

# Prevalence and correlates of past 12-month suicide attempt among in-school adolescents in Guatemala

This article was published in the following Dove Press journal:  
*Psychology Research and Behavior Management*

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**Background:** The aim of this investigation was to estimate the prevalence of past 12-month suicide attempts and associated factors among in-school adolescents in Guatemala.

**Methods:** Cross-sectional data from the 2014 “Global School-based Health Survey (GSHS)” included 4,274 students (median age 14 years, interquartile range=2 years) that were representative of all middle school students in Guatemala.

**Results:** The prevalence of past 12-month suicide attempt was 16.6%, 12.2% among boys and 20.2% among girls. Among students with a suicide attempt in the past year, 52.8% had a suicide plan in the past year. In adjusted logistic regression analysis, male sex and loneliness were associated with past 12-month suicide attempt, and among boys, none of the variables, and among girls, loneliness and current alcohol use were associated with past 12-month suicide attempt.

**Conclusion:** A high prevalence and several specific factors associated with suicide attempt were identified which can help in guiding preventive strategies.

**Keywords:** suicidal attempt, demographic factors, internalizing problems, externalizing problems, Guatemala

## Introduction

Suicide is a leading cause of death among adolescents.<sup>1</sup> Suicide attempt has been identified as a major risk factor for suicide death.<sup>2</sup> Suicide prevention activities among adolescents need to include the assessment of the prevalence and correlate of suicide attempts.<sup>3</sup> There are limited data on the recent prevalence and its correlates of suicide attempts among adolescents in Guatemala, a small country located in Central America.<sup>4</sup>

A significant increase in suicide rates among adolescents (15–19 years) was found in Guatemala for both genders, among boys from 3.07 in 1990–1999 to 4.74 2000–2009, and among girls from 1.63 in 1990–1999 to 3.12 in 2000–2009.<sup>5</sup> In a school survey among students (12–18 years) in southwest Trifinio region of Guatemala, 11.6% reported suicidal ideation.<sup>6</sup> In the 2009 Guatemala “Global School-based Health Survey (GSHS)”, the prevalence of suicide attempt was 13.4% (10.4% among boys and 16.7% among girls).<sup>7</sup> In a cross-sectional survey of suicide attempters (N=31) attending emerging care services in Santa Rosa in Guatemala, Mijangos et al<sup>4</sup> found that 39% were adolescents (14–18 years old), and 71% had used poisoning with agrochemicals as a means of attempting suicide. In school-based surveys of students (12–18 years) from 40 low-income and middle-income countries,

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the “mean 12-month prevalence of suicide attempts was 17.2%”.<sup>7</sup> In other countries in Central America, the past 12-month prevalence of suicide attempts among school-going adolescents was in Belize 13.3%, Costa Rica 8.5%, El Salvador 13.1% and Honduras 17.2%.<sup>7</sup> In a local community study among youth in Nicaragua, the prevalence of past 12-month suicide attempt was 2.1% in males and 1.5% in females,<sup>8</sup> and in another small study in Nicaragua among adolescents, the prevalence of past 12-month suicide plans or attempt was 10.1% among boys and 12.8% among girls.<sup>9</sup>

Factors associated with suicide attempts among adolescents may include sociodemographic variables, internalizing and externalizing problems. Sociodemographic factors include female sex,<sup>7,10</sup> older age,<sup>7</sup> and food insecurity or lower socioeconomic status.<sup>7,11</sup> Internalizing problems may include, having no close friends,<sup>12</sup> loneliness<sup>7,12,13</sup> and anxiety.<sup>7,11,13,14</sup>

Externalizing problems may include, alcohol use,<sup>7,12,14,15</sup> drug use,<sup>13–15</sup> cannabis use,<sup>16</sup> soft drink consumption,<sup>17</sup> being bullied,<sup>7,12,18,19</sup> exposure to interpersonal violence,<sup>10</sup> being physically attacked,<sup>13,15</sup> and in physical fight,<sup>15</sup> sexual coitus<sup>20</sup> and injury.<sup>21</sup> Limited data exist on the prevalence and correlates of suicide attempts among adolescents in Guatemala. Consequently, this investigation aimed at examining the prevalence, sociodemographic, internalizing and externalizing problems associated with suicide attempts among in-school adolescents in Guatemala.

