

Article

Adolescent Physical Fighting in Ghana, Their Demographic and Social Characteristics

Emmanuel O. Acquah ^{1,*}, Jennifer K. Lloyd ², Laura Davis ² and Michael L. Wilson ^{2,3}

¹ Centre for Learning Research, Department of Teacher Education, University of Turku, Turku 20014, Finland

² Centre for Injury Prevention and Community Safety, PeerCorps Trust Fund, 352/64 Makunganya Street, Co-Architecture Building, 4th Floor, Dar es Salaam 22499, Tanzania; E-Mails: jwilburn@jhsph.edu (J.L.); laura.davis@peercorpstrust.org (L.D.); michael.wilson@peercorpstrust.org (M.W.)

³ Unit of Adolescent Psychiatry, Turku University Hospital, Department of Adolescent Psychiatry, Kaskenkatu 18 A 3, Turku 20700, Finland

* Author to whom correspondence should be addressed; E-Mail: eoacqu@utu.fi; Tel.: +358-233-366-54.

Received: 30 October 2013; in revised form: 24 April 2014 / Accepted: 29 April 2014 /

Published: 5 May 2014

Abstract: Physical fighting is an important behavioral concern of public health importance among adolescents worldwide. The present study examines the patterns and correlates of physical fighting among a school-based population in a low-income country setting. Data on 6235 adolescents aged 11–16 years were derived from the Republic of Ghana contributions to the Global School-based Health Survey. Three thresholds of participation in a physical fight during a 12-month recall period were compared against several independent sociodemographic variables. Bivariate analyses were used to screen for statistically significant associations and multinomial logistic regression was used to examine significant relationships while adjusting for covariates. Within the recall period, 32% of adolescents had reported being involved in two or more physical fights. Those involved in a physical fight during three or more days during the recall period were more likely to have been bullied (relative risk ratios (RRR) = 1.86; 99% confidence intervals (CI): 1.38–2.52), have had a troubled experience with alcohol (RRR = 2.202; CI = 1.55–2.64), and miss days of school (RRR = 2.02; CI = 1.39–2.92). When adjusted only for age and sex, having understanding parents was protective (RRR = 0.64; CI = 0.53–0.78) as was having a positive school environment (RRR = 0.73; CI = 0.55–0.97). Our findings

suggest that school-based programming which simultaneously targets multiple risk behaviors and conflict resolution may be helpful in interventions to reduce rates of physical fighting.

Keywords: adolescents; violence; physical fighting; epidemiology; Africa

1. Introduction

Adolescence (age 10–19 years) is associated more with violent behavior than any other age group. For instance, when prevalence and incidence rates of offending behavior are plotted against age, the adolescent years have been found to rank highest [1–3]. Physical fighting has been identified as one of the most common forms of interpersonal violence during adolescence [4–7], and has been found to be strongly and positively associated with victimization, alcohol and substance use, gender and age, school context, the peer group, serious injuries and societal factors [4,7–11]. Relative to alcohol use, several studies on adolescents have reported links between alcohol use and physical fighting [4,7,9–12]. About 38% of adolescent drinkers reported having been involved in a physical fight [11,13] while 11% report to have been drinking when they got into their most recent fights.

The difference in gender is an important factor associated with physical fighting. Boys more than girls have been found to frequently engage in physical fighting [4,12,14,15], however, this gender gap in violent behavior seems to be narrowing [4,16]. White and colleagues [17] have reported that one in three male alcohol users and one in four female alcohol users had engaged in aggressive behavior like fighting after drinking.

In general, the school is perceived to be a place where student's socio-emotional and psychosocial wellbeing are promoted; however, recent research findings suggest that the school environment is increasingly becoming a common site of physical aggression. Fraga and colleagues [4] indicated that 343 (45%) of Portuguese adolescents reported school as the setting where fights occurred most frequently. Rudatsikira, *et al.* [12] have also reported that 13.5% of US high school students had engaged in physical fighting on school property within the 12 months prior to being surveyed. Beyond these, physical fighting has also been found to be associated with serious injuries [5,13,18], smoking [12], and having been bullied and physically attacked [6,12].

In high income countries, studies of physical fighting among school-aged children have found a prevalence rate ranging from 37% to 69% for boys and 13% to 32% for girls [7]. Data from low-income country settings and African settings on the prevalence of and correlates of physical fighting among in-school adolescents is however limited. To our knowledge, only one study has so far examined this subject using data from a Southern African country [19]. This study found that 50.6% (55.2% males and 46.2% females) of Namibian school-going adolescents had engaged in physical fighting in the past 12 months. The study also found that smoking, drinking alcohol, drug use, and bullying victimization were positively associated with fighting. This estimate is lower than those reported in several high-income countries such as Hungary 48.4% (64.6% males and 32% females), Scotland 44.6% (60.2% males and 29% females), Czech Rep. 47.9% (69% males and 26.7% females), and Lithuania 49% (66.6 males and 31.4% females) for boys [7] but not for girls. Although the authors did not provide any justification for their finding as it relates to the country income, the finding that

Namibian 13–16 year old boys engage in much lower physical fighting than their peers in high income countries is surprising as research continue to show that country income can make a difference in the prevalence of physical fighting [20–22].

