

# Psycho-social wellbeing among in-school adolescents of Sri Lanka; prevalence of selected attributes and associated factors

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## Research article

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# Abstract

**Background** An optimum adolescence is associated with a psycho-social and cognitive development. These developments affects the interactions in the day-to-day activities of young people and have impacts on their lives beyond the adolescence age-group. The prevalence of psycho-social problems among adolescents are on the rise. The aim of this study was to estimate the prevalence and factors associated with the selected attributes of psycho-social well-being among 13 to 17-year in-school adolescents of Sri Lanka using the Global School Health Survey (GSHS). **Methods** GSHS, was a cross-sectional study conducted among 3,650 adolescents of aged 13-17, attending government schools. Data were collected using a self-administered questionnaire. Four selected psychosocial well-being outcomes (i.e. being bullied, loneliness, feeling anxious, suicidal ideation and practices) were assessed with questions for 11 potential associated factors of those. The sample was selected through a two-staged cluster sampling technique. Multivariable analysis was done with multiple logistic regression to determine the independent associated factors. **Results** Majority of the respondents belonged to the 13-15 age group (66.5%) and with 51.1% were females. More than one third of the participants (37.7%, 95%CI 36.1-39.5) had experienced bullying 30 days prior to the study. 'Loneliness' and 'feeling anxious' had been experienced by 9.0% (95%CI 8.0-10.0) and 4.7% (95%CI 3.9- 5.4), respectively. The prevalence of planning an attempt of suicide was 6.3%, while 6.6% had at least attempted suicide once. Multivariable analysis revealed that 'lacked parental support' and 'being engaged in a fight' were independently associated with being bullied, feeling lonely and considering attempting suicide. Mutual associations of the four outcomes with each other indicate that being bullied was significantly associated with loneliness and feeling anxious. In addition, loneliness was independently associated 'considering an attempt of suicide' (OR=2.9, 95%CI=2.0 to 4.3). Feeling anxious was also associated with considering attempting suicide (OR=3.4, 95%CI= 2.1 to 5.4). **Conclusion** This study demonstrated that the prevalence of psycho-social wellbeing is among school going adolescents is a major public health problem in Sri Lanka. School-based interventions to address these issues should be designed with the goal of increasing adolescents' awareness of the measures of raising the psycho-social wellbeing.

## Background

Adolescence includes the transitional period from childhood to the adulthood and often defined as from 10 to 19 years (1, 2). Prevalence of adverse psycho-social health issues is rising among these young people globally (3-5). One tenth of children and youth have some mental health problem that not only significantly interfere with their day today life but also go beyond the adolescence(3). Similarly, attributes of social disintegration, such as isolation and loneliness have been associated with a higher mortality (5, 6). Furthermore, many of the psychological problems reported in the adulthood are often found to have been originated in the adolescence(4, 7).

Presence of depressive symptoms, suicidal behaviours, loneliness, isolation are some manifestations of low psycho-social wellbeing among adolescents. It had been documented even before the 21<sup>st</sup> century that about 15% of adolescents experience depression to a moderate to severe degree (8). Depression and

suicidal behaviours are inter-related. Suicidal ideations are strongly associated with suicidal attempts (8). In an Estonian study with 13-15 year school children, self-assessed depressive feelings and suicidality were found to be 26.1% and 12.8% respectively (8). Prevalence of negative social attributes extend across a vast range exceeding 30% of the adolescents in some settings(1, 9).

There are several associated factors negatively influencing the above manifestations, including bullying, substance abuse, smoking and peer-violence. These factors are associated with many mental health problems like anxiety, depression and suicidal ideation (10, 11). Additionally these factors are likely to be persistent or repeatedly occur, thus augmenting their negative effect over time (12). The prevalence of these factors varies from school grade to school grade. In some circumstances, even teachers are unaware of these factors. As an example, in a study done in Pakistan, more than half of the teachers did not have adequate knowledge on bullying(13). To the contrary favourably associated factors that reduce the risk of the above manifestations include family bond and the practice of life skills (14, 15).