## Methods

### Sample and procedure

This analysis utilizes 2015 Guatemala “Global School-based Health Survey (GSHS)” cross-sectional data; more details and the dataset can be publicly accessed.<sup>22</sup> The study used a two-stage cluster sampling strategy to produce a nationally representative sample of all students in “Primero (First), Segundo (Second), and Tercero basico (Basic third)” in Guatemala.<sup>23</sup> Under the supervision of trained survey administrators, students completed a self-administered questionnaire in their language during classroom periods.<sup>23</sup> The study proposal was approved by the Ministry of Education and a national ethics committee, and “necessary approvals and permission were obtained from the participating schools, parents and students before the survey was administered”.<sup>23</sup>

### Measures

The study questionnaire used was from the GSHS<sup>24</sup> and is shown in Table 1.

## Data analysis

Data analysis was done with STATA software version 15.0 (Stata Corporation, College Station, TX, USA), taking the complex sampling design of the study into account. Data results were described with descriptive statistics. Logistic regression was used to estimate associations between independent variables and one or multiple suicide attempts in the past year, overall, and for boys and girls, separately. Missing cases were excluded from the analysis. To minimize type 1 error, a greater alpha level of 0.01 was used as cutoff for significance.

## Results

### Sample characteristics

The study sample consisted of 4,274 middle school students (median age 14 years, interquartile range=2 years) from Guatemala. The proportion of male students was 49.4% and that of female students 50.6%. The overall study response rate was 82%.<sup>21</sup> Almost one in seven (15.0%) of the students reported sometimes, mostly or always experiencing hunger, 7.1% had no close friends, 8.9% felt lonely and 7.1% had anxiety. Further, 18.3% of the participants were current alcohol users, 4.1% current cannabis users, 3.4% had ever used amphetamine, 19.7% ever had sex, 28.0% consumed two or more soft drinks a day, 23.9% had been bullied in the past month, 23.9% had been attacked in the past year, 22.8% in a physical fight and 31.8% had sustained a serious injury in the past year. The prevalence of past 12-month suicide attempt was 16.6%, 12.2% among boys and 20.2% among girls. Among students with a suicide attempt in the past year, 52.8% had a suicide plan in the past year. Further sample characteristics are presented in Table 2.

### Associations with suicide attempt

In adjusted logistic regression analysis, male sex and loneliness were associated with past 12-month suicide attempt. In addition, in unadjusted analysis, sometimes, mostly or always experiencing hunger, having no close friends, anxiety, substance use (alcohol, cannabis and amphetamine) and interpersonal violence (bullying victimization, having been physically attacked, and in a physical fight) and injury was associated with past 12-month suicide attempt (see Table 3).

### Associations with suicide attempt by sex

In adjusted logistic regression analysis, among boys, none of the variables and among girls loneliness and current

**Table 1** Description of variables

Variables	Question	Response options (coding scheme)
Age	"How old are you?"	"11 years old or younger to 18 years old or older"
Sex	"What is your sex?"	"Male, Female"
Hunger	"During the past 30 days, how often did you go hungry because there was not enough food in your home?"	"1= never to 5= always (coded 1-3=0 and 4-5=1)"
Suicide ideation	"During the past 12 months, did you ever seriously consider attempting suicide?"	"Yes, No"
Suicide plan	"During the past 12 months, did you make a plan about how you would attempt suicide?"	"Yes, No"
Suicide attempt	"During the past 12 months, how many times did you actually attempt suicide?"	"1=0 times to 5=6 or more times (coded 1=0 and 2-5=1)"
<b>Internalizing problems</b>		
No close friends	"How many close friends do you have?"	"1=0 to 4=3 or more (coded 1+=0, 0=1)"
Loneliness	"During the past 12 months, how often have you felt lonely?"	"1=never to 5=always (coded 1-3=0 and 4-5=1)"
Anxiety	"During the past 12 months, how often have you been so worried about something that you could not sleep at night?"	"1=never to 5=always (coded 1-3=0 and 4-5=1)"
<b>Externalizing problems</b>		
Current alcohol use	"During the past 30 days, on how many days did you have at least one drink containing alcohol?"	"1=0 days to 7=All 30 days (coded 1=0 and 2-7=1)"
Current cannabis use	"During the past 30 days, how many times have you used marijuana?"	"1=0 times to 5=20 or more times (coded 1=0 and 2-5=1)"
Amphetamine use	"During your life, how many times have you used amphetamines or methamphetamines?"	"1=0 times to 5=20 or more times (coded 1=0 and 2-5=1)"
Ever sex	"Have you ever had sexual intercourse?"	"Yes, No"
Soft drinks	"During the past 30 days, how many times per day did you usually drink carbonated soft drinks, such as Coca-cola, Pepsi Cola, Sprite, Seven-up, Grapette, or Orange Crush? (Do not include diet soft drinks.)"	"1=not in the past days to 7=5 or more times per day (coded 1-3=0 and 4-7=1)"
Bullied	"During the past 30 days, on how many days were you bullied?"	"1=0 days to 7=All 30 days (coded 1=0 and 2-7=1)"
Physically attacked	"During the past 12 months, how many times were you physically attacked?"	"1=0 times to 8=12 or more times (coded 1=0 and 2-8=1)"
In a physical fight	"During the past 12 months, how many times were you in a physical fight?"	"1=0 times to 8=12 or more times (coded 1=0 and 2-8=1)"
Injury	"During the past 12 months, how many times were you seriously injured?" "(An injury is serious when it makes you miss at least one full day of usual activities (such as school, sports, or a job) or requires treatment by a doctor or nurse.)"	"1=0 times to 8=12 or more times (coded 1=0 and 2-8=1)"

