positive connection with suicide attempt percentage. However, being White and female (White* Female percent of) had a negative coefficient, indicating a negative relation with suicide attempt percentage.

Table 2: Correlation Analysis

	1	2	3	4	5	6	7	8
Suicide Attempt	1.000							
Forced sex	0.292	1.000						
PD use lifetime	0.216	0.170	1.000					
Bullied school	0.204	0.196	0.112	1.000				
Cyberbully	0.199	0.225	0.093	0.491	1.000			
Age	-0.020	0.008	0.021	-0.074	-0.051	1.000		
White	-0.055	-0.014	-0.061	0.088	0.081	-0.009	1.000	
Female	0.060	0.132	0.031	0.094	0.139	-0.063	-0.009	1.000

A regression analysis was performed to explore the effects of risky health practices of teenagers on the frequency of suicide attempts. Table 3 (regression analysis table) demonstrates the correlation of all independent variables. The dependent variable was the number of suicide attempts.

Table 3: Regression Statistics

Variables	Coefficients	Std. Error	P-value
Intercept	0.090	0.021	<0.001
Forced sex	0.138	0.009	<0.001
PD use lifetime	0.032	0.008	<0.001
Forced sex* PD use lifetime	0.040	0.006	<0.001
Bullied school	0.099	0.017	<0.001
Cyberbully	0.114	0.019	<0.001
Bullied school* PD use lifetime	0.103	0.017	<0.001
Cyberbully*PD use lifetime	0.034	0.019	0.065
Age	-0.006	0.004	0.163
White	-0.023	0.016	0.133
Female	0.045	0.015	0.003
White* Female	-0.076	0.022	0.000

Note: There were 8,266 observations for regression. Value of R^2 is 0.16.

Being a victim of sexual abuse has a significant association with suicide attempts. The coefficient value for forced sex was 0.138 which means that for every 100 students who experienced forced sexual intercourse, they will attempt average about 14 more suicide attempts than the students who did not experience sexual abuse (see Table 3).

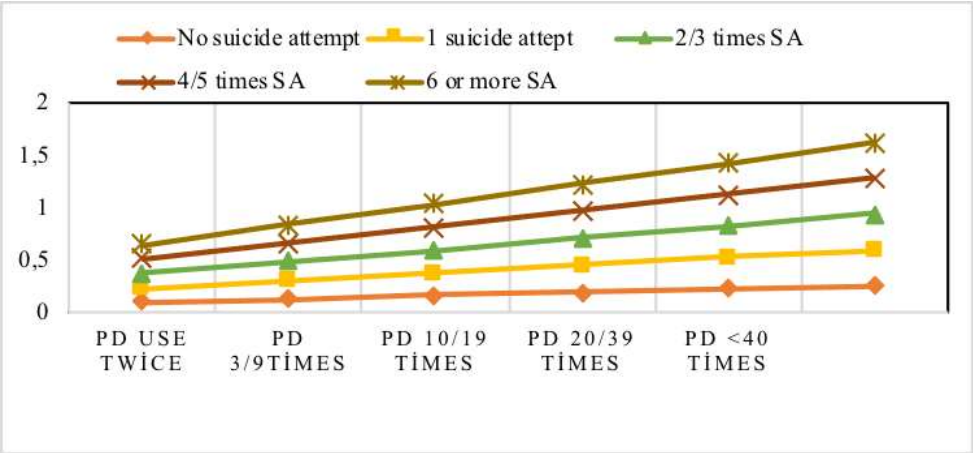

Figure 1: Suicide Attempts by Sexual Violence and Drug Misuse

The preceding graph (see Figure 1) illustrates the combining effect of sexual abuse and drugs misuse on suicide attempts of adolescents. For every two students who experienced forced sexual abuse and also misused prescription drugs, they would try average one more suicide attempt than those who did not misuse prescription drugs (0.498).

