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INTRODUCTION

- Suicide is the third leading cause of death among adolescents in the United States.¹
- Risk factors for high-school aged adolescent suicide include: body mass index and perceived weight; sexual activity; dating violence; perceived low academic performance; sexual orientation; family history of suicide; psychopathology; stressful life events; substance abuse; and access to firearms.²
- A gender paradox exists in which boys have a suicide completion rate six times higher than that of girls, while girls have twice the rate of suicide attempts than boys.³
- Most studies of adolescent suicide ideation, planning and attempt have focused on high-school aged adolescents.
- Studies examining the risk factors for suicide ideation and planning among middle school adolescents, particularly in rural areas, are limited.
- The objective of this cross-sectional study is to examine the risk factors, including being bullied in school, for suicide ideation and planning among middle school adolescents in a rural Appalachian County in Ohio.

METHODS

- **Study Setting:** A rural Appalachian county in Northeast Central Ohio.
- **Study Population:** Of the 1,032 middle school students (6th - 8th grades) in the county in 2009, 47.5% (n=490) were surveyed for the study.
- **Survey Instrument:** The 2009 National Middle School Youth Risk Behavior Survey (YRBS)-- a confidential, voluntary, and self-administered instrument used nationally to assess behavioral risk factors among adolescents. The YRBS survey instrument included 50 questions on: demographics; behaviors that contribute to unintentional injuries and violence; tobacco use; alcohol and other drug use; sexual risk behaviors; unhealthy dietary behaviors; and physical inactivity.
- **Data Analyses:** Descriptive, univariable and multivariable logistic regression analyses were performed to assess the relationship between suicide ideation and planning with putative risk factors using SAS 9.1.3[®](Cary, NC). Entry criteria of p=0.5 and p=0.15 for variable remaining in the model were used respectively in the stepwise multivariable logistic regression models.

RESULTS

Table 1 Demographics, High-risk Behaviors, Bullying Experience in School and Suicide Ideation and Planning among Rural Appalachian Middle School Adolescents, 2009 (N= 490)*

	n	%	
Age (years)	≤ 12	142	30.0
	13	186	39.2
	≥ 14	146	30.8
Sex	Female	236	48.2
	Male	254	51.8
Race/Ethnicity	American Indian or Alaska Native	24	5.3
	Asian/Native Hawaiian or Other Pacific Islanders	8	1.8
	Black or African American	7	1.5
	Hispanic or Latino	23	5.0
	White	395	86.4
Self-perception of weight	Very underweight	30	6.4
	Slightly underweight/About the right weight	317	67.6
	Slightly overweight/Very overweight	122	26.0
Ever had sexual intercourse	Yes	82	17.5
	No	387	82.5
Ever been bullied on school property	Yes	229	47.0
	No	258	53.0
Ever seriously thought about killing yourself	Yes	109	22.3
	No	379	77.7
Ever made a plan about how you would kill yourself	Yes	66	13.6
	No	419	86.4
Ever tried to kill yourself	Yes	40	8.3
	No	443	91.7
Ever tried cigarette smoking	Yes	139	29.5
	No	332	70.5
Ever had a drink of alcohol	Yes	183	39.0
	No	286	61.0
Ever used marijuana	Yes	41	8.7
	No	431	91.3
Ever used any form of cocaine, including powder, crack, or freebase	Yes	7	3.6
	No	455	96.4
Ever sniffed glue, or breathed the contents of spray cans, or inhaled any paints or sprays to get high	Yes	50	10.6
	No	423	90.4
Ever used steroid pills or shots without a doctor's prescription	Yes	13	2.8
	No	458	97.2

*Not all variable values may add up to 490 due to missing data

RESULTS (continued)

TABLE 2 Association between Demographic Characteristics, High-risk Behaviors and Suicide Ideation and Planning among Rural Appalachian Middle School Adolescents, 2009