alcohol use were associated with past 12-month suicide attempt. In addition, in unadjusted analysis, among boys, having no close friends, loneliness, anxiety, substance use

(alcohol, cannabis and amphetamine) and interpersonal violence (bullying victimization and having been physically attacked) were associated with past 12-month suicide

**Table 2** Descriptive statistics of independent variables and by suicidal attempt

Variable (# missing cases)	Total sample			Suicide attempt		
	All	Boys	Girls	All	Boys	Girls
	N (%)	% (95% CI)				
<b>Socio-demographics</b>						
All	4,274			16.6 (14.1, 19.4)	12.2 (9.0, 16.4)	20.2 (16.9, 23.9)
Sex (#84)						
Female	2,170 (50.6)					
Male	2,120 (49.4)					
Age in years (#55)						
13 or less	1,106 (28.6)	27.6 (20.7, 35.9)	28.6 (21.7, 36.8)	18.7 (14.9, 23.1)	15.0 (9.6, 22.6)	22.7 (16.3, 30.8)
14	1,278 (27.8)	26.1 (20.6, 32.5)	29.9 (25.2, 35.1)	16.1 (14.9, 21.3)	14.2 (8.7, 22.4)	17.1 (11.6, 24.5)
15	1,249 (25.8)	26.1 (21.6, 32.5)	26.4 (22.1, 31.2)	16.5 (12.4, 21.5)	11.2 (6.4, 18.9)	22.2 (16.7, 28.9)
16 or more	686 (17.7)	20.1 (12.5, 30.8)	15.1 (7.6, 27.7)	12.6 (7.6, 20.0)	6.3 (2.4, 15.5)	18.4 (7.6, 38.1)
Hunger (#56)						
Never	1,660 (62.4)	59.6 (55.4, 63.8)	65.4 (58.6, 71.6)	14.3 (12.2, 16.7)	10.7 (7.4, 15.2)	17.1 (14.5, 19.9)
Rarely	1,069 (22.5)	26.0 (22.4, 29.9)	19.0 (15.2, 23.5)	17.7 (11.9, 25.4)	11.1 (6.1, 19.3)	26.1 (19.1, 34.6)
Sometimes/mostly/always	589 (15.0)	14.4 (10.5, 19.4)	15.6 (10.4, 22.8)	24.7 (17.5, 33.5)	20.5 (11.2, 34.5)	25.8 (16.4, 38.2)
<b>Internalizing problems</b>						
No close friends (#116)	386 (7.1)	8.0 (5.9, 11.0)	6.0 (4.5, 8.0)	29.8 (22.0, 38.9)	25.2 (14.0, 41.1)	32.1 (18.1, 50.3)
Loneliness (#67)	447 (8.9)	5.3 (3.8, 7.3)	12.5 (10.2, 15.3)	50.5 (38.1, 62.7)	42.9 (23.9, 64.3)	52.8 (41.3, 63.9)
Anxiety (#151)	360 (7.1)	5.0 (3.5, 7.1)	8.9 (6.8, 11.7)	37.1 (26.4, 49.1)	23.5 (14.0, 36.6)	38.7 (21.7, 59.0)
Suicidal ideation (#184)	869 (18.0)	13.1 (9.7, 17.8)	22.6 (19.2, 26.6)	49.3 (42.7, 56.0)	39.8 (30.8, 49.5)	54.3 (44.8, 63.5)
Suicide plan (#158)	700 (13.7)	10.2 (8.3, 12.4)	17.4 (14.3, 20.8)	52.8 (41.5, 63.8)	40.4 (21.3, 63.1)	58.9 (49.0, 68.0)