There is a paucity of documented studies done on adolescent psycho-social wellbeing in Sri Lanka. However, the limited available findings imply that psycho-social problems among adolescents are far from being rare (16, 17). Among the adolescents in Sri Lanka about 70% are schooling(18). Hence schools have become ideal settings for the exploration of adolescent issues.

Global School-Based Student Health Survey (GSHS) has been developed by the World Health Organization with other collaborators with aims that include helping countries in identifying priorities and trends(19, 20). Accordingly, GSHSs have been conducted globally by Ministries of Health and Education from 2003(18). The last GSHS has been completed in Sri Lanka in 2016 and the previous in 2008 with the objective of assessing the prevalence of health behaviours and the protective factors(11, 21). In the GSHS-2008, there were some eye-opening findings. As examples nearly 10% of students between 13-15 years had stated that they had seriously considered attempting suicide during previous 12 months. Similarly, 7.6% had felt alone always or most of the time(21). In the GSHS-2016, participants of 16 and 17 years were additionally included in the study population. Therefore, findings of GSHS-2016 would spread across a full range of 13 to 17 year period of the adolescence and would enable detecting trends when compared with the findings of 2008.

In this background, this paper describes the findings of a secondary analysis of the GSHS-2016 data in relation to factors associated with the selected attributes of psycho-social well-being among 13 to 17-year in-school adolescents of Sri Lanka. The aim of this study was to estimate the prevalence of bullying, feeling alone, sleep disturbances due to a worry, suicidal ideation and practices and the associations of 11 selected factors with these among in-school adolescents of Sri Lanka.

## Methods

GSHS-2016 was completed as a descriptive cross-sectional study among a representative sample of in-school adolescents aged 13-17 years who were in grades 8 to12, in 25 districts of Sri Lanka. Sri Lanka, an island in the Indian Ocean with a population of 21.7 million, has been recently graduated to an upper-

middle income level(22). Out of the total population, around 16.2% are between 10- 19 years(23). Being enrolled in a government-school was an eligibility-criteria of the participants. Data collection was done between 1<sup>st</sup> October 2016 to 30th November 2016. The survey included a two-stage cluster sampling method in a sampling frame of 40 schools including 3650 students. In stage I, 40 schools were selected and stage II, systematic sampling was used to select classes of those schools. Minimum sample size needed at the data collection stage was estimated to be 3125 with a 5% margin of error and an assumed response rate of 80%. At the end of the two rounds, the selected classes included 3650 potential participants.

The data collection was done using a standard self-administered questionnaire developed by WHO and has been used in more than 100 countries (24, 25). The questionnaire was culturally adopted to the Sri Lankan context and translated to the two mainly practiced languages (i.e. Sinhalese and Tamil) in Sri Lanka. The cultural adaptation was done by a group of experts consisting of teachers, officials from teachers training institute, public health experts, paediatricians, psychologists and parents. Cultural appropriateness of the questions and the words used in the questions were assessed and modified to improve the cultural appropriateness. The participants had the option of selecting their choice of the language of the questionnaire. The culturally adopted study instrument had nine sections and the section on psychosocial well-being included questions of four selected domains (i.e. bullying, loneliness, feeling anxious, suicidal ideation and practices) and 11 potential associated factors of these. Bullying was considered positive when a student or group of students say or do bad and unpleasant things to another student or when a student is teased a lot in an unpleasant way or when a student is left out of things on purpose, during the past 30 days. Subjective perception of loneliness was assessed for the last 12 months prior to the survey. If a student had been so worried about something that they could not sleep at night during 12 months before the survey, the student was taken as positive to feeling anxious. Suicidal ideation and practices were assessed for the last 12 months prior to the survey. The 11 associated factors assessed included;

1. Age
2. Sex
3. Ever smoking
4. Ever drinking alcohol
5. Had close friends at school
6. Students in their school were kind and helpful during last 30 days
7. Played one or more sports during the 12 months before the survey
8. Lacked parental support
  - During the past 30 days, parents or guardians did not understand their problems and worries
9. Lacked parental supervision
  - During the past 30 days, parents or guardians did not check to see if their homework was done

## 10. Was physically attacked during last 12 months

- A physical attack was defined as when one or more people hit or strike someone, or when one or more people hurt another person with a weapon (such as a stick, knife, or gun). It is not a physical attack when two students of about the same strength or power choose to fight each other.