There is now a growing body of research to suggest that adolescent fighting may be more closely related to poverty. Simpson, Janssen, Craig, and Pickett [21] examined the contribution of individual and area level measures of SES to the occurrence of various injury types among 7235 early-mid Canadian adolescents and found that lower SES was associated with increased risk for fighting injuries. Conversely, another study involving African-American adolescents in the USA found a weak association between poverty and having been suspended from school for fighting [22]. Wilson and Daly [23] have shown that income inequality as measured by the Gini index is a better predictor of rates of violent crime than absolute income levels. Numerous other studies suggest that countries, states, and neighborhoods with less wealth have higher rates of hostility, violent crime, and homicide [20,24,25]. In view of this background, one might expect that lower-middle income countries defined by the World Bank as countries with a per capita Income of less than US \$12,476 (World Bank, 2012) would report more incidences of physical fighting and violence. While not the focus of the present analyses, this literature provides a background for interpreting and understanding the results of this study.

There is a need to understand the patterns and risk factors associated with physical fighting among adolescents in African countries where many people live below the poverty line, and for which social and cultural influences are strong and have a direct impact on adolescents' behaviors. Furthermore, school violence has been found to have consequences for disrupted learning activities, absenteeism and school drop-out [26,27], all of which are common challenges facing education in African countries. The goal of this study was to examine the patterns and risk factors associated with physical fighting among school attending adolescents in a low-income country setting.

2. Methods

2.1. Setting

This study was based on data collected in the Republic of Ghana. Ghana is a predominately rural West African country situated just north of the Equator. It has a population of approximately 25 million people and is bordered by Ivory Coast, Togo, Burkina Faso and the Atlantic Ocean to the South [28]. The country has a Gross National Product per capita of USD \$1400 and as such is classified as a lower-middle income country (World Bank, 2012).

2.2. Data Description

The data for this study were derived from the Ghana contribution to the Global School-based Health Survey (GSHS). The GSHS was developed by the World Health Organization in collaboration with the U.S. Centers for Disease Control. It collects relevant information for the discernment of behavioral and health risks among adolescents of school age in 43 countries. Briefly, a two-stage cluster sampling design was used to facilitate the collection of data representing all students in Ghana. At stage one; schools were selected with a probability proportional to their enrollment size. At stage

two, classrooms within the selected schools were randomly selected and all students in the selected classrooms were eligible to participate. In Ghana, a total of 6235 secondary students aged 11–16 years (52.4% male) participated in the survey which had a response rate of 86%. We excluded 154 participants that did not have complete information on their age and gender resulting in a final sample of 6082 (52.4% male). Detailed information on data collection methods, the questionnaire and procedures are published elsewhere (WHO, 2012). At the time of data collection, the study had been approved by the Ghana Education Service. Written permission was obtained from the participating schools and classroom teachers. Parental permission was obtained and student participation was voluntary and anonymous [29]. All data used in the present study were freely available and accessible via the US centers for Disease Control website (<http://www.cdc.gov/gshs/>).

2.3. Measurements

- (a) Dependent variable (physical fighting). For the dependent variable we used the responses to the survey question: “During the past 12 months, how many times were you in a physical fight?” The responses were “0 times”; “1 time”; “2 or 3 times”; “4 or 5 times”; “6 or 7 times”; “8 or 9 times”; “10 or 11 times”; and “12 or more times”. Because the cell sizes in the higher frequency categories of fighting were sparse, the dependent variable was trichotomized to facilitate analysis. These answers were trichotomized in the following matter: 0 times (not having been involved in a physical fight); 1–2 times; and 3 or more times. This categorization of the variable was carried out with the aim of elucidating dose-response relationships with the independent variables and to facilitate comparisons between the independent variables. The three thresholds were used to determine which risk factors were associated with potentially problematic fighting behaviors (category 3) as opposed to those who may have been involved in one or two disputes (category 2). Based on indications in the literature [4,6,7,12,14,15,30] and in addition to the demographic variables of age and gender, we selected several independent variables from the questionnaire to screen for statistically significant associations with the dependent variable. We examined 10 psychosocial factors grouped into 5 domains reflecting past research [11,13] as follows: demographic factors (gender, age, and hunger), interpersonal experience (physically attacked, bullied, and serious injury), parent child relationship (had understanding parents and had parents who were aware of their free time activities), school functioning (school connectedness and truancy), and alcohol consumption and problems (alcohol misuse and negative experience as a result of alcohol use). All independent variables were dichotomized according to the distribution of the data in order to facilitate analysis. These variables are described below:
- (b) Hunger. Associations with having gone hungry within the 30 days preceding the survey were examined using the question: “During the past 30 days, how often did you go hungry because there was not enough food in your home”? The responses were: “Never”; “rarely”; “sometimes”; “most of the time”; or “always”. These were dichotomized into “yes” corresponding to “most of the time/always” and “no” corresponding to “never/rarely/sometimes”.
- (c) Physically attacked. Associations with having been physically attacked were examined using the question: “During the past 12 months, how many times you were physically attacked?” The responses were: “0 times”; “1 time”; “2 or 3 times”; “4 or 5 times”; “6 or 7 times”; “8 or 9 times”;