<b>Externalizing problems</b>						
Current alcohol use (#102)	953 (18.3)	19.8 (15.3, 25.2)	16.2 (12.9, 20.2)	30.2 (22.1, 39.7)	21.8 (12.8, 34.7)	36.0 (28.6, 44.1)
Current cannabis use (#197)	322 (4.1)	5.7 (4.0, 8.1)	2.6 (1.7, 3.8)	41.7 (24.7, 61.0)	34.0 (17.8, 54.9)	59.8 (33.7, 81.4)
Ever amphetamine use (#192)	170 (3.4)	4.7 (3.1, 7.0)	1.6 (0.9, 2.9)	60.9 (42.9, 76.5)	55.2 (36.1, 72.8)	76.9 (54.9, 90.1)
Ever sex (#472)	797 (19.7)	28.5 (23.1, 34.6)	10.2 (7.7, 13.3)	20.1 (13.7, 28.5)	16.4 (9.8, 26.1)	27.5 (18.0, 39.7)
Soft drinks (2 or more/day) (#26)	1,418 (28.0)	28.4 (22.8, 34.7)	28.6 (22.0, 36.3)	19.8 (15.6, 24.8)	15.7 (11.0, 22.1)	24.5 (17.1, 33.7)
Bullied (#294)	884 (23.9)	26.7 (21.8, 32.2)	20.8 (18.0, 23.9)	24.5 (17.6, 32.9)	19.7 (11.9, 31.0)	29.2 (19.3, 41.6)
Attacked (#56)	1,067 (23.9)	27.7 (23.4, 32.4)	19.3 (15.6, 23.5)	26.6 (20.8, 33.5)	23.1 (15.4, 33.0)	29.3 (20.7, 39.7)
In physical fight (#46)	1,114 (22.8)	30.9 (27.1, 35.0)	14.1 (11.4, 17.3)	22.1 (15.9, 29.8)	16.0 (10.4, 23.9)	31.6 (21.2, 44.2)
Injury (#26)	1,481 (31.8)	36.9 (32.3, 41.8)	26.3 (21.6, 31.5)	22.0 (17.5, 27.3)	17.0 (11.5, 24.3)	26.2 (19.5, 34.2)

**Abbreviation:** CI, confidence interval.

attempt. In unadjusted analysis among girls, in addition, current cannabis use, ever amphetamine use and in a physical fight were associated with past 12-month suicide attempt (see Table 4).

## Discussion

The study aimed to examine for the first time the national prevalence of past 12-month suicide attempt and associated factors among school adolescents in Guatemala. The prevalence of past 12-month suicide attempt was

16.6%, 12.2% among boys and 20.2% among girls, which is an increase compared to the 2009 GSHS in Guatemala (overall 13.4%, 10.4% among boys and 16.7% among girls),<sup>7</sup> higher than in Belize (13.3%), Costa Rica (8.5%), El Salvador (13.1%)<sup>7</sup> and Nicaragua (<12%),<sup>8,9</sup> but similar to Honduras (17.2%), and the mean prevalence from 40 low-income and middle-income countries (17.2%).<sup>7</sup> Some of the country differences may relate to social and cultural factors, which should be subject to future studies.