Risk Factor	Suicide Ideation [†] / Suicide Planned [‡]	
	Crude OR (95% C.I.) [*]	Crude OR (95% C.I.) [*]
Age (years) [†]		
≥14	1.9 (1.1 – 3.3)	1.5 (0.8 – 2.3)
13	1.2 (0.7 – 2.3)	1.2 (0.7 – 2.3)
Female	2.1 (1.4 – 3.3)	1.8 (1.4 – 3.1)
Very underweight [§]	2.0 (0.9 – 4.6)	1.6 (0.9 – 2.9)
Slightly overweight/Very overweight [§]	2.3 (1.5 – 3.8)	1.9 (0.7 – 2.3)
Ever had sex	3.4 (2.1 – 5.7)	4.6 (2.6 – 8.2)
Ever tried cigarette smoking	3.7 (2.3 – 5.6)	4.1 (2.4 – 7.0)
Ever had a drink of alcohol	2.6 (2.6 – 4.0)	2.1 (1.2 – 3.5)
Ever used marijuana	3.2 (1.7 – 6.2)	2.9 (1.4 – 6.2)
Ever used any form of cocaine, including powder, crack, or freebase	3.2 (1.2 – 8.7)	8.4 (3.1 – 22.7)
Ever sniffed glue, or breathed the contents of spray cans, or inhaled any paints or sprays to get high	4.4 (2.4 – 8.1)	5.7 (3.8 – 10.8)
Ever used steroid pills or shots without a doctor's prescription	2.2 (0.7 – 6.9)	3.0 (0.9 – 10.2)
Ever been bullied on school property	2.3 (1.4 – 5.9)	2.7 (1.5 – 4.7)

[†]Suicide Ideation = "Ever seriously thought about killing yourself"
[‡]Suicide Planned = "Ever made a plan about how you would kill yourself"
^{*}OR: Odds Ratio; 95% C.I.: 95% Confidence Interval
[†]Reference group: ≤12 years;
[§]Reference group: slightly under weight or normal weight

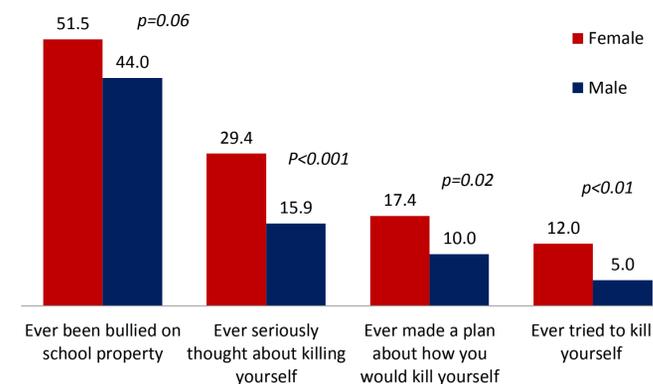


FIGURE 1 Proportion of Middle School Rural Appalachian Adolescents Reporting Experiencing Bullying in School and Suicidal Tendencies by Sex, 2009

RESULTS (continued)

TABLE 3 Multivariable Logistic Regression Analyses of Association between Middle School Adolescent Suicide Ideation and Planning and Putative Risk Factors among Rural Appalachian Adolescents, 2009

Risk Factor	Suicide Ideation [†] / Suicide Planned [‡]	
	Adjusted OR (95% C.I.) [*]	Adjusted OR (95% C.I.) [*]
Female	2.7 (1.6 – 4.5)	2.7 (1.2 – 4.4)
Slightly overweight/Very overweight [†]	2.1 (1.2 – 3.5)	-
Ever had sex	2.0 (1.1 – 3.8)	2.2 (1.1 – 4.5)
Ever used any form of cocaine	-	3.9 (1.1 – 14.0)
Ever sniffed glue, or breathed the contents of spray cans, or inhaled any paints or sprays to get high	3.0 (2.1 – 11.9)	3.2 (1.5 – 6.8)
Ever been bullied on school property	1.9 (1.2 – 3.1)	2.7 (1.4 – 5.1)

[†]Suicide Ideation = "Ever seriously thought about killing yourself"
[‡]Suicide Planned = "Ever made a plan about how you would kill yourself"
^{*}OR: Odds Ratio; 95% C.I.: 95% Confidence Interval;
[†]Reference group: slightly under weight or normal weight

CONCLUSIONS

- Several previously identified risk factors for suicide ideation and planning among high-school aged adolescents were also observed in this rural Appalachian middle school adolescents population.
- Additionally, experiencing bullying in school was found to be significantly associated with suicide ideation and planning in this study.
- These associated risk factors for adolescent suicide ideation and planning have implications for identifying at-risk individuals as early as middle school for targeted suicide prevention programs.

REFERENCES

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