## 11. Was in a fight during last 12 months

- A physical fight occurs when two students of about the same strength or power choose to fight each other.

Data collection was facilitated and supervised by the principal investigator (SS) and was done by education instructors (all educated up to tertiary level education) who have been trained in data collection.

The data set was cleaned and edited for inconsistencies. Missing data were not statistically imputed. Analysis was done with Statistical Package of Social Sciences version 26 (26). The prevalence of the outcome-domains and associated factors were described with the point estimates as well as confidence intervals. Bi-variable analysis was done using the uni-variable logistic regression. The effect measures of these associations were presented with their interval estimates. In determining the independent associated factors, multivariable analysis was done with multiple logistic regression. Beta coefficients and their confidence intervals were described for the associated factors.

Informed written consent was obtained from the from the parents/ guardians. Data collection was done on pre-planned days without interfering with the routine activities of the schools. Ethics approval was obtained from the Ethics Review Committee of Faculty of Medicine, Colombo (Approval number-EC-16-184).

## Results

The overall response rate of the selected participants was 89% with 3262 usable data records. One hundred and sixteen (n=388) either did not give consent to be included in the study or was absent from school on the day of the data collection.

### Characteristics of participants

Most of the students who responded belonged to the 13-15 age group (66.5%). The study group consisted of an equal proportion of males (48.9%) and females (51.1%) (table 1). Further analyses were performed on the 3173 participants who were within the 13 to 17 years (i.e. excluding the 88 participants who were studying between grades 8-12 but being outside these age limits).

### **Table 1: Description of study participants of the 2016 Sri Lankan Global School-Based Survey (N=3261)**

Characteristic	Frequency	(%)
Age		
12 years or younger	66	(2.1)
13-15 years	2196	(66.5)
16-17 years	977	(30.7)
18 and older	22	(0.7)
Sex ( <i>Missing - 19</i> )		
Male	1437	(48.9)
Female	1805	(51.1)

### Selected outcomes related to psycho-social well-being

The table 2 shows the percentage of participants who experienced three selected outcomes in relation to psycho-social well-being, namely being subjected to bullying, feeling loneliness and feeling anxious.

**Table 2: Distribution of the study participants of age 13-17 by the frequency of been subjected to bullying during the last 30 days, felt loneliness during last 12 months and felt anxious during last 12 months by sex and age categories**

Variable	Subjected to bullying in last 30 days	Loneliness (felt most of the time or always) during past 12 months	Feeling anxious (most of the time or always) in last 12 months
	Percentage (95% CI)	Percentage (95% CI)	Percentage (95% CI)
Total	37.7 (36.1- 39.5)	9.0 (8.0- 10.0)	4.7 (3.9- 5.4)
Sex			
Males	48.6 (45.8- 51.2)	8.2 (6.8-9.7)	4.1 (3.2-5.2)
Females	28.9 (26.7-30.9)	9.5 (8.1-10.8)	4.8 (3.8-5.8)
Age			
13-15 years	37.7 (35.7-39.8)	7.6 (6.5-8.7)	3.7 (2.9-4.5)
16-17 years	36.8 (33.7-39.8)	12.0 (9.9-14.0)	6.3 (4.8-7.9)

More than one third of the participants (37.7%) had experienced bullying 30 days prior to the study, with a significantly higher male (48.6%, 95% CI 45.8- 51.2) preponderance compared to females (28.9%, 95% CI