- “10 or 11 times”; and “12 or more times”. These were dichotomized into “0 or 1 time” and “2 or more times”.
- (d) Bullied. Being bullied was examined using the question: “During the past 30 days, on how many days were you bullied?” The responses were: “0 days”; “1 or 2 days”; “3 to 5 days”; “6 to 9 days”; “10 to 19 days”; “20 to 29 days”; “All 30 days”. These were dichotomized into “0 to 2 days” and “3 or more days”. This threshold is consistent with the “repeated and over time” nature of bullying behavior [31].
 - (e) Alcohol misuse. Alcohol misuse was examined using the question: “During your life, how many times did you drink so much alcohol that you were really drunk?” The responses were “0 times”; “1 or 2 times”; “3 to 9 times” and “10 or more times”. These were dichotomized into “0 times to 2 times” and “3 or more times”.
 - (f) Negative experience as a result of alcohol use. Negative experiences resulting from alcohol use was examined using the question: “During your life, how many times have you ever had a hang-over, felt sick, got into trouble with your family or friends, missed school, or got into fights as a result of drinking alcohol?” The responses were “0 times”; “1 or 2 times”; “3 to 9 times” and “10 or more times”. These were dichotomized into “0 times to 2 times” and “3 or more times”.
 - (g) Serious injury. Risk for serious injuries was examined using the question: “During the past 12 months, how many times were you seriously injured?” “0 times”; “1 time”; “2 or 3 times”; “4 or 5 times”; “6 or 7 times”; “8 or 9 times”; “10 or 11 times”; “12 or more times”. These were trichotomized into “0 times”; “1 time”; and “2 or more times”.
 - (h) Truancy. Missing school was examined using the question: “During the past 30 days, on how many days did you miss classes or school without permission?” The responses were: “0 days”; “1 or 2 days”; “3 to 5 days”; “6 to 9 days”; “10 or more days”. These were trichotomized into “0 days”; “1 or 2 days” and “3 or more days”.
 - (i) School connectedness. We examined school connectedness using: “During the past 30 days, how often were most of the students in your school kind and helpful?” The responses were: “Never”; “rarely”; “sometimes”; “most of the time”; or “always”. These were dichotomized into “most of the time/always” and “never/rarely/sometimes”.
 - (j) Had understanding parents. Having understanding parents was examined using: “During the past 30 days, how often did your parents or guardians understand your problems and worries?” The responses were: “Never”; “rarely”; “sometimes”; “most of the time”; or “always” and these were dichotomized into “always” and “never/rarely/sometimes/most of the time”.
 - (k) Had parents who were aware of their free time activities. Having parents who were aware of their free time activities was examined using: “During the past 30 days, how often did your parents or guardians really know what you were doing with your free time?” The responses were “never”; “rarely”; “sometimes”; “most of the time”; or “always” and these were dichotomized into “always” and “never/rarely/sometimes/most of the time”.

2.4. Statistical Analyses

We first examined the distribution of the selected independent variables within the trichotomized dependent variable. These associations were then screened for statistical significance using Pearson’s

chi-square for categorical variables and ANOVA for the continuous variable age. The results for the bivariate analyses were reported as proportions along with their chi-square values. We then used binomial and multinomial logistic regression to model the relationship between the dependent and independent variables. Two multinomial logistic regression models were created. In the first, all variables which were significant at the bivariate level were included. In the second model, each variable significant in the bivariate analyses was run in a model containing the variables age and gender to control for the potential confounding effects of both. From the results of both models we reported relative risk ratios (RRR) along with their corresponding 99% confidence intervals (CI). Statistical significance for the initial bivariate analyses was set at 0.05 while the adjusted analysis was set at 0.01. 81 observations were missing age information and 73 observations were missing gender variables. This was handled by using list-wise deletion for age and gender variables. The tabulate command in STATA was used to determine if the significantly associated variables had the strong correlation that was predicted. All variables had a statistically significant correlation with the dependent variable. The data was weighted by using the built-in feature in STATA that compensates for differing patterns of non-response. The weights were calculated by taking the inverse of the sampling fraction. All analyses were performed using Stata 12 (2011) for Linux (StataCorp, 2011).

3. Results

Within the recall period, 32% of participants reported being involved in two or more physical fights. All the sociodemographic variables, apart from age, gender, and parental knowledge of free time activities were significant at the bivariate level and included in subsequent analyses which adjusted for potential confounding.

3.1. Demographic Factors (i.e., Gender, Age, Hunger)

There was no significant difference in the ages of students who were involved in physical fighting when compared with those who were not. In the other bivariate analyses (Table 1) males were slightly overrepresented in having been involved in a physical fight during 1 or 2 days and 3 or more days, but the difference between gender was not statistically significant. The analyses showed a significant association between hunger and fighting. Students who reported fighting involvement during three or more days were simultaneously more likely to report hunger (RRR = 1.30).

Table 1. Differences among school-attending adolescents who reported being involved in physical fights in Ghana (2007).

