

BMJ Open Association of socioeconomic status with psychiatric problems and violent behaviours in a nationally representative sample of Iranian children and adolescents: the CASPIAN-IV study

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ABSTRACT

Objectives: The aim of the present study was to evaluate the association between socioeconomic status (SES) and psychiatric problems and violent behaviours in a nationally representative sample of Iranian children and adolescents, based on nationwide surveillance programme data, 2011–2012.

Methods: Overall, 14 880 students, aged 6–18 years, were selected using a multistage cluster sampling method from rural and urban areas of 30 provinces in Iran. SES was estimated based on a main summarised component, extracted from principle component analysis of family assets and parents' jobs and education. For statistical analysis, SES was classified as 'low', 'middle' and 'high'. The WHO-Global School Based Student Health Survey (WHO-GSHS) questionnaire was used to assess psychiatric problems and violent behaviours.

Results: In total, 13 486 students (participation rate 90.6%) completed the study: 50.8% were boys and 75.6% were urban residents, with a mean age of 12.47 ±3.36 years. In the multivariate model, the ORs of depression, anxiety, feeling worthless, anger, insomnia, confusion and physical fights were lower in students with high SES compared with those with low SES ($p<0.05$) but physical fights was lower in the high SES group than in the low SES group ($p<0.05$). No significant relationship was documented between SES and other variables, including getting worried, history of bullying and being victimised.

Conclusions: Children and adolescents with low SES were at higher risk for psychiatric problems and violent behaviours. Mental health policies and public interventional strategies should be considered at the public level, notably for low SES families.

INTRODUCTION

Mental disorders are a major cause of morbidity, and are estimated to affect almost one

Strengths and limitations of this study

- This national study had a large sample size of over 13 000 participants (Iranian children and adolescents).
- This study had a comprehensive set of data used to determine socioeconomic status using factor analysis and many known confounders, such as rural or urban residence and smoking, which were adjusted for in the final analysis.
- Due to the Cross-sectional design of the study, causality could not be assessed.

in every three people.^{1 2} Mental disorders and their underlying causes are diverse, consisting of a deeply interconnected causality network of environmental, interpersonal and genetic factors.^{3 4} Because of their relatively higher prevalence, depression and anxiety disorders have been studied more extensively. Both of these disorders are considered risk factors for some potentially fatal conditions. Depression is a risk factor for suicide, and generalised anxiety disorder increases the risk of future cardiovascular events.^{5 6}

Mental disorders are common in children and adolescents.⁷ Many mental disorders have direct and indirect effects on children's wellbeing and school performance.⁸ Furthermore, mental disorders, occurring during childhood and adolescence, are well established predisposing factors for mental disorders in adulthood.^{9–11} Many risk factors, such as a history of sexual abuse, parental neglect, parental mental disorder, physical illness and being bullied at school, are associated with mental disorders in childhood

and adolescence, as well as an increased risk of mental disorders in adulthood.^{10 12 13} This risk is more prevalent in women than in men.¹¹ Previous studies showed that sociodemographic factors, such as older age, living in a metropolitan area, female gender, lower parental education, parental unemployment and family poverty may predict psychiatric problems and violent behaviours in children and adolescents.^{14–16} Some previous studies found that substance abuse—for example, alcohol, cigarette smoking and cannabis use—is also significantly associated with a higher rate of psychiatric problems.^{14 17}

Studies conducted in developed countries showed that socioeconomic status (SES) may affect the risk factors for psychiatric problems; such experience is limited in other countries. Studies in Iran have shown socioeconomic inequalities regarding mental health status and violent behaviours.^{18–20} A meta-analysis revealed that children with a lower SES are more likely to be bullied at school.²¹ In Japan, childhood SES is positively associated with the lifetime onset of psychiatric problems. Nevertheless, in some cases, such as sexual abuse, the SES effect is less evident.²²

The childhood SES indicators mainly consist of parental educational attainment, parental occupational status, and family assets or income. Some studies have shown that financial hardship and poverty in childhood are associated with psychiatric problems.^{23–25} A systematic review showed that the prevalence of violence and aggressive behaviours is of concern among Iranian youth and adolescents; it is associated with sociodemographic characteristics and family environment.¹⁹ Another systematic review showed that a low SES was strongly associated with psychiatric problems and violent behaviours in adolescents, and the strength of these associations varied according to different SES indicators.^{19 26} Although psychiatric problems are culturally and regionally connected,^{27 28} no large scale study has been conducted in developing countries.

The aim of the current study was to examine the association of SES (as the independent variable) with psychiatric problems and violent behaviours (as the dependent variable) in a nationwide sample of Iranian children and adolescents.

