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Prevalence and correlates of physical bullying behaviours (on/off-school property) among adolescents in Saint Vincent and the Grenadines

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Abstract

Background Bullying remains a serious public health and educational concern among school-going adolescents worldwide. However, no national survey has examined the prevalence and correlates of physical bullying (on and off-school property) among school-going adolescents in the Island country of Saint Vincent and the Grenadines. This study sought to examine the prevalence and correlates of physical bullying among adolescents from St. Vincent and the Grenadines.

Methods We analysed data from the 2018 Global School-based Student Health Survey using Pearson Chi-square and Binomial Logistic Regression, with an adjusted odds ratio (AOR) at a 95% confidence interval (CI).

Results Among this population, physical bullying on/off-school property was prevalent among 24% and 18%, respectively. After adjusting for other predictors, we found that males were less likely to be bullied on school property than females. However, being a younger adolescent (≤ 15 years old), being physically attacked, cyberbullied, having close friends, and having suicidal ideas were associated with increased odds of being physically bullied on school property. Also, being physically attacked, cyberbullied, worried, and having suicidal plans increased the odds of being physically bullied off school property.

Conclusion We recommend a multidisciplinary approach to adolescent bullying prevention in Saint Vincent and the Grenadines and countries with similar characteristics based on our findings.

Trail registration Global School-Based Student Health Survey 2018 (VCT_2018_GSHS_v01) Registered August 20, 2021, https://extranet.who.int/ncdsmicrodata/index.php/catalog/878.

Keywords Bullying behaviours (on/off-school property), Adolescents, Risk and protective factors, Saint Vincent and the Grenadines

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Introduction

Bullying in schools is a serious public health and social problem [1]. Globally, various forms of bullying have devastating effects on victims [2, 3]. A substantial number of studies have been done on the extent of bullying among adolescents, especially at school. There have been reports of depression, suicidal attempts, and school dropouts due to bullying in various societies [4–6]. Also, bullying victimisation is known to lead to a cumulative decrease in life satisfaction [7, 8], negatively influencing both acculturation processes and overall life satisfaction [7].

Bullying is described in many studies as a mean behaviour meted out by the abuser or bully, who is usually braver or stronger than the abused or victim who is bullied [1, 2, 9]. It can take the form of verbal abuse (mean words) or physical abuse. Physical bullying is the most common form of bullying among adolescents. Physical bullying usually involves fighting, shoving, hitting, stealing, or destroying property. Adolescents are typically involved either as the bully or bullied. Evidence shows that 246 million children globally are affected by school-related violence each year.

The prevalence and related factors influencing physical bullying behaviours among adolescents have been researched in many countries to show a varied number of cases. A study in Nigeria indicated that 1575 (16.7%) adolescents reported being bullied in school in the last 12 months [4]. In an analysis of the global variation of bullying by Biswas et al. [5], the highest prevalence was observed in the Eastern Mediterranean Region (45·1%, 44·3–46·0%) and African region (43·5%, 43·0–44·3%), and the lowest in Europe (8·4%, 8·0–9·0%). In a study by Yusuf et al. [3], among adolescents in Indonesian schools, a total of 19.9% were victims of bullying. Additionally, in the last month, 1 in 3 students has been bullied by their peers at school. However, the Sustainable Development Goals (SDG) goal 16 seeks to "Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels" [10]. In partnership with the World Anti-Bullying Forum, the United Nations Educational Scientific and Cultural Organization (UNESCO) campaigned against bullying as it violates SDG goal 16 and can prevent students from being educated due to fear.

Several studies have been conducted on the risk and protective factors associated with bullying involving adolescents. Risk factors of bullying victimisation have been outlined as lower age [11–13], female gender [14–16], having close friends [3, 17], being physically attacked, suicidal behaviours (ideation, plan, attempt) [18], truancy, serious injuries, loneliness, hunger, lack of parental connectedness, and less parental bonding [6], amphetamine use, and substance abuse [19](Hong et al., 2019), cyberbullying [16, 20], parents/guardians who used tobacco [12], multiple sexual partners [19]. Similarly, Qian et al. [21](2022) found that alcohol use and lack of emotional management and control were the main contributory factors to bullying in schools. Additionally, the absence of trusted people and a lack of sense of security on or off the school premises also predisposes adolescents to physical bullying. However, understanding parents was identified as a protected factor in bullying victimisation [14]. Similarly, high academic performance and coping with stress were protective for participants who had been victims of bullying [22].