Variable	Fighting 1–2 days	Fighting 3 or more days	P-val	T-score/chi-square
Age (mean)	14.4	14.5	0.432	1.677
Sex (male)	54.2	49.91	0.140	3.932
Being physically attacked	55.20	80.25	<0.001	1.1^03
Had misused alcohol	42.92	60.14	<0.001	659.615
Had a negative experience as a result of alcohol use	47.95	63.64	<0.001	675.902
Early sexual debut	23.67	32.37	<0.001	172.603
Hunger	23.98	35.28	<0.001	131.689

Table 1. *Cont.*

Variable	Fighting 1–2 days	Fighting 3 or more days	P-val	T-score/chi-square
Had been bullied	56.14	76.93	<0.001	545.331
Truant from school	27.84	47.31	<0.001	496.795
School connectedness	19.18	21.90	<0.001	43.466
Had understanding parents	18.83	18.85	<0.001	57.592
Parent's knowledgeable about free time activities	70.06	64.30	<0.001	22.332

Notes: Figures in table are reported as weighted proportions except for age.

3.2. Interpersonal Experience

A significantly higher proportion of those who reported physical fighting in the latter two categories of physical fighting reported that they had experienced being bullied and were the victims of two or more physical attacks within the recall period. Violent behaviors were strongly clustered in the presence of physical fighting. Those involved in physical fights during three or more days were more likely to have reported being bullied (RRR = 1.86), and had respectively, a two- and five-fold increase in the likelihood of reporting being physically attacked (RRR = 2.22 and 5.11). Serious injuries were also reported more frequently among those involved in physical fighting (RRR = 1.40 and 2.02 respectively).

3.3. Parent/Child Relationship

Having understanding parents was significantly associated with lower rates of physical fighting. While the bivariate analyses indicated an initial association between having understanding parents and fighting, the results did not reach a statistical significance.

3.4. School Functioning

Similar to hunger, the analyses showed a significant association between truancy and fighting. Feeling connected to peers in the school environment was significantly associated with lower rates of physical fighting. While the bivariate analyses indicated an initial association between reporting a positive school environment and fighting, the results did not reach a statistical significance. After controlling for all covariates in a logistic regression model (Table 2), we found that physical fighting was strongly associated with higher rates of truancy (RRR = 2.02) for those involved in three or more physical fights.

Table 2. Multinomial regression analyses of selected variables examined simultaneously according to fighting category among school-attending adolescents in Ghana (2007).

Variable	Fighting 1–2 days RRR (99%CI)	P-value	Fighting 3 or more days RRR (99%CI)	P-value
Age	0.96 (0.88–1.04)	0.208	1.02 (0.92–1.14)	0.555
Sex (male)	1.23 (0.95–1.60)	0.043	1.00 (0.80–1.25)	0.991
Hunger	1.02 (0.82–1.26)	0.834	1.30 (0.98–1.72)	0.018
Attacked	2.22 (1.72–2.87)	<0.001	5.11 (3.94–6.63)	<0.001
Bullied	1.12 (0.89–1.41)	0.191	1.86 (1.38–2.52)	<0.001

Table 2. *Cont.*

Variable	Fighting 1–2 days RRR (99%CI)	P-value	Fighting 3 or more days RRR (99%CI)	P-value
Alcohol misuse	1.37 (1.38–1.80)	0.003	1.75 (1.41–2.18)	<0.001
Troubled alcohol experience	1.84 (1.38–2.49)	<0.001	2.02 (1.55–2.64)	<0.001
Serious injury	1.40 (1.06–1.84)	0.002	2.02 (1.39–2.92)	<0.001
Truancy	1.28 (0.91–1.80)	0.064	2.02 (1.39–2.92)	<0.001
School connectedness	0.83 (0.60–1.13)	0.123	0.99 (0.75–1.31)	0.909
Understanding parents	0.79 (0.59–1.07)	0.043	0.93 (0.70–1.24)	0.522

Notes: RRR = Relative Risk Ratio; CI = Confidence Interval; All results compared against individuals not involved in a physical fight during the recall period; Results adjusted for age, gender, clustering (classrooms and schools).

3.5. Alcohol Consumption/Problems

Having a negative experience with alcohol ($p < 0.001$) and having misused alcohol was also associated with significantly higher rates of physical fighting. A misuse of alcohol was found to be significantly associated with an increase in physical fighting for both categories (RRR = 1.37 and 1.75 respectively) of fighting as well as a negative experience as a result of alcohol use (RRR = 1.84 and 2.02 respectively).

After modeling the relationship between physical fighting and select independent variables, adjusting only for age and gender (Table 3), we found that all of the selected variables were significantly associated. Of interest were the variables which capture risk behaviors. Alcohol misuse was associated with a two- fold increase (RRR = 2.53) for students involved in at least one physical fight. Similarly, those students who had reported being involved in physical fighting also reported more often to have had a negative experience with alcohol (RRR = 2.85 and RRR = 5.22 respectively). These students were also more likely to repeatedly miss school (RRR = 1.99 and RRR = 4.67 respectively). Two significant associations did however, confer protective effects for physical fighting, namely a positive school environment (RRR = 0.66 and RRR = 0.73 respectively) and having understanding parents (RRR = 0.62 and RRR = 0.64 respectively).

Table 3. Multinomial regression analyses of selected variables examined separately according to physical fighting category among school-attending adolescents in Ghana adjusted for age and gender.