METHODS

In 2011–2012, the fourth national school based surveillance programme survey entitled the Childhood and Adolescence Surveillance and Prevention of Adult Non-communicable Disease (CASPIAN-IV) was conducted based on the WHO-Global School Based Student Health Survey (GSHS) protocol.²⁹

GSHS was developed by the WHO and Centers for Disease Control and Prevention in cooperation with United Nations' UNICEF, UNESCO and UNAIDS, and aimed to help countries measure and assess behavioural risk factors and protective factors among children and adolescents.²⁹ According to the GSHS survey, the

current national school based surveillance was designed and conducted to indicate the risk behaviours and risk factors of chronic diseases among children and adolescents in Iran. In brief, by applying a multistage cluster sampling method, 14 880 school students aged 6–18 years were selected from 30 provinces in Iran according to their school level (elementary, middle school and high school) and living area (urban or rural). Sampling frame was based on the list of students in each province, stratified by sex, living area and grade; it was obtained from the information bank of the Ministry of Education. In each province, schools were ordered by the type and name of the school, and then the number of students was added cumulatively in each province. After determining clusters in each province, 10 students were selected consecutively in each cluster. In total, 48 clusters of 10 subjects for each province (a total of 14 880 students) and an equal number of their parents were selected as study participants.³⁰

Sample size estimation was done based on the cluster sampling method, to achieve a good estimate of the main risk factors, including dietary behaviours, overweight, obesity and physical inactivity. The sample size was calculated based on a proportion estimation formula. For attaining the maximum sample size, the prevalence of the main risk factors of interest was considered as 0.5, with a precision of 0.1 and a type I error of 0.05. We multiplied the estimated sample size (100 subjects) by gender (boy/girl), living area (urban/rural) and an attrition rate of 20%. Thus the sample size was calculated as 480 students in each province. A total of 48 clusters of 10 subjects were selected in each province—that is, a total of 14 880 students at the national level. All measurements were done under standard protocols using calibrated instruments. Trained healthcare providers completed the questionnaires by interviews with students and parents. Under the comprehensive supervision of an executive manager, all processes were monitored and evaluated by a team of trained experts. Questionnaires were double checked at the provincial level.

The data were double checked at the district level by expert supervisors from school health providers, and were then controlled by national supervisors. After conducting the required revision, the provincial executive approved the final version. Data entry and cleaning were performed at the national level for the final databases.

Definitions of terms

Demographic and anthropometric information

Two sets of questionnaires were completed for students and their parents at the same time. Based on the Persian version of the main WHO-GSHS questionnaire, trained interviewers obtained students' demographic and anthropometric data, including age, sex, family size, living with parents, daily sleep duration, daily screen time (ST), physical activity (PA), smoking habits (active and passive smoking), body mass index (BMI) and birth

order. According to standard protocols, height and weight were measured, without shoes and with light clothing, to the nearest 0.1 unit of measure (cm for height and kg for weight). BMI was calculated from weight and height ($\text{BMI} = \text{weight (kg)} / \text{height (m)}^2$). The participants' ST behaviour was assessed by asking them to report the average daily time spent watching TV, and leisure time on a computer or playing electronic games during the week prior to the study. According to the international ST recommendations, for analysis, daily ST was categorised into two groups: <2 hours (low) and ≥ 2 hours (high).³¹ Participants reported the weekly frequency of their leisure time PA outside the school. Spending at least 30 min per day for PA was considered as an acceptable level for leisure time PA. For statistical analysis, each weekly frequency was categorised as follows: 0–2 days per week (mild), 3–5 days per week (moderate) and 6–7 days per week (vigorous). Students were considered as active smokers if they reported using tobacco products (cigarette, pipe, hookah, etc). If they reported that one of their household members smoked tobacco products at home, the participant was considered as passive smokers.

Socioeconomic status

The methods and variables used for calculating family SES were based on the categories approved in the Progress International Reading Literacy Study (PIRLS) for Iran.³² The SES information was obtained from the parents' questionnaire. The participants' SES was determined using the principle component analysis (PCA) method including parents' education, occupation, possessing a private car, their school type (public/private), home type (private/rented) and having a personal computer at home. The SES score for each student was a weighted average of the SES variables. The weighted averages of these variables were summarised under one main component, named the SES score. A lower score corresponded to a lower SES. The calculated score was categorised into tertiles to define SES levels. The first tertile was considered 'low', and the second and third ones as 'middle' and 'high' SES, respectively.

Psychiatric problems and violent behaviours

The Persian version of the standardised questionnaires was prepared and designed based on the WHO-GSHS questionnaire. This was adopted as an international collaborative surveillance project collecting information on the leading causes of mortality and morbidity, and the questionnaire validity and reliability were confirmed through previous studies.³³ The questionnaires and content validity were evaluated by psychiatric and psychology experts after translation. The quality of the questions was assessed via two pilot studies in Tehran. After each pilot study, questions with any difficulty in comprehension were modified. The questionnaire's internal reliability was assessed and approved (Cronbach's reliability coefficient >0.7). Psychiatric problems were measured using seven questions

regarding problems of feeling worthless, anger, anxiety, insomnia, confusion, depression and getting worried. There were also three questions regarding experiences of bullying, being victimised and physical fights. Online supplementary appendix 1 presents the questions and scoring method used for the domains of the psychiatric problems and violent behaviours.