26.7-30.9). 'Loneliness' and 'feeling anxious' had been experienced equally by both sexes. The prevalence of experiences in bullying was similar between the two age categories (age 13-15 years and 16-17 years). In contrast, 'loneliness' was significantly higher in the older age group (12.0%, 95% CI 9.9-14.0) compared to the 13-15 category (7.6%, 95% CI 6.5-8.7). Significantly more students in the elderly group (i.e. age group 16-17 years) (6.3%, 95% CI 4.8-7.9) had experienced anxiousness compared to their younger counterparts (3.7%, 95% CI 2.9-4.5).

Table 3 depicts three outcomes in relation to psycho-social well-being, related to suicides: ideation, planning and attempting. Nearly one tenth of the participants have seriously considered attempting suicide. The prevalence of planning an attempt of suicide was 6.3%, while 6.6% had at least once attempted suicide. None of these outcomes showed significant difference between different sex and age groups.

**Table 3: Distribution of the study participants of age 13-17 by the frequency of the consideration of attempting suicide, planned suicide, attempted suicide by sex and age categories**

	Seriously considered attempting suicide	Planned attempting suicide	At least once attempted suicide
	Percentage (95% CI)	Percentage (95% CI)	Percentage (95% CI)
Total	9.3 (8.2-10.2)	6.3 (5.4-7.1)	6.6 (5.7-7.5)
Sex			
Males	9.6 (8.1-11.1)	6.1 (4.8-7.4)	6.6 (5.3-7.9)
Females	8.9 (7.6-10.2)	6.5 (5.3-7.6)	6.5 (5.3-7.7)
Age			
13-15 years	9.0 (7.8-10.2)	6.4 (5.3-7.4)	6.6 (5.7-7.7)
16-17 years	9.5 (7.7-11.3)	6.1 (4.5-7.5)	6.4 (4.8-7.9)

### Associations of psycho-social wellbeing

Table 4 shows unadjusted associations of eleven selected characteristics in relation to four selected outcomes of the psycho-social wellbeing: being bullied, loneliness, feeling anxious and considering attempting suicide.

**Table 4: Factors associated mental health illness (Unadjusted Odds Ratios with 95% CI) - from total study population**

Characteristic	Total	Subjected to bullying 30 days	Loneliness- felt most of the time or always	Feeling anxious - last 12 months	Considered attempting suicide	
Age	13-15	2196	1	1	1	
	16-17	977	0.9 (0.8-1.1)	1.6 (1.2-2.1)*	1.8 (1.3-2.5)*	1.0 (0.8-1.4)
Sex	Male	1437	2.3 (2.0-2.7)*	0.9 (0.7-1.1)	0.8 (0.6-1.2)	1.1 (0.9-1.4)
	Female	1805	1	1	1	1
Ever smoking	Yes	189	3.4(2.5-4.7)*	1.8 (1.2-2.8)*	3.1 (1.8-5.0)*	2.7 (1.8-4.1)*
	No	2906	1	1	1	1
Ever drinking alcohol	Yes	219	2.3(1.7-3.1)*	2.0 (1.4-3.0)*	2.5 (1.5-4.0)*	2.3 (1.5-3.3)*
	No	2929	1	1	1	1
Had close friends	No	180	1.4* (1.1-1.9)	2.3 (1.6-3.5)*	2.6 (1.5-4.2)*	2.5 (1.6-3.6)*
	Yes	3082	1	1	1	1
Students in their school were kind and helpful	No	1564	1.5* (1.3-1.8)	1.2 (0.9-1.6) *	1.7 (1.2-2.4)*	1.7 (1.3-2.2)*
	Yes	1666	1	1	1	1
Played one or more sports	No	532	0.7* (0.6-0.9)	1.6 (1.2-2.1)*	1.4 (0.9-2.0)	1.6 (1.2-2.1)*
	Yes	2730	1	1	1	1
Lacked parental support	Yes	1214	2.0* (1.7-2.8)	2.5 (1.9-3.2)*	2.6 (1.8-3.7)*	2.7 (2.1-3.5)*
	No	2013	1	1	1	1
Lacked parental supervision	Yes	987	2.5* (2.2-3.0)	2.1 (1.6-2.6)*	2.3 (1.7-3.2)*	2.6 (2.0-3.3)*
	No	2246	1	1	1	1
Was physically attacked	Yes	1119	4.9* (4.2-5.8)	2.0 (1.6-2.6)*	2.4 (1.7-3.3)*	2.0 (1.5-2.5)*
	No	2120	1	1	1	1
Was in a fight	Yes	1420	3.9* (3.3-4.5)	1.5 (1.2-1.9)*	2.4 (1.7-3.4)*	2.1 (1.7-2.7)*
	No	1838	1	1	1	1