Variable	Fighting 1–2 days RRR (99%CI)	P-value	Fighting 3 or more days RRR (99%CI)	P-value
Hunger	1.35 (1.08–1.68)	<0.001	2.26 (1.77–2.90)	<0.001
Attacked	2.96 (2.40–3.64)	<0.001	9.30 (7.13–12.09)	<0.001
Bullied	1.86 (1.52–2.27)	<0.001	4.65 (3.67–5.88)	<0.001
Alcohol misuse	2.53 (2.05–3.12)	<0.001	5.15 (4.25–6.24)	<0.001
Troubled alcohol experience	2.85 (2.24–3.63)	<0.001	5.22 (4.14–6.59)	<0.001
Serious injury	2.02 (1.57–2.61)	<0.001	4.36 (3.03–6.28)	<0.001
Truancy	1.99 (1.40–2.81)	<0.001	4.67 (3.64–5.98)	<0.001
School connectedness	0.66 (0.49–0.89)	<0.001	0.73 (0.55–0.97)	0.004
Understanding parents	0.62 (0.47–0.81)	<0.001	0.64 (0.53–0.78)	<0.001

Notes: RRR = Relative Risk Ratio; CI = Confidence Interval; All results compared against individuals not involved in a physical fight during the recall period; Results adjusted for age, gender, clustering (classrooms and schools).

4. Discussion

This study found that 32% of school going adolescents in Ghana had engaged in physical fighting during a one-year period of recall. This was consistent with reported rates among Portuguese adolescents [4] and among secondary school students in the U.S. [5] but lower than those reported elsewhere in the Sub-Saharan African region (55.2% males and 46.2% females) [19] and in numerous high-income countries [7]. This estimate is surprising when interpreted from the point of view of contextual factors such as socioeconomic indicators and social and cultural norms. Evidence suggests that lower levels of wealth may result in social conditions that lead to acceptance of violence in society [24,25]. As Ghana is a low-income country, one would have expected a much higher prevalence rate than reported here. The low prevalence observed may be explained by the fact that although Ghana is a poor country, income inequality within Ghana may be much lower than in other Sub-Saharan countries and yet, similar to those in the US, where there is considerable social inequality yet overall much more wealth. This can be so as past research on trends in poverty in Ghana suggests that apart from the three Northern regions, there are not large disparities in wealth between the regions of Ghana [32]. However, we are unable to determine if the income levels of the participating regions might have influenced the current data as the Global School-Health Survey did not provide information on this.

Also, the differences in rates of physical fighting between the current data and a Southern African country and high-income countries likely reflect underlying cultural differences in the acceptance of violence within these different countries. In Ghana, strong cultural and community bonds, and social cohesion dictate a reduced tolerance for violence. There are social norms and sanctions that make it unattractive for any individual to want to engage in deviant behavior. When adolescents are embedded within cultures whose norms forbid violence, these are likely to directly influence physical fighting behavior thus leading to reduced violence.

We found, in contrast to the literature, that there was not a significant relationship between gender and physical fighting behavior. This finding is particularly surprising considering that past studies on youth fighting has consistently shown that boys engage more in physical fighting than girls virtually in all settings [4,19,20,33]. Furthermore, at the contextual level, boys in Ghana are socialized to be tough [34]. Because of this, physical attacks are a common means by which interpersonal conflicts are resolved [34]. Girls on the other hand are socialized to exhibit behaviors ascribed with being feminine, such as being caring and empathetic towards others and to refrain from “masculine” behaviors or activities such as fighting. These social expectations are reinforced through social approval such as rewarding displays of bravery, and fighting for males and feminine-ascribed behaviors in the way they talk, walk and carry themselves for females. Therefore, while we cannot find any socially plausible explanation for this data, it is possible that the fighting rates among males were underreported either willfully or because of inability to recall.

In the present sample, we also found that alcohol misuse and a negative life experience as a result of alcohol use were associated with physical fighting. These associations were similar to those reported in High Income Country settings [4,7,9–12] and in one Low-and-Middle Income Country setting [19] and further confirm that alcohol consumption worldwide is associated with interpersonal violence among adolescents.

Consistent with previous research, having been a victim of bullying and having been physically attacked were associated with physical fighting [6,11,12]. Adolescents who reported to have engaged in physical fighting in the last 12 months were more likely to acknowledged having been a victim of bullying and to have suffered being physical attacked by peers. These findings strengthen the fact that physical fighting is related with other negative peer behavior characteristics among adolescents.

The finding that physical fighting was associated with serious injuries is consistent with previous studies [13,18], and complements those that have reported links between alcohol consumption, physical fighting and injuries [5,11]. Programs focusing on reducing violent related injuries should target physical fighting and excessive alcohol intake among adolescents.

While we found that there existed differences in the rates of physical fighting among those reporting hunger, no significant association with physical fighting was found after adjusting for covariates. Past studies focusing on the associations of poverty with physical fighting in adolescents have not used hunger as a proxy for poverty [20,24,25]. This is because most studies conducted on adolescent physical fighting have been carried out in the High Income Country regions [18,20,35] where rates of hunger are low. This may partially explain the limited exploration of hunger as a correlate for physical fighting in prior research. However, as the present data was derived from a Low-and-Middle Income Country, it was possible to examine the links between physical fighting and hunger. This result lends some credence to the explanations given early for the low prevalence of fighting in the present data. According to Grebmer and colleagues [36], hunger is closely tied with poverty and countries that suffer from hunger are Low-and Middle Income Countries—Sub Saharan Africa and South Asia and have the highest Global Hunger Index (GHI) and poverty.