Bullying among adolescents on- and off-school property demands global interest, particularly in the policy structure of different countries to promote anti-bullying school programs. There have not been any studies on the prevalence and correlates of bullying among adolescents in St. Vincent and the Grenadines. Additionally, little is known about the factors influencing adolescents to become bullying victims utilising national data. Focusing this study on Saint Vincent and the Grenadines stems from the realisation of the island nation's distinct sociocultural and environmental setting, where social problems like bullying can be made worse by geographic isolation. Thus, social dynamics are frequently exacerbated in small communities, which makes bullying behaviours among teenagers more visible and significant. This makes it necessary to identify the bullying trends of these adolescents and implement strategies to curb them to ensure an atmosphere of peace and freedom on and off the school site. This study seeks to identify the prevalence and correlates of physical bullying among adolescents from St. Vincent and the Grenadines. We hope that understanding the individual risk factors may provide the baseline needed for the development of evidence-based intervention programmes based on local facts and their subsequent evaluation in the island country. We hypothesised that factors related to participants' characteristics, drugs and substance use, violence and injuries, and personal-social and suicidal behaviours would be predictive of physical bullying among adolescents in Saint Vincent and the Grenadines.

Methods

Study design and sample

We analysed data on physical bullying behaviours and their correlates in school-going adolescents (aged 13–17 years) in Saint Vincent and the Grenadines. We used data from the 2018 Global School-Based Student Health Survey (GSHS). The GSHS is a school-based survey which uses a self-administered questionnaire to obtain data on young people's health behaviour and protective factors related to the leading causes of morbidity and mortality among children and adults worldwide. In collaboration

with the United States (US) Centres for Disease Control and Prevention (CDC) and Saint Vincent and the Grenadines Ministry of Health, Wellness and Environment, the WHO carried out the GSHS. The survey used a cross-sectional study design to collect data from WHO member countries interested in examining the behavioural risk factors and protective factors in several domains of functioning among the youth in schools. The study used close-ended structured questionnaires to solicit responses from Saint Vincent and the Grenadines student adolescents. The WHO website (https://extranet.who.int/ncdsmicrodata/index.php/catalog/878/study-description#metadata-identification) contains details of the systematic steps followed in collecting data from respondents.

Sampling Procedure

A two-stage cluster sample design was employed to obtain data representative of all SVG Community College students in grades 1–6. All eligible schools were initially selected using a probability proportional sampling technique inversely related to the total number of enrolled students. During the second stage, classes were randomly selected using a simple random method. Additionally, all students in assigned classrooms were allowed to participate using a census sample. A bias of this sampling approach is intra-cluster correlation, where individuals within the same cluster may share similar characteristics or experiences, which can inflate standard errors and affect the reliability of statistical analyses.

A 78%, 78%, and 100% response rate was recorded for an overall survey, students and schools, respectively. Between January and December 2018, 1,876 students completed the survey out of the recommended sample size of 2407. Data was collected from in-school adolescents aged 11 to 18 who were present at school on the day of the survey and who had signed a parental or guardian agreement form or a child assent form for students under 18.

Measures

Dependent variables

We extracted two primary outcome measures on bullying behaviours (on-school and off-school property) from the data. The study measured each bullying behaviour with a single self-report item or question. For instance, the item, "During the past 12 months, have you ever been bullied when you were not on-school property?" was used to measure bullying on-school property experiences, while bullying off-school property was measured with the question, "During the past 12 months, have you ever been bullied on school property?". The responses to both items were categorised as "yes" (1) or "no" (2).

Independent variables

A set of 21 predictor variables, including participants' characteristics, drugs and substance use, violence and injuries, personal-social, and suicidal behaviours, was used to determine their predictive effects on the two outcome variables (bullied on-school property and bullied off-school property). The details of the questions, the variable names and the coding used for the statistical analysis are presented in Table 1.

Ethical statements

Before the primary data collection, the data collection instruments were piloted to test the validity and reliability of the instruments. The study also received required Institutional Review Board approvals from Saint Vincent and the Grenadines Ministry of Health, Wellness and Environment and the Ministry of Education before the data collection was carried out. Entry permission protocols were followed to seek permission from the MoH and the heads of the various schools included in the study. In addition to individual informed consent, parental consent was solicited from adolescents and children below 18 years, respectively, using verbal and written agreements. Access to the data can be obtained at the WHO website (https://extranet.who.int/ncdsmicrodata/index.php/catalog/878/study-description#metadata-identification).

Statistical analysis

We applied the sample weighting method at the school, student, and sex within grade levels to make it representative of the adolescents in Saint Vincent and the Grenadines to minimise bias on various trends of nonresponses. We recorded some variables on a binary scale in this study. We used the multiple imputation (MI) technique to address the issue of missing data. We applied the MI technique where the missing values exceeded 1%. We implemented a multiple imputation strategy to manage this, creating five separate imputations using an automatic imputation method. This method was selected because it is well-suited for datasets with minimal but non-negligible missingness, providing robust estimates by preserving the data's overall distribution. We rigorously compared imputed values to observed values and validated them against results from a complete case analysis, demonstrating that the imputed data reasonably reflected the observed dataset and upheld internal consistency. Furthermore, we evaluated the final model's goodness of fit, which confirmed a significant predictive capacity of severe injuries with no indication of misfit. By following these steps, we aimed to ensure the reliability and stability of our findings, addressing potential biases from missing data and reinforcing the robustness of our model outcomes.