It is observed that except for the age, other characteristics are statistically significantly associated with being bullied at 5% significant level (Table 4). The highest effect measure was observed for 'being physically attacked'. A participant who has been physically attacked is 4.9 times likely to be subjected to bullying compared to one without. Except for the sex of the participant, other characteristics were significantly associated with loneliness. The highest effect measure was observed for 'lacking parental support' (OR=2.5, 95% CI= 1.9- 3.2). Ten characteristics had been associated with considering attempting suicide, with age and sex being the only exceptions. 'Lacked parental support' and 'having ever smoked' were associated with 2.7 times likelihood of considering attempting suicide compared to absence of those factors.

Table 5 shows the adjusted effect measures of these associations. Adjustments have been done for the other 10 characteristics in this table as well as for the presence of these outcomes (as mentioned in table 6). Out of the characteristics mentioned in Table 5, five were independently associated with being bullied: male sex (OR=1.7, 95% CI=1.4 to 2.1), lacking parental support (OR=1.3, 95% CI=1.1 to 1.5), lacking parental supervision (OR=1.6, 95% CI=1.2 to 1.9), being physically attacked (OR=3.0, 95% CI=2.5 to 3.7) and being in a fight (OR=2.1, 95%CI=1.7 to 2.5). Older age (OR=1.7, 95% CI=1.2 to 2.3) and lack of parental support (OR=1.8, 95% CI=1.3 to 2.5) were independently associated with loneliness while male sex was observed to be a protective factor (OR=0.6, 95% CI=0.4 to 0.8). Five factors were associated significantly with considering attempting to suicide. Those were: not having close friends (OR=1.6, 95% CI=1.01 to 2.7), not engaging in sports (OR=1.5, 95% CI=1.1 to 2.1), lacking parental support (OR=1.7, 95% CI=1.2 to 2.3), lacking parental supervision (OR=1.5, 95% CI=1.1 to 2.1) and being in a fight (OR=1.5, 95% CI=1.1 to 2.1).

Mutual correlations of these four outcomes with each other are mentioned in table 6. Being bullied was significantly associated with loneliness (OR=2.4, 95% CI=1.8 to 3.3) and feeling anxious (OR=2.8, 95% CI= 1.7 to 4.5). In addition, experiencing loneliness was independently associated "considering an attempt of suicide" (OR=2.9, 95% CI=2.0 to 4.3). Feeling anxious was also associated with considering attempting suicide (OR=3.4, 95% CI= 2.1 to 5.4).

## **Discussion**

This is the first documented journal article exploring the factors independently associated with four important attributes (i.e. being bullied, loneliness, feeling anxious and ideation of attempting suicide) among a national-wide sample of 13-17year old school children. The prevalence of these attributes was notably high with nearly 38% being bullied, 9.3% considering attempting suicide, 9% loneliness and 5% feeling anxious. In general, there was a notable mutual co-existence of these attributes, highlighting their vicious impacts of the life of the school children. The present study revealed: Older age (for 2 attributes), male gender (for 2 attributes), lacking parental support (for 3 attributes), lacking parental supervision (for 2 attributes), being physically attacked (for 1 attribute) and engaging in a fight (for 4 attributes), not

engaging in sports (for 1 attribute) and not having close friends (for 1 attribute) as independent risk factors.