Past research has presented mixed findings regarding the association of physical fighting with parenting or parental behavior. Whereas some studies reported that adolescents who feel warmth and support from their parents were less likely to use drugs and engage in other violent behavior [30–32] others have documented that parental involvement and alcohol use [37] and parental monitoring [5] were not associated with violent behavior. In our study, the bivariate analyses revealed that having understanding parents and having parents who knew the whereabouts of their children were both related to lower risk of physical fighting. However, after adjusting for covariates, there was no significant association between physical fighting and having understanding parents. One possible explanation is that parental closeness influenced youth's ability to select "prosocial" friends which decreases the risk of fighting. Therefore parental closeness was indirect and peer influence was direct, which could be why our findings were not significant [38,39].

A favorable peer environment at school was found not to be associated with adolescent physical fighting in this study. The literature has not established a clear association between peer environment at school and physical fighting, although social pressure has been identified as one of the contextual factors that are linked to alcohol related aggression [40]. However, the importance of the peer group in adolescence has long been established. Having friends and peer acceptance has been found to enhance adolescent's social wellbeing while peer rejection has been found to have negative consequences for social adjustment [41,42]. Furthermore, we found that physical fighting was associated with an increased tendency to miss days of school. Truancy as a correlate of physical fighting has not also been widely examined in the literature. This is probably because truancy is seen more as resulting from social pressure and delinquency rather than fighting [43]. Existing research has implicated the peer

group for alcohol consumption and other deviant behavior [44]. Indeed peer pressure has been found to contribute to adolescents alcohol use [40,44]. Furthermore, frequent high volume drinking has been found to be related to physical fighting and to alcohol-related fighting [11,13] while delinquency is found to be associated with fighting and alcohol related fighting. Since adolescence is plagued with complex individual and contextual development issues that are interconnected in a complex way, it makes sense to think that adolescents who fight would also be more likely to play truancy in school.

4.1. Strengths and Limitations

Several features ensure the reliability of the results presented in this study. The sample was representative of all school-attending adolescents aged 11–16 years in Ghana. The sample size was large enough to allow for statistical analyses to generate valid results. Sampling bias was reduced via a multi-stage sampling process. The survey questionnaire was extensively piloted in cross-national and cross-cultural settings and, all surveys were carried out in a controlled environment which ensured anonymous responses to the questionnaires. Previous surveys measuring alcohol intake have reported biases due to measurement imprecision [45]. In the present study however, we did not note significant group differences. However, the results must still be interpreted in light of their limitations. The cross-sectional nature of the data does not allow for causal interpretations. The study remains silent on adolescents who were either not present on the day of the survey or those that do not attend school—the latter which may be at increased risk for physical fighting. All data used in this study were self-reported which, even in an anonymous survey, is subject to social-desirability in responses and non-response bias. Despite being designed to be administered cross-culturally, there may have been some questions which were interpreted differently from their original intent by the respondents. Much of the measurement was limited to single item measures such as in the case of parenting and school-environment, although this is typical of large sample surveys, it can drive associations to null. There was also the possibility that some of the questions, namely physical fighting and being attacked, were multiple reports of the same event. The cross-sectional nature of the data does not allow for further exploration of the events themselves. Furthermore, in surveys, measurements of alcohol intake are imprecise and this imprecision has a tendency to drive associations to the null [45].

5. Conclusions

Physical fighting was found to be associated with several detrimental behaviors among a nationally representative sample of 11–16 year olds in Ghana. Our results suggest that school-based programming which simultaneously targets multiple risk behaviors and conflict resolution may be helpful in interventions aimed at reducing rates of physical fighting. Further surveys would benefit from the inclusion of more family and peer-related factors which might potentially help to elucidate correlates for aggression.

Acknowledgements

The authors would like to thank the Centers for Disease Control and Prevention (Atlanta, GA, USA); and the World Health Organization (Geneva, Switzerland). We would also like to thank all the in-country survey officers and participants who took part in the study.