Table 1 Independent variables derivation from survey data

1. Age	**How old are you?**	**1 = 12–14** **2 = 15–17**
2. Sex	What is your sex?	1 = Male 2 = Female
3. Grade	In what form are you?	1 = 1–3 2 = 4–6
4. Close friends	Do you have close friends?	1 = yes 2 = no
5. Physical attack	During the past 12 months, have you experienced any physical attacks?	1 = yes 2 = no
6. Suicidal ideation	During the past 12 months, did you ever seriously consider attempting suicide?	1 = yes 2 = no
7. Suicidal attempt	During the past 12 months, did you attempt suicide?	1 = yes 2 = no
8. Suicidal plan	During the past 12 months, did you make a plan about how you would attempt suicide?	1 = yes 2 = no
9. School truancy	During the past 30 days, did you miss classes or school without permission?	1 = yes 2 = no
10. Amphetamine use	During your life, did you use amphetamine or methamphetamine (also called ice or yellow)?	1 = yes 2 = no
11. Current use of alcohol	During the past 30 days, did you have at least one drink containing alcohol?	1 = yes 2 = no
12. Current marijuana smoking	During the past 30 days, did you use marijuana?	1 = yes 2 = no
13. Physical fight	During the past 12 months, did you engage in any physical fights?	1 = yes 2 = no
14. Cyberbullied	During the past 12 months, have you ever been cyberbullied?	1 = yes 2 = no
15. Parents/guardians who used tobacco	Do any of your parents/guardians use tobacco?	1 = yes 2 = no
16. Multiple sexual partners	During your life, have you had sexual intercourse with more than one person?	1 = yes 2 = no
17. Currently, smoke cigarettes	Do you currently smoke a cigarette?	1 = yes 2 = no
18. Understanding parents	During the past 30 days, did your parents or guardians understand your problems and worries?	1 = yes 2 = no
19. Serious injury	During the past 12 months, were you seriously injured?	1 = yes 2 = no
20. Loneliness	During the past 12 months, how often have you felt lonely?	1 = yes 2 = no
21. Worry	During the past 12 months, have you been so worried about something that you could not sleep at night?	1 = yes 2 = no

We conducted a bivariate analysis using Pearson Chi-square to estimate the relationship between serious injuries and the explanatory variables. We further entered the variables that showed significant association ($p<0.05$) into a binomial logistic regression model. The results obtained from the analysis were presented with a corresponding adjusted odds ratio (AOR) at a 95% confidence interval (CI) ($p<0.05$). These analytical approaches are suitable for the categorical nature of the datasets, and other previous studies using similar WHO GSHS datasets employed the same techniques [23–25].

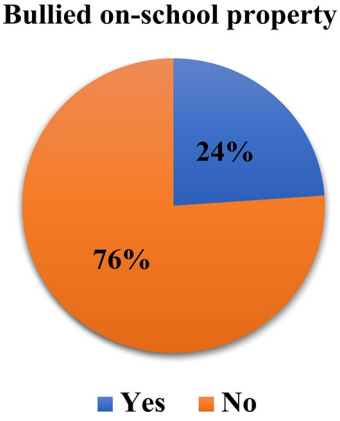

Fig. 1 Prevalence of bullying on and off-school properties

Results

Background characteristics of respondents

The prevalence of physical bullying among adolescents in Saint Vincent and the Grenadines was 24% and 18% for bullying on-school property and off-school property, respectively (see Fig. 1). Moreover, bullying on and off campus was predicted by many factors. From Table 2, more female adolescents significantly experienced physical bullying on campus (15.3%) than males. More students (13.3%) aged≤15 years experienced physical bullying on campus. Also, more students in grades 1–3 significantly experienced physical bullying on-school property (16.5%). Further, more students who drink alcohol significantly experienced physical bullying on off-school property (9.8%). Furthermore, more students who experienced a physical attack (9.0%, 7.7%) and engaged in a physical fight (8.8%, 7.4%) were bullied both on and off-school property, respectively. More (11.1%) adolescents who had serious injuries significantly experienced bullying on off-school property. Besides, more adolescents who were cyberbullied (7.8%, 7.3%), experienced loneliness (7.3%, 5.5%), worry (5.5%, 7.9%), had suicide ideation (10.6%, 7.6%), planned to commit suicide (9.4%, 7.6%) and attempted suicide (7.1%, 5.8%) significantly experienced bullying on and off-school property respectively. More (6.9%) adolescents who missed school without permission significantly experienced bullying on the off-school property (See Table 2).