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**Table 3** Logistic regression for predictors of suicide attempts

Variables	COR (95% CI)	AOR (95% CI) <sup>a</sup>
<b>Socio-demographics</b>		
Sex		
Female	1 (Reference)	1 (Reference)
Male	0.54 (0.37, 0.82)**	0.48 (0.30, 0.76)*
Age in years		
13 or less	1 (Reference)	1 (Reference)
14	0.83 (0.53, 1.32)	0.82 (0.46, 1.46)
15	0.86 (0.55, 1.33)	0.60 (0.36, 1.01)
16 or more	0.62 (0.33, 1.20)	0.54 (0.20, 1.51)
Hunger		
Never	1 (Reference)	1 (Reference)
Rarely	1.29 (0.84, 1.99)	1.29 (0.69, 2.42)
Sometimes/mostly/ always	1.97 (1.28, 3.02)*	0.96 (0.62, 1.49)
<b>Internalizing problems</b>		
No close friends	2.42 (1.67, 3.51)**	1.32 (0.52, 3.35)
Loneliness	6.78 (3.83, 12.03)**	4.81 (2.81, 8.24)**
Anxiety	3.54 (2.27, 5.52)**	1.13 (0.57, 2.22)
<b>Externalizing problems</b>		
Current alcohol use	2.87 (1.87, 4.40)**	1.36 (0.90, 2.04)
Current cannabis use	4.13 (1.98, 6.62)**	1.59 (0.66, 3.83)
Ever amphetamine use	9.47 (4.80, 18.67)**	2.60 (0.51, 13.17)
Ever sex	1.63 (1.04, 2.55)	1.27 (0.73, 2.21)
Soft drinks (2 or more/ day)	1.38 (1.00, 1.91)	1.17 (0.78, 1.75)
Bullied	2.29 (1.41, 3.71)**	1.15 (0.59, 2.24)
Attacked	2.36 (1.72, 3.24)**	1.42 (0.92, 2.21)
In physical fight	1.63 (1.13, 2.36)*	1.01 (0.60, 1.71)
Injury	1.72 (1.26, 2.36)**	1.41 (0.95, 2.08)

**Notes:** <sup>a</sup>Adjusted for all variables in the table; \*\* $P < 0.001$ ; \* $P < 0.01$ .

**Abbreviations:** COR, crude odds ratio; AOR, adjusted odds ratio.

The study found that among those with a suicide attempt in the past 12 months, about half (52.7%) had a suicide plan in the past 12 months. This result is consistent with previous findings,<sup>7</sup> and underlines the seriousness of the suicide attempts compared to impulsively implemented suicide attempts in this study.<sup>7</sup> Considering that suicide plans are developed prior to suicide attempts, it will be important to identify suicide plans early in order to prevent suicide.<sup>7</sup> In case of impulsive suicide attempts, it will be crucial to restrict access to means of attempting suicide in suicide prevention.<sup>7</sup> This may turn out to be difficult, as many adolescents in Guatemala use fairly easy available agrochemicals (herbicides and organophosphates) as a means of attempting suicide.<sup>4</sup>

Consistent with previous research,<sup>7,10</sup> this study found that the prevalence of suicide attempt was higher in girls than in boys. Such gender differences may be related to greater internalizing of emotional and behavioral problems among females than males (leading more likely to suicidal ideation and suicide attempts) and greater externalizing emotional and behavioral problems among males than females (leading more likely to suicide death).<sup>25</sup> In this study, most internalizing problems were higher in girls than in boys, and most externalizing problems were higher in boys than girls. Some studies<sup>7</sup> found that suicide attempts during adolescents increase with age, while this study did not find age differences. Contrary to previous findings that found an association between poor socioeconomic status or food insecurity,<sup>7,11</sup> this study found only in unadjusted analysis such an association. This study reports an association between internalizing problems or psychosocial distress (loneliness, and in unadjusted analysis having no close friends and anxiety) and suicidal attempt. The link between psychosocial distress and suicide attempt has been established in previous studies.<sup>7,10,11,13,15,21</sup>

Consistent with previous research,<sup>7,12-16</sup> this study found, among girls, an association between substance use (alcohol, and overall, in unadjusted analysis, current cannabis use and lifetime amphetamine use) and suicide attempts. The correlation between substance use, mental distress and suicide attempt may refer to a clustering of health risk behaviors. Consistent with a previous review,<sup>10</sup> this study found female-specific risk factors (loneliness) but not male-specific risk factors for suicide attempt. These health risk behaviors identified may need to be targeted in health promotion intervention in a combined fashion, rather than addressing individual risk behaviors in preventing suicide attempts.

## Study limitations

The cross-sectional study was limited to school-going youth and precludes causative conclusions and generalizations for all youth. The GSHS content was assessed by self-report, including suicidal behavior, internalizing and externalizing problems, and could lead to bias in reporting. Another limitation was that the GSHS in Guatemala did not assess rural-urban location of the study schools.