Author Contributions

EA participated in the study design, interpretation of the data and drafted the first manuscript. JL and LD participated in the study design, carried out analyses and interpretation of the data and participated in the drafting of the manuscript in consultation with the co-authors. ML participated in the study design, carried out analyses, and interpreted the data and drafting of the manuscript in consultation with the co-authors. All authors approved of the final version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. Blumstein, Alfred, and Jacqueline Cohen. "Characterizing criminal careers." *Science* 27 (1987): 985–91.
2. Farrington, David P. "Age and Crime." *Crime and Justice* 7 (1986): 189–250.
3. Moffitt, Terrie E. "Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy." *Psychological Review* 100, no. 4 (1993): 674–701.
4. Fraga, Silvia, Elisabete Ramos, Sonia Dias, and Henrique Barros. "Physical fighting among school-going Portuguese adolescents: Social and behavioural correlates." *Preventive Medicine* 52 (2011): 401–04.
5. Kodjo, Cheryl M., Peggy Auinger, and Sheryl A. Ryan. "Prevalence of, and factors associated with, adolescent physical fighting while under the influence of alcohol or drugs." *Journal of Adolescent Health* 35 (2004): 346.e11–16.
6. Muula, Adamson S., Emmanuel Rudatsikira, and Seter Siziya. "Correlates of weapon carrying among high school students in the United States." *Annals of General Psychiatry* 7 (2008): 1–8.
7. Pickett, William, Wendy Craig, Yossi Harel, John Cunningham, Kelly Simpson, Michal Molcho, Joanna Mazur, Suzanne Dostaler, Mary D. Overpeck, and Candace E. Currie. "Cross-national Study of Fighting and Weapon Carrying as Determinants of Adolescent Injury." *Pediatrics* 116 (2005): e855–63.
8. Baldry, Anna C. "Bullying in schools and exposure to domestic violence." *Child Abuse & Neglect* 27 (2003): 713–32.
9. Ellickson, Phyllis, Hilary Saner, and Kimberly A. McGuigan. "Profiles of violent youth: Substance use and other concurrent problems." *American Journal of Public Health* 87 (1997): 985–91.
10. Huizinga, David, and Jakob-Chien Cynthia. "The contemporaneous co-occurrence of serious and violent juvenile offending and other problem behaviors." In *Serious & Violent Juvenile Offenders: Risk Factors and Successful Interventions*. Edited by Loeber Rolf and David P. Farrington. Thousand Oaks: Sage Publications, Inc, 1998, pp. 47–67.
11. Swahn, Monica H., and John E. Donovan. "Alcohol and violence: Comparison of the psychosocial correlates of adolescent involvement in alcohol-related physical fighting versus other physical fighting." *Addictive Behaviors* 31 (2006): 2014–29.

12. Rudatsikira, Emmanuel, Adamson Muula, and Seter Siziya. "Variables associated with physical fighting among US high-school students." *Clinical Practice and Epidemiology in Mental Health* 4 (2008): 1–8.
13. Swahn, Monica H., Thomas R. Simon, Bart J. Hammig, and Janet L. Guerrero. "Alcohol-consumption behaviors and risk for physical fighting and injuries among adolescent drinkers." *Addictive Behaviors* 29 (2004): 959–63.
14. Grunbaum, J. Anne, Laura Kann, Steven A. Kinchen, Barbara Williams, James G. Ross, Richard Lowry, and Lloyd Kolbe. "Youth Risk Behavior Surveillance—United States, 2001." *Journal of School Health* 72 (2002): 313–28.
15. Walton, Maureen A., Rebecca M. Cunningham, Abby L. Goldstein, Stephen T. Chermack, Marc A. Zimmerman, Raymond C. Bingham, Jean T. Shope, Rachel Stanley, and Frederic C. Blow. "Rates and Correlates of Violent Behaviors Among Adolescents Treated in an Urban Emergency Department." *Journal of Adolescent Health* 45 (2009): 77–83.
16. Schulte, Mayer T., Danielle Ramo, and Sandra A. Brown. "Gender Differences in Factors Influencing Alcohol Use and Drinking Progression among Adolescents." *Clinical Psychology Review* 29 (2009): 535–47.
17. White, Helene R., John Brick, and Stephen Hansell. "A Longitudinal Investigation of Alcohol Use and Aggression in Adolescence." *Journal of Studies on Alcohol and Drugs* 11 (1993): 62–77.
18. Lowry, Richard. "Weapon-carrying, physical fighting, and fight-related injury among U.S. adolescents." *American Journal of Preventive Medicine* 14 (1998): 122–29.
19. Rudatsikira, Emmanuel, Seter Siziya, Lawrence N. Kazembe, and Adamson S. Muula. "Prevalence and associated factors of physical fighting among school-going adolescents in Namibia." *Annals General Psychiatry* 6 (2007): 1–5.
20. Pickett, William, Michal Molcho, Frank J. Elgar, Fiona Brooks, Margaretha de Looze, Katharina Rathmann, Tom F.M. ter Bogt, Saoirse N. Gabhainn, Dagmar Sigmundová, Margarida G. de Matos, Craig Wendy, Sophie D. Walsh, Yossi Harel-Fisch, and Candace Currie. "Trends and Socioeconomic Correlates of Adolescent Physical Fighting in 30 Countries." *Pediatrics* 131 (2012): e18–26.
21. Simpson, Kelly, Ian Janssen, Wendy M. Craig, and William Pickett. "Multilevel analysis of associations between socioeconomic status and injury among Canadian adolescents." *Journal of Epidemiology and Community Health* 59 (2005): 1072–77.
22. Cotten, Nikki U., Jacqueline Resnick, Dorothy C. Browne, Sandra L. Martin, Donna R. McCarragher, and Joan Woods. "Aggression and fighting behavior among African-American adolescents: Individual and family factors." *American Journal of Public Health* 84 (1994): 618–22.
23. Wilson, Margo, and Martin Daly. "Life expectancy, economic inequality, homicide, and reproductive timing in Chicago neighborhoods." *British Medical Journal* 314 (1997): 1271–74.
24. Fajnzlber, Pablo, Daniel Lederman, and Norman Loayza. "Inequality and Violent Crime." *Journal of Law and Economics* 45 (2002): 1–26.
25. Wilkinson, Richard G., and Kate E. Pickett. "The problems of relative deprivation: Why some societies do better than others." *Social Science & Medicine* 65 (2007): 1965–78.