Bivariate analysis

Table 2 below presents the association between independent variables and bullying on and off-school property. Sex ($p<0.000$), age ($p<0.000$), grade ($p<0.047$) and having close friends ($p<0.002$) were significantly associated with only bullying on school property. Also,

Table 2 Predictors of bullying on and off-school property

Variables		Bullied on-school property				Bullied off-school property			
		Yes	No	χ^2	φ	Yes	No	χ^2	φ
Personal									
Sex	Male	161 (8.6%)	723 (38.5%)	29.545***	−0.125	143 (7.6%)	741 (39.5%)	3.834	−0.045
	Female	287 (15.3%)	705 (37.6%)			195 (10.4%)	797 (42.5%)		
Age (years old)	≤15	281 (15.0%)	757 (40.4%)	13.014***	0.083	189 (10.1%)	849 (45.3%)	0.057	0.006
	≥16	167 (8.9%)	671 (35.8%)			149 (7.9%)	689 (36.7%)		
Grade	1–3	309 (16.5%)	911 (48.6%)	4.020*	0.046	223 (11.9%)	997 (52.1%)	0.162	0.009
	4–5	139 (7.4%)	517 (27.6%)			115 (6.1%)	541 (28.8%)		
Drugs and substance use									
Amphetamine or methamphetamine use	Yes	38 (2.0%)	93 (5.0%)	2.037	0.154	38 (2.0%)	93 (5.0%)	11.517**	0.078
	No	410 (21.9%)	1335 (71.2%)			300 (16.0%)	1445 (77.0%)		
Marijuana use	Yes	68 (3.6%)	252 (13.4%)	1.469	−0.028	68 (3.6%)	252 (13.4%)	2.730	0.038
	No	380 (20.3%)	1176 (62.7%)			270 (14.4%)	1286 (68.6%)		
Alcohol	Yes	207 (11.0%)	671 (35.8%)	0.084	−0.007	184 (9.8%)	694 (37.0%)	9.656**	0.072
	No	241 (12.8%)	757 (40.4%)			154 (8.2%)	844 (45.0%)		
Violence and Injuries									
Physically attacked	Yes	168 (9.0%)	335 (17.9%)	34.259***	0.135	145 (7.7%)	358 (19.1%)	54.372***	0.170
	No	280 (14.9%)	1093 (58.3%)			193 (10.3%)	1180 (62.9%)		
Physical fight	Yes	165 (8.8%)	439 (23.4%)	5.790*	0.056	139 (7.4%)	465 (24.8%)	15.054***	0.090
	No	283 (15.1%)	989 (52.7%)			199 (10.6%)	1073 (57.2%)		
Serious injury	Yes	240 (12.8%)	707 (37.7%)	2.250	0.035	208 (11.1%)	739 (39.4%)	20.170***	0.104
	No	208 (11.1%)	721 (38.4%)			130 (6.9%)	799 (42.6%)		
Cyberbullied	Yes	147 (7.8%)	169 (9.0%)	107.139***	0.239	137 (7.3%)	179 (9.5%)	165.162***	0.297
	No	301 (16.0%)	1259 (67.1%)			201 (10.7%)	1359 (72.4%)		
Personal-social									
Truancy	Yes	141 (7.5%)	418 (22.3%)	0.790	0.021	130 (6.9%)	429 (22.9%)	14.795***	0.089
	No	307 (16.4%)	1010 (53.8%)			208 (11.1%)	1109 (59.1%)		
Close friends	Yes	66 (3.5%)	133 (7.1%)	10.558**	0.075	40 (2.1%)	159 (8.5%)	0.654	0.019
	No	382 (20.4%)	1295 (69.0%)			298 (15.9%)	1379 (73.5%)		
Loneliness	Yes	137 (7.3%)	285 (15.2%)	22.070***	0.108	104 (5.5%)	318 (17.0%)	16.191***	0.093
	No	311 (16.6%)	1143 (60.9%)			234 (12.5%)	1220 (65.0%)		
Worry	Yes	104 (5.5%)	211 (11.2%)	17.380***	0.096	88 (7.9%)	227 (19.7%)	25.218***	0.116
	No	344 (18.3%)	1217 (64.9%)			250 (10.1%)	1311 (62.3%)		
Suicidal									
Ideation	Yes	199 (10.6%)	320 (17.1%)	82.558***	0.210	149 (7.6%)	370 (18.0%)	55.530***	0.172
	No	249 (13.3%)	1108 (59.1%)			189 (10.4%)	1168 (64.0%)		
Plan	Yes	177 (9.4%)	304 (16.2%)	59.379***	0.178	143 (7.6%)	338 (18.0%)	60.077***	0.179
	No	271 (14.4%)	1124 (59.9%)			195 (10.4%)	1200 (64.0%)		
Attempt	Yes	134 (7.1%)	218 (11.6%)	47.981***	0.160	109 (5.8%)	243 (13.0%)	49.186***	0.162
	No	314 (16.7%)	1210 (64.5%)			229 (12.2%)	1295 (69.0%)		