## Conclusions

A high prevalence of suicide attempts was observed among school-going adolescents in Guatemala. Several

**Table 4** Logistic regression for predictors of suicide attempts in boys and girls

Variables	Boys		Girls	
	COR (95% CI)	AOR (95% CI) <sup>a</sup>	COR (95% CI)	AOR (95% CI) <sup>a</sup>
<b>Socio-demographics</b>				
Age in years				
13 or less	1 (Reference)	1 (Reference)		1 (Reference)
14	0.94 (0.40, 2.20)	1.08 (0.44, 2.68)	0.70 (0.42, 1.17)	0.70 (0.33, 1.53)
15	0.72 (0.34, 1.51)	0.46 (0.22, 0.95)	0.97 (0.60, 1.57)	0.60 (0.27, 1.32)
16 or more	0.38 (0.12, 1.20)	0.25 (0.06, 1.12)	0.77 (0.23, 2.53)	0.82 (0.19, 3.55)
Hunger				
Never	1 (Reference)	1 (Reference)		1 (Reference)
Rarely	1.05 (0.50, 2.17)	0.58 (0.17, 1.99)	1.71 (1.11, 2.64)	2.11 (1.19, 3.74)
Sometimes/mostly/always	2.16 (1.13, 4.11)	0.64 (0.29, 1.43)	1.69 (0.99, 2.86)	1.17 (0.59, 2.32)
<b>Internalizing problems</b>				
No close friends	2.91 (1.45, 5.85)*	2.02 (0.70, 5.84)	2.01 (0.91, 4.42)	1.37 (0.43, 4.36)
Loneliness	6.76 (2.50, 18.31)**	7.36 (1.44, 37.58)	6.08 (3.61, 10.22)**	5.46 (3.49, 8.53)**
Anxiety	2.62 (1.44, 3.75)*	1.13 (0.24, 5.34)	2.82 (1.09, 7.29)	1.17 (0.47, 2.93)
<b>Externalizing problems</b>				
Current alcohol use	2.80 (1.62, 4.84)**	0.48 (0.20, 1.15)	2.75 (1.69, 4.49)**	2.21 (1.29, 3.79)*
Current cannabis use	4.38 (2.03, 9.48)**	1.60 (0.28, 9.16)	6.57 (2.37, 18.20)**	1.92 (0.89, 4.16)
Ever amphetamine use	12.09 (6.10, 23.96)**	2.05 (0.29, 9.16)	14.28 (4.99, 40.86)**	3.54 (0.55, 22.92)
Ever sex	2.28 (1.35, 3.83)*	3.12 (1.01, 9.58)	1.78 (0.96, 3.31)	0.67 (0.25, 1.80)
Soft drinks (2 or more/day)	1.53 (0.95, 1.29)	1.31 (0.72, 2.39)	1.46 (0.90, 2.34)	1.05 (0.58, 1.90)
Bullied	2.77 (1.48, 5.19)*	1.17 (0.32, 4.32)	2.16 (1.13, 4.12)	1.15 (0.39, 3.40)
Attacked	3.54 (2.10, 5.98)**	1.60 (0.64, 4.00)	1.88 (1.14, 3.10)	1.20 (0.63, 2.26)
In physical fight	1.66 (0.99, 2.75)	0.91 (0.49, 1.72)	2.06 (1.19, 3.56)*	1.19 (0.64, 2.20)
Injury	1.94 (1.00, 3.79)	1.86 (0.87, 3.98)	1.61 (1.05, 2.48)	1.13 (0.43, 2.40)

Notes: <sup>a</sup>Adjusted for all variables in the table; \*\*P<0.001; \*P<0.01

Abbreviations: COR, crude odds ratio; AOR, adjusted odds ratio.

factors were identified, among both boys and girls, loneliness, and among girls, alcohol use and ever amphetamine use, which should be targeted in health promotion school programs, so as to prevent suicide attempts among adolescents in Guatemala.

## Acknowledgments

We thank the World Health Organization for making the data available for data analysis (<https://www.who.int/ncds/surveillance/gshs/guatemaladataset/en/>), and the country coordinator from Guatemala (Olivia J. Brathwaite Dick) for the assistance in GSHS data collection.

## Disclosure

The authors report no conflicts of interest in this work.

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