The comparison of the prevalence of the attributes with the findings of the 2008 survey depicts notable observations. The percentage of children subjected to bullying has remained more or less the same (around 37% in overall) with a slight increase among boys(21). The proportion of children who felt lonely (most of the time or always) remained the same (i.e. 7.6%) despite having an extended sample with two additional older years(21). In fact, the prevalence was relatively higher (12% versus 7.6%) among the children between 16-17 years compared to those between 13-15 years. Even though a slight decrease was observed in the proportion of those seriously considering the suicide (9.9% versus 9.3%), the burden was relatively higher (0.5% in excess) among the children who were 16-17 years. These provides two important inferences. One is that the burden of these psycho-social attributes have remained unchanged in between 2008 to 2016. Second is that these remain issues with similar or higher magnitude even among the sub-group of 16-17 years, which were not included in the 2008 survey. Both these phenomena reflect the necessity of novel interventions in addressing these immediately.

It is important to review similar regional GSHS findings with these Sri Lankan observations. As an example, the percentage of children 13-17 years who seriously considered suicide in past 12 months were: 4.9% in Bangladesh (2014), 5.4% in Indonesia (2015), 13.7% in Nepal (2015), 12.5% in Thailand (2015) and 15.2% in Maldives (2014)(27-31). A pooled estimate of suicidal ideation among students between 13-17 years of age in the south-east Asia region was estimated to be around 7%. Furthermore, in general, female students reported higher rates of suicidal ideation than male students in south-east Asian countries (32). As another example, the proportions who were bullied included: 24.6% in Bangladesh (2014), 20.6% in Indonesia (2015), 51% in Nepal (2015), 29.5% in Thailand (2015) and 22.2% in Maldives (2014)(27-31). There are global settings like Liberia(2017) where the proportions are further higher with children seriously considering suicide being reported as 21.0% and the bullied percentage as 49.2%(33). According to the recent GSHS results in Southeast Asian countries, the percentage of students who reported feeling so worried about something that they could not sleep at night varied from 3.9% in Myanmar to 15.1% in Maldives. The pooled 12-month prevalence of feeling anxious across the 10 countries was 6.9%(32). This reflects that these problems are not unique to Sri Lanka, but persist as regional and global burdens. However with the far improved health standards and achievements as well as with the well-established public health infrastructure, Sri Lanka is at a more favourable position in addressing these(34, 35).

The risk factors explored in the survey are known to be present with a notable magnitude in the study population. This is complemented by other published literature on the 2016 GSHS as well. As examples, the GSHS findings show that the prevalence of violence-related factors are far from rare with 44.2% being in a fight and 35.1% being physically attacked(11). Additionally, the prevalence of alcohol, smoking, smokeless tobacco and substance abuse within the previous 30 days had been between 2-4%(36). The alcohol and tobacco related risk factors are in general reported at a lower level than compared to regional settings(28-31), whereas violence related items like being engaged in a fight are reported at the same or a

higher magnitude(27-31). The findings of the present study reflect the co-existence of the psycho-social attributes. Each four attribute was significantly associated with at least two more attributes when adjusted for all the factors included in the study. This in in congruence with the global literature that these conditions have mutual associations(37-39). These imply the importance of screening and detection of school children of affected with these attributes and the value of early intervention as the presence of one attribute is independently associated with the occurrence of another.