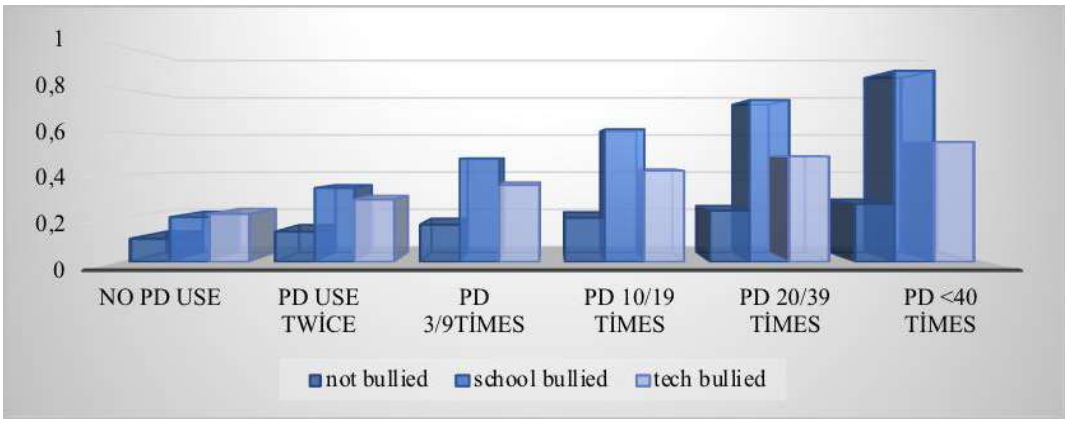

Figure 2: Suicide Attempts by Bullying and Drug Misuse

The study found the interaction of bullying and drugs misuse on suicide attempts (see Figure 2). Bullied at school would also have quite a high increase in average suicide attempts, especially when misusing prescription drugs. But adolescents who were cyberbullied and had a history of using prescription drugs, the interactive impact was not significant.

Discussion

The purpose of this research was to examine whether a sexual violence victim experiences more, or less frequent suicide attempts accompanied by use of self-medication. Additionally, the study explored the interactive impact of prescription drug misuse on bully victims and their suicide attempts. Understanding these associations is crucial as they address significant public health concerns (Baiden et al., 2020; Kann et al., 2018). Regression analysis revealed that multiple risk factors had a more pronounced effect on adolescents. The results indicated a significant association between SVV and suicide attempts, with forced sex (SVV) showing a coefficient value of 0.138 which means that students experiencing sexual abuse had an average of 14 more suicide attempts per 100 students compared to those who did not. Moreover, the study found that the frequency of suicide attempts increased among sexually victimized adolescents who misused prescription drugs. This aligns with previous literature emphasizing the strong connection between SVV and suicide attempts among male and female adolescents (Basile et al., 2006; Basile et al 2020; Liu et al., 2019). Similarly, bullying at school also contributed to a higher average of suicide attempts, especially when combined with prescription drug misuse. The study highlights that combining two factors can escalate the overall number of youth suicide attempts. Despite the assumption that prescription drug use reduces affective disorders among adolescents, it appears that drug abuse may worsen the cycle of unhealthy attitudes of adolescents.

However, when examining the interactive impact of cyberbullying and prescription drug misuse, the results were not significant. Prior studies have yielded mixed results regarding the association. Some suggesting a link to suicide ideation and others to self-harm behaviors rather than suicidal intent (Baiden & Tadeo, 2020; John et al., 2018; Dorol & Mishara, 2021). Additionally, cyberbullying may have an accumulative effect when combined with in-person bullying (Hinduja & Patchin, 2018; John et al., 2018).
The study revealed a higher likelihood of suicide attempts among non-White males compared to White males (with a difference of 0.023). Prior research has consistently shown an increase in self-reported suicidal behaviors among non-White males (Lindsey et al., 2019; Xiao et al., 2021). Results also found a notable increase in suicide attempts among female adolescents, as evidenced by a positive coefficient. However, White females had fewer expected suicide attempts compared to other groups, while non-White females had more expected suicide attempts than non-White males. It is well-documented in the literature that girls are more likely than boys to attempt suicide during adolescence (Cash & Bridge, 2010).

Females have a higher susceptibility to risky behaviors like violence victimization and cyberbullying (Baiden et al., 2020). Negative experiences on social media platforms, such as negative remarks, body shaming, and stalking, can have detrimental effects on their psychological well-being, sleep patterns, eating habits, and mental health, potentially leading to depression, self-medication, and suicidal thoughts. It is essential for intervention programs to prioritize the unique needs of female adolescents and implement targeted interventions. Additionally, understanding the underlying mechanism behind the observed racial difference is important and should be addressed.

Conclusion

To promote a healthy environment for adolescents, it is essential to reduce risky health practices. School boards can implement targeted programs, identify at-risk adolescents, and create peer support systems and social learning programs. Policymakers should focus on adolescents' specific needs and implement cost-effective intervention programs that address multiple risk factors (Baiden, Kuurie et al., 2019). Comprehensive training and health education should be provided by schools, teachers, communities, and social support systems to reduce misconceptions among adolescents. Suicide prevention strategies should address the specific needs of female adolescents and prioritize interventions to reduce the rising trend of suicidal behavior among them.

Recommendation

This study's cross-sectional design limits its ability to establish causal relationships between variables, emphasizing the need for longitudinal research (Baiden et al., 2020). Utilizing a combination of quantitative questionnaires and in-depth interviews can provide more comprehensive understanding of the causal links between suicide and various risk factors. It is crucial for future studies to include data on sexual orientation to account for the unique experiences and health risks faced by LGBT individuals (Baiden et al., 2020) . Self-reported answers in the YRBS data may be prone to recall error and under-reporting of sensitive issues, emphasizing the importance of incorporating data from multiple sources (Brener, Billy et al., 2003). Additionally, the study acknowledges that the R2 value (0.16) is relatively small, suggesting the presence of other unexplored factors influencing youth suicidality. Future research should consider these factors and expand the understanding of adolescent suicidal behaviors.

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