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

amphetamine use ($p<0.001$), current use of alcohol ($p<0.002$), and respondents who suffered serious injury ($p<0.000$) were only associated with bullying on off-school property. Moreover, respondents who were physically attacked ($p<0.000$; $p<0.000$), engaged in a physical fight ($p<0.018$; $p<0.000$), cyberbullied ($p<0.000$; $p<0.000$), felt lonely ($p<0.000$; $p<0.000$), worried about things they could not achieve ($p<0.000$; $p<0.000$), had suicidal thoughts ($p<0.000$; $p<0.000$), planned to commit suicide ($p<0.000$; $p<0.000$) and attempted suicide were associated with both bullying on and off-school property respectively (see Table 2).

The effect sizes observed in this study underscore significant economic and psychological impacts on students due to bullying. Moderate to strong associations between bullying and variables like cyberbullying (ϕ=0.239 on-school, ϕ=0.297 off-school), physical attack (ϕ=0.135 on-school, ϕ=0.170 off-school), and suicidal ideation (ϕ=0.210 on-school, ϕ=0.172 off-school) highlight the serious psychosocial toll bullying takes on students,

including increased risks of mental health issues and self-harm.

Multivariate analysis

Table 3 presents the logistic regression for bullying on and off-school property predictors. After adjusting for other factors predicting bullying on and off-school property, males were less likely to be bullied on school property than females (AOR=0.69, 95%CI=0.538–0.884). Adolescents aged less or equal to 15 years were more likely to be bullied on school property than those aged≥16 years (AOR=1.65, 95%CI=0.538–0.884). Also, those who were physically attacked [(AOR=1.81, 95%CI=1.382–2.359), (AOR=1.88, 95%CI=1.394–2.547)], and cyberbullied [(AOR=2.88, 95%CI=2.189–3.794), (AOR=4.39, 95%CI=1.394–2.547)] were more likely to be bullied on and off-school property than those who were not physically attacked and were not cyber bullied respectively. Adolescents with close friends (AOR=1.67, 95%CI=1.394–2.547) and suicidal ideation (AOR=1.71, 95%CI=1.271–2.309) were more likely to be bullied at school property than those who had close friends and those who did not have suicidal ideation respectively. Also, respondents who worried about things they could not do (AOR=1.47, 95%=1.046–2.066) and planned to commit suicide (AOR=1.56, 95%=1.114–2.189) were more likely to be bullied off-school property than their colleagues (see Table 3).

Table 3 Logistic regression for predictors of bullying on and off-school property

Variable	Bullying on-school property	Bullying off-school property
	AOR (95%CI)	AOR (95%CI)
Demographic		
Sex (Male)	0.69(0.54–0.89) **	-
Age (≤ 15)	1.65(0.54–0.89) ***	-
Grade	0.94 (0.69–1.29)	-
Personal		
Truancy	-	1.24(0.93–1.64)
Drugs and substance use		
Amphetamine use	-	1.12(0.67–1.86)
Alcohol abuse	-	1.15(0.87–1.50)
Violence and Injuries		
Physical attack	1.81(1.38–2.36) ***	1.88(1.39–2.55) ***
Physical fight	0.97(0.74–1.27)	0.92(0.67–1.24)
Cyberbullied	2.88 (2.19–3.79) ***	4.39(3.280–5.88) 8***
Personal-social		
Serious injury	-	1.28(0.97–1.70)
Close friends	1.67(1.18–2.36) ***	-
Loneliness	1.20(0.91–1.59)	1.00(0.73–1.38)
Worry	1.11(0.82–1.52)	1.47(1.05–2.07) *
Suicide		
Idea	1.71(1.27–2.31) ***	1.30(0.93–1.82)
Plan	1.26(0.932–1.702)	1.56(1.11–2.19) *
Attempt	1.17(0.85–1.61)	1.22(0.86–1.74)
Constant	0.008***	0.005**

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$; "-" variable was not included in the original model