Out of the 14 factors explored for each attribute (i.e. including their mutual associations), except for age and sex, all other nine were modifiable. Out of these, factors related to the domains of lack of parental involvement, presence of violence and not engaging in sports activities were detected as independently associated with the psycho-social attributes. Even if the substance-use did not yield direct significant associations with these four attributes, these are well known to be associated with factors that increase their likelihood with reference to observations of the same study population (11, 36). This highlights the need of a comprehensive package addressing the web of causation of these related outcomes. The initiatives like “promotion of life skills” and “health promoting school programme” have been implemented with added emphasis in recent years as collaborative efforts of Ministries of Health and Education, addressing these phenomena (40, 41). The impact of these would hopefully help in reducing these burdens, which could be evaluated in the next GSHS.

This study helpful in drawing several policy recommendations and interventions to adolescent health in Sri Lanka. Findings confirmed that problematic psychosocial attributes of the are prevalent among the school-going adolescents despite the attempts to improve child health in Sri Lanka. The policy interventions should target for improving the skills of parents for better parenting care. Furthermore, more emphasis should be given for interventions in caring of children in families with domestic disputes. National education curriculum should be reviewed to bring about the personality development policy interventions to reduce the burden from attempted suicide, loneliness, bullying and violence. Special attempts should be made to incorporate improved-access to care for children with different psychological needs. The communication-links between the field health team and the school administrations must be strengthened in relation to the identification of the affected children. Similarly, the collaboration between field staff and curative institutions must be ensured in the referral of the identified children under the supervision of the district and provincial level public health specialists.

There were several limitations of the study. Firstly, the study participants include only those who have been enrolled in government schools having excluded the students of the private sector. This was emphasized in interpreting data. Secondly the responses were given as stated by the participants without verification of the responses. Due to the sensitiveness of the questions asked, utilization of the self-administered questionnaires was the best available option. However, before administration of the questionnaires, the importance of the provision of genuine responses were highlighted to the whole classroom. Thirdly the study did not capture non-school going adolescents of the selected age group. Therefore, generalizing the findings to the entire adolescent population in Sri Lanka is not possible, as their circumstances may differ significantly. This was clearly mentioned in the eligibility criteria and was

concerned in the interpretation of findings. Finally, the study used a standard instrument that has been developed by WHO and it did not include some of the important variables such as like household income, ethnicity, support of the extended family, having a disability etc.

## Conclusions

The four psycho-social outcomes- being bullied, loneliness, feeling anxious and considering attempting suicide are prevalent in notable proportions among the school children of 13-17 years of Sri Lanka as suggested by the findings of GBSHS-2016. Nine out of eleven factors explored in the present study are significantly associated with at least one of these attributes. The presence of one attribute is significantly associated with the presence of at least two other attributes. High prevalence of the potential risk factors of these when combined with this co-existence of these attributes could potentially increase the burden and worsen the impact of these. Detecting and managing these attributes among school children and addressing the potential risk factors must be regarded as a local as well as a regional priority.

## List Of Abbreviations

CI	-	Confidence interval
GSHS	-	Global School-based Student Health Survey
OR	-	Odds Ratio
WHO	-	World Health Organization

## Declarations

### *Ethics approval and consent to participate*

The study is in accordance with Helsinki Declaration. The ethical clearance to conduct the study was received from Faculty of Medicine, University of Colombo, Sri Lanka (EC-16-184). Written informed consent was obtained from all parents/guardians prior to participation in the study and filling out the questionnaires. The form of consent was approved by the ethics committee.

### *Consent for publication*

Not applicable

### *Availability of data and materials*

The dataset used during the current study is available from WHO's NCD Microdata Repository (<https://extranet.who.int/ncdsmicrodata/index.php/catalog/648>)

### *Competing interests*

The authors declare that they have no competing interest.

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This study was funded by the World Health Organization (WHO). The funder only provided financial assistance to conduct the study and had no role in the study design, data collection, data analysis, data interpretation, or writing the manuscript.

### *Authors' contributions*

NW, SS, NSG, AL; Research idea, study design, analysis and interpretation. SS, NW, BM; Drafting of the manuscript. NW, SS, NSG, AL, SG, CW, RP, BM; Data analysis, interpretation, supervision and mentorship. All authors read and approved the manuscript.

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