26. Moskowitz, Harry, John L. Griffith, Carla DiScala, and Robert D. Sege. "Serious injuries and deaths of adolescent girls resulting from interpersonal violence: Characteristics and trends from the united states, 1989–1998." *Archives of Pediatrics and Adolescent Medicine* 155 (2001): 903–08.
27. Miller, Ted R., Nancy M. Douglass, John B. Rossman, and Shelli B. Miller. *Databook on Nonfatal Injury: Incidence, Costs, and Consequences*. Washington DC: The Urban Institute, 1995.
28. Adinkrah, Mensah. "Epidemiologic Characteristics of Suicidal Behavior in Contemporary Ghana." *Crisis: The Journal of Crisis Intervention and Suicide Prevention* 32 (2011): 31–36.
29. Owusu, Andrew, Peter Hart, Brittney Oliver, and Minsoo Kang. "The Association between Bullying and Psychological Health among Senior High School Students in Ghana, West Africa." *Journal of School Health* 81 (2011): 231–38.
30. Berenson, Abby B., Constance M. Wiemann, and Sharon McCombs. "Exposure to violence and associated health-risk behaviors among adolescent girls." *Archives of Pediatrics and Adolescent Medicine* 155 (2001): 1238–42.
31. Olweus, Dan. "Bullying at School: Basic Facts and Effects of a School Based Intervention Program." *Journal of Child Psychology and Psychiatry* 35 (1994): 1171–90.
32. Osei, Robert D. "Reducing poverty through a social grants programme: The case of Ghana." ISSER research paper, Ghana Institute of Statistical Social and Economic Research, University of Ghana, Accra, Ghana, 2011.
33. Mahalik, James R., Shuan M. Burns, and Matthew Syzdek. "Masculinity and perceived normative health behaviors as predictors of men's health behaviors." *Social Science & Medicine* 64 (2007): 2201–09.
34. Owusu-Banahene, Nana O., and Francis K. Amedahe. "Adolescent students' beliefs about aggression and the association between beliefs and reported level of aggression: A study of senior high school students in Ghana." *Australian Journal of Educational & Developmental Psychology* 8 (2008): 64–71.
35. Smith-Khuri, Eleanor, Ronaldo Iachan, Peter C. Scheidt, Mary D. Overpeck, Saiorse N. Gabhainn, William Pickett, and Yossi Harel. "A cross-national study of violence-related behaviors in adolescents." *Archives of Pediatrics and Adolescent Medicine* 158 (2004): 539–44.
36. Grebmer, V. Klaus, Heidi Fritschel, Bella Nestorova, Tolulope Olofinbiyi, Rajul Pandya-Lorch, and Yisehac Yohannes. *The Challenge of Hunger 2008: Global Hunger Index*. Washinton DC: Internal Food Policy Research Institute, 2008.
37. Reingle, Jeniffer M., Wesley G. Jennings, Sara D. Lynne-Landsman, Linda B. Cottler, and Molina M. Maldonado-Molina. "Toward an Understanding of Risk and Protective Factors for Violence among Adolescent Boys and Men: A Longitudinal Analysis." *Journal of Adolescent Health* 52 (2013): 493–98.
38. Prinstein, Mitchell J., Julie Boergers, and Anthony Spirito. "Adolescents' and Their Friends' Health-Risk Behavior: Factors That Alter or Add to Peer Influence." *Journal of Pediatric Psychology* 26 (2001): 287–98.
39. Smith, Paula, Brian R. Flay, Carl C. Bell, and Roger P. Weissberg. "The Protective Influence of Parents and Peers in Violence Avoidance among African-American Youth." *Maternal and Child Health Journal* 5 (2001): 245–52.

40. Giancola, Peter R. “Alcohol-Related Aggression during the College Years: Theories, Risk Factors and Policy Implications.” *Journal of Studies on Alcohol and Drugs* 26 (2002): 1350–58.
41. Rubin, Kenneth H., William M. Bukowski, and Jeffrey G. Parker. “Peer Interactions, Relationships, and Groups.” In *Handbook of Child Psychology*. Hoboken: John Wiley & Sons, Inc., 2007.
42. Sumter, Sindy R., Caroline L. Bokhorst, Laurence Steinberg, and Michiel P. Westenberg. “The developmental pattern of resistance to peer influence in adolescence: Will the teenager ever be able to resist?” *Journal of Adolescence* 32 (2009): 1009–21.
43. Reid, Ken. “The Causes, Views and Traits of School Absenteeism and Truancy: An Analytical Review.” *Research in Education* 74 (2005): 59–82.
44. Kinard, Brian R., and Cynthia Webster. “The Effects of Advertising, Social Influences, and Self-Efficacy on Adolescent Tobacco Use and Alcohol Consumption.” *Journal of Consumer Affairs* 44 (2010): 24–43.
45. Wilson, Michael L., Andrea C. Dunlavy, Bharathi Viswanathan, and Pascal Bovet. “Suicidal Expression among School-Attending Adolescents in a Middle-Income Sub-Saharan Country.” *International Journal of Environmental Research and Public Health* 9 (2012): 4122–34.

© 2014 by the authors; licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/3.0/>).