Hosmer and Lemeshow test (goodness of fit), $\chi 2$ (8) = 11.890, $p=0.156$

Discussion

Drawing from the 2018 GSHS data set, our study aimed to examine the prevalence and correlates of physical bullying behaviours among school-going adolescents in Saint Vincent and the Grenadines. We found a 24% and 18% prevalence of bullying on-school and off-school property, respectively. Comparatively, our study recorded a higher prevalence of on-school property bullying than bullying rates reported in the United States (10.6%) [26], North India (16%) [27], Malaysia (16.2%) [28], and Indonesia (19.9%) [3]. This moderately high prevalence makes bullying a serious issue that requires critical attention among school-going adolescents in Saint Vincent and the Grenadines, as Sarfo et al. [24]observed other negative psychosocial correlates of suicidal behaviour among these adolescents, including bullying victimisation. Another study by Sarfo et al. [29] among school-going adolescents in Saint Vincent and the Grenadines also estimated that 50.5% of them experienced serious injuries

Furthermore, a higher prevalence than what we found among our study population was reported in Ghana (41.3%) [30], Benin (42.1%) [23], Brazil (43.3%) [31], and Malawi (44.5%) [32]. The differences in the variable definition of bullying behaviours and cultural context in each study partly account for the variations in the prevalence rates. For instance, while our study reported specifically on the prevalence of physical bullying behaviours (on- and off-school properties), some studies estimated the prevalence by including other forms of bullying. Also, unlike our study, most studies did not distinguish the prevalence of bullying victimisation and perpetration, hence the variations in the reported prevalence rates

We found that adolescents aged 15 years or less had higher odds of bullying victimisation on-school property than those aged 16 years or above. This finding aligns with similar studies in Saint Vincent and the Grenadines [24, 29] that show that younger ages are associated with negative psychosocial issues at school due to their vulnerability. Like other studies, there is a higher risk of being victimised through bullying at younger ages [5, 33]. This finding calls for reinforcing effective coping behaviours, especially for younger children

Contrary to previous studies that observed males were at higher risk of bullying victimisation [5, 27], we found that being a male instead decreased one's likelihood by 0.69 of being physically bullied on-school property in

Saint Vincent and the Grenadines. Cultural differences may influence bullying patterns in schools in Saint Vincent and the Grenadines, hence this identified outcome. Smith et al. [34] explained that males' susceptibility to bullying victimisation might be due to more risk-taking behaviours. As noted in Sarfo et al.'s [29] study, adolescent males in Saint Vincent and the Grenadines were more likely to experience negative events that lead to unintentional injuries

Akin to the findings of some studies [30, 35], we found that adolescents who were physically attacked were at higher risk of being bullied on school property (1.81) and off-school property (1.88) compared with those who did not experience any physical attacks. The direct link between being physically attacked and being a victim of physical bullying remains unclear. Nonetheless, our perspective analysis explains that physical attack occurs in the context of power imbalance, with the victim being the less powerless. Also, continuous physical attack co-occurs with physical bullying and may also be a consequence of bullying. This finding calls for effective school-based interventions to help in-school adolescents disengage from aggressive behaviours. Interventions that involve group-based problem-solving have been demonstrated to contribute significantly to the reduction in in-school adolescents' engagement in aggressive behaviours, which may have predisposed them to bullying victimisation [36]

We also found that adolescents who were cyberbullied were more than twice as likely to be bullied on school property and more than four times at risk of off-school property bully victimisation than their peers who were not cyberbullied. Although there is unclear direct link between cyberbullying as a predictor of physical bullying on-school or off-school properties, several studies have found a relatively high level of overlap between cyberbullying and traditional bullying (relational, verbal, and physical), with a higher percentage of adolescents who were cyberbullied also falling victims to physical bullying [37, 38]. This finding may be partly explained by the higher internalising and externalising symptoms among cyberbullying victims [39], which may have poorer outcomes than peers who do not fall victim to cyberbullying. Also, we postulated that adolescents exposed to aggressive and violent online games and videos might develop aggressive and violent behaviours, which may predispose them to physical bullying victimisation in the context of a power imbalance between peers

Contrary to the findings of previous studies [23, 30], we found higher odds of bullying victimisation among adolescents who had close friends compared with those who did not have close friends. However, our study findings are consistent with those of a study in Malaysia, which found the number of peers associated with bullying victimisation [40]. This further affirms why friends are mostly cited in several instances of bullying victimisation and perpetration involving adolescents [41, 42]. For adolescents from different cultures, friendship serves different purposes and meanings. It is possible that having close friends who are frequently engaged in quarrelling and other physically violent behaviours may predispose peers within the same circle to bullying victimisation [40]. This finding creates the impression that anti-bullying efforts targeting highly aggressive school children may diffuse to their peers with resultant positive outcomes for bullying reduction. Also, our perspective analysis speculated a dynamic bilateral relationship between friendship formation and bullying victimisation. Adolescents who fall victim to bullying might befriend peers who were also bullied victimised. Like anyone else, school children who fall victim to bullying also desire intimate friendships. As such, deliberately choosing peers who also fall victim to bullying may thus serve as their only reasonable option and may be far more meaningful than going in for friends who perpetrate bullying [43]

Our study further found that worrying increased adolescents' likelihood of being physically bullied on an off-school property, which is consistent with a study report among Malawian adolescents [32]. Some studies have also found significant links between being a bully victim and arrays of mental health problems, of which worry is not an exemption [44]. Generally, children who fell victim to frequent bullying were more worried about bullying and experienced poor physical and mental health [8, 45]. Adolescents who fall victim to bullying have a higher risk for adverse consequences, including depression, anxiety, low self-esteem, and delinquency [8, 25, 45]. These detrimental consequences may trigger worrying thoughts among adolescents who may have accounted for this observed outcome. These findings show that worrying not only predicts bullying victimisation, but the reverse can be said of bullying as an exacerbating factor for worry. Thus, although most available literature focuses on bullying victimisation as a predictor of worry, our study affirmed the possibility of a bilateral relationship between worry and bully victimisation

A previous study by Sarfo et al. [24] demonstrated a significant association between suicidal behaviours (idea, plan, and attempt) and bullying victimisation among school-going adolescents in Saint Vincent and the Grenadines. In our study, we found suicidal behaviours such as suicide ideas and suicide plans as significant risk factors for physical bullying on and off-school properties. Although we observed substantial cross-level interaction between suicide behaviours and bullying, it is evident, after comparing with findings of other studies, that most studies focused on explaining the predictive effect of bullying victimisation on suicide behaviours, with

little available evidence on the predictive effect of suicide behaviours on bullying victimisation. This finding calls for urgent attention to design anti-bullying interventions to curb this behaviour and aid reporting among victims

Conclusion

The study discovered a high frequency of physical bullying among adolescents in Saint Vincent and the Grenadines using nationally representative data from the 2018 GSHS. This finding elevates physical bullying in Saint Vincent and the Grenadines to a moderately high public health concern. In addition to the moderately high prevalence of physical bullying, several explanatory factors were associated with physical bullying among adolescents in Saint Vincent and the Grenadines. Regarding the bivariate analysis, we found that adolescents who are females, age (≤15), grade (1–3), and have close friends experienced bullying on school property. Furthermore, adolescents who suffered serious injuries, abused substances (amphetamines and alcohol) and were truants were more likely to be bullied on off-school property. Also, adolescents who engaged in physical behaviours (attacks and fights), suicidal behaviours (ideas, plans, and attempts), were cyberbullied, lonely, and worried about things were more likely to be bullied on and off school property

Multivariate analysis demonstrated that males were less likely to be bullied on school property than females. Younger adolescents (aged ≤ 15 years) were more likely to be bullied on school property than older ones (aged ≥ 16 years). Also, those who were physically attacked and cyber bullied were more likely to be bullied on and off school property than those who did not experience such negative behaviours. Adolescents with close friends and suicidal ideation were more likely to be bullied at school property than those who had close friends and those who did not have suicidal ideation, respectively. Moreover, adolescents who worried about things they could not do and planned to commit suicide were more likely to be bullied off-school property

Saint Vincent and the Grenadines may not be able to provide inclusive and equitable quality education, encourage lifelong learning opportunities, or guarantee these school-age adolescents healthy lives by the year 2030 if this rate of physical bullying continues. Thus, government, school administration, parents, and other stakeholders must strengthen policies and programs to influence adolescents' behaviour in schools. Additionally, identifying proactive steps to lower the prevalence of physical bullying will assist Saint Vincent and the Grenadines in achieving some of the SDG targets, particularly SDGs 3.5 and 4.1 (strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful alcohol use; ensure inclusive and equitable quality education, and promote opportunities for lifelong learning for all). Also, students must access mental health resources on campus to help with their psychological and mental health needs

Strengths and limitation

Our study is one of the first to use substantial data to investigate physical bullying among adolescents in Saint Vincent and the Grenadines. The representativeness of our sample allows us to learn more about the factors that increase the likelihood that these adolescents in Saint Vincent and the Grenadines would experience physical bullying. Also, our study focused primarily on physical bullying as a form of bullying, which distinguishes it from other forms of bullying, including cyberbullying, verbal bullying, and sexual bullying, among others. On the other hand, a clear distinction between bullying victims and perpetrators, as well as those who are both victims and perpetrators, could not be distinguished in our study. Also, given that the GSHS is a cross-sectional database, we could not establish a causal link between the risk factors and physical bullying. Generally, cross-sectional secondary data typically lacks experimental control, essential for ruling out confounding factors that may influence observed associations

Additionally, a single item was used to measure several mental health dimensions, such as bullying and suicide behaviours (suicidal thoughts, plans, and attempts). A question structure like this may not fully capture all clinical symptoms for diagnostic purposes. Further, due to the unavailability of data in the WHO database system, we could not examine the influence of some important variables of a sociological nature, particularly the family context of adolescents, on bullying victimisation. Also, the lack of data on variables such as adolescents' self-esteem, attitudes toward social diversity, social stereotypes, vertical and horizontal trust, primary emotions, and individual psychological states could not permit us to examine their influence on bullying victimisation among adolescents in Saint Vincent and the Grenadines. Besides, self-reported data can introduce some biases due to recall and social desirability. If these biases occur, they may compromise the quality of data collected and might not reflect participants' actual experiences. Despite these limitations, our study's findings must serve as the baseline for subsequent research and interventions involving adolescents in Saint Vincent and the Grenadines

Implications for research and intervention

In this study, we have attempted to address key research issues regarding the prevalence and correlates of physical bullying among adolescents in Saint Vincent and the Grenadines. Our goal was to identify the risk variables and characteristics predisposing teenagers to physical

bullying. Finally, we highlight a few potential research projects and physical bullying prevention strategies

Future research directions could focus on understanding the asymmetric effects of transitions into and out of bullying victimisation among adolescents in Saint Vincent and the Grenadines, as observed by Jang et al. [46]. Future studies could explore how parental involvement and education levels influence children's resilience against bullying, particularly during critical transitions from primary to secondary school. Additionally, longitudinal studies could be conducted to track the mental health trajectories of adolescents in Saint Vincent and the Grenadines who experience varying patterns of victimisation over time. Given the multicultural context of many families, future studies should examine how cultural differences influence the experiences of bullying and its psychological impacts. Research should also focus on developing and evaluating intervention strategies incorporating findings from both Jang et al. [46] and other studies, aiming to enhance parental support systems and school-based programs addressing bullying

Our findings consider the psychosocial, personal, and demographic characteristics connected to physical bullying among students. The educational system has developed over time to provide more opportunities for interaction between students and teachers. The school has become the students' second home due to this circumstance. As a result, school employees now serve as pupils' second parents. As a result, Saint Vincent and the Grenadines schools ought to offer mental health services and support mechanisms for students through behaviour monitoring, direction, and counselling on stress management and how to react to physical and cyberbullying [47]. To do this, it would be crucial to designate a few school staff members as mental health focal points or call points and teach them the fundamental skills for spotting pupils most vulnerable to physical bullying [48]

Additionally, Saint Vincent and the Grenadines' educational system must move away from a one-dimensional approach to addressing issues with adolescent mental health and instead consider a more thorough and all-encompassing strategy. We expect that schools investigate a physical bullying risk assessment tool available online, where children can answer standardised questionnaires about physical bullying during predetermined times. The objective here is to find each student's risk factors for physical bullying and advise proper management and referrals considering those risks [49]. Adolescents" use of drugs and other substances should be a key area of attention for physical bullying prevention initiatives. In more detail, amphetamine, marijuana, cigarettes, and alcohol usage were linked to many types of physical bullying

Furthermore, many experts have shown a link between student drug and substance usage and poor academic performance [50]. Preventing student substance usage would have a positive rippling effect on both academic performance and aggression levels. To stop adolescents from using alcohol and other drugs, Botvin and Griffin [50] pointed out that the school environment or system could not be ignored. In general, we advise schools to offer opportunities for skill development through athletics, music, and other pursuits that pique adolescents' interests and serve as a substitute for drug usage. We have high hopes that establishing cooperative efforts between policymakers, the school, and other pertinent stakeholders to address social and behavioural issues, particularly substance use among students, will significantly reduce physical bullying, improve mental health, and improve academic outcomes

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Author contributions
J.O.S. conceived the idea of the study. J.O.S. and P.O. downloaded and analysed the data. All authors, J.O.S., P.O., P.Y.A.A., N.I.G., and C.O.B.O. wrote the manuscript. All authors read and approved the final version of the manuscript.

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Data availability
This paper uses data from the GSHS. The GSHS is supported by the WHO and the CDC. This dataset is freely available at: https://extranet.who.int/ncdsmicrodata/index.php/catalog/878.

Declaration

Ethics approval and consent to participate
All procedures contributing to this project are per the ethical standards of the relevant national and institutional committees on human experimentation and the Helsinki Declaration of 1975, as revised in 2008. Ethical approval was obtained from the Institutional Review Boards of the Ministry of Health, Wellness, and Environment of Saint Vincent and the Grenadines, WHO, and CDC. Written and signed consent/assent were obtained from all participants, schools, and parents in the study.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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