Ethical considerations

The ethics committee of Tehran and Isfahan University of Medical Sciences and the Ministry of Health and Ministry of Education approved the study. Participation in the study was voluntary. Study objectives and methods were explained to all participants, and written informed consent and oral assent were obtained from all parents and students, respectively. Participants completed the questionnaires in a private and quiet place away from their parents, classmates and school staff. All questionnaires were completed anonymously.

Statistical analysis

Quantitative variables are expressed as mean (95% CI) and qualitative variables as percentages (95% CI). Analysis of variance (ANOVA) or χ^2 tests were used to compare the psychiatric problems and violent behaviours according to SES categories. The association of SES categories with psychiatric problems and violent behaviours was evaluated using different logistic regression models. First we assessed a possible interaction of SES categories with psychiatric problems and violent behaviours across gender and living area in a logistic regression model, and due to lack of interaction we considered these variables (gender and living area) as confounders in the logistic regression model. In each logistic regression model, potential confounders were adjusted to control the confounding effect. Model I was a crude model (without adjustment); in model II, the association was adjusted for age, gender and living area; in model III, family size, PA, ST activity, smoking status, birth order and living with parents were additionally adjusted. Results obtained from the logistic regression model are presented as OR (95% CI).

All statistical analyses were conducted based on survey data analysis methods. Data were analysed using the STATA package V.11.0 (Stata Statistical Software: Release 11. College Station, Texas, USA: StataCorp LP Package) and a p value <0.05 was considered significant.

RESULTS

Participants consisted of 13 486 children and adolescents out of 14 880 invited students (participation rate 90.6%), including 50.8% boys and 75.6% urban residents, with a mean age of 3.36 ± 12.47 years. Baseline characteristics of the study population, stratified by living area, are presented in table 1.

In rural areas, 59.4% and 11.3% of students were in the low and high SES groups, respectively; in urban

Table 1 Characteristics of participants according to living area: the CASPIAN-IV study

	Urban	Rural	Total	p Value
Age (year)*	12.81 (12.61 to 13.01)	11.42 (11.08 to 11.75)	12.47 (12.29 to 12.64)	<0.001
BMI (kg/m ²)*	19.29 (19.12 to 19.45)	17.49 (17.20 to 17.77)	18.85 (18.70 to 19.00)	<0.001
Birth order*	2.02 (1.99 to 2.04)	2.23 (2.17 to 2.29)	2.07 (2.07 to 2.09)	<0.001
Sex†				
Boy	50.31 (47.25 to 53.36)	52.17 (47.63 to 56.68)	50.76 (48.2 to 53.32)	0.50
Girl	49.69 (46.64 to 52.75)	47.83 (43.32 to 52.37)	49.24 (46.68 to 51.8)	
Sleep duration (hour/day)†				
<5	0.71 (0.55 to 0.91)	0.46 (0.27 to .78)	0.65 (0.51 to 0.81)	>0.001
5–8	24.25 (23.02 to 25.53)	17.65 (15.78 to 19.68)	22.65 (21.59 to 23.74)	
>8	75.03 (73.73 to 76.29)	81.89 (79.81 to 83.8)	76.7 (75.59 to 77.78)	
Worthless†	11.08 (10.32 to 11.88)	8.259 (7.071 to 9.62)	10.39 (9.73 to 11.08)	>0.001
Angriness†	39.5 (38.08 to 40.94)	32.26 (29.76 to 34.86)	37.73 (36.5 to 38.99)	>0.001
Worried†	32.44 (31.03 to 33.88)	20.24 (18.14 to 22.51)	29.46 (28.24 to 30.7)	>0.001
Insomnia†	17.06 (16.09 to 18.08)	12.9 (11.37 to 14.61)	16.05 (15.21 to 16.92)	>0.001
Confusion†	8.881 (8.189 to 9.626)	7.92 (6.755 to 9.269)	8.64 (8.04 to 9.28)	0.20
Depression†	22.53 (21.41 to 23.69)	16.23 (14.45 to 18.18)	20.99 (20.03 to 21.99)	>0.001
Anxiety†	26.64 (25.4 to 27.91)	20.74 (18.67 to 22.97)	25.2 (24.13 to 26.3)	>0.001
Victim†	27.49 (26.32 to 28.7)	26.97 (24.75 to 29.3)	27.36 (26.33 to 28.43)	0.69
Bully†	17.5 (16.57 to 18.48)	17.75 (16 to 19.65)	17.56 (16.74 to 18.42)	0.81
Physical fight†	39.75 (38.32 to 41.2)	40.52 (37.92 to 43.17)	39.94 (38.68 to 41.21)	0.61
Family size†				
≥4	47.92 (46.55 to 49.29)	61.05 (58.29 to 63.75)	51.08 (49.92 to 52.24)	>0.001
<4	52.08 (50.71 to 53.45)	38.95 (36.25 to 41.71)	48.92 (47.76 to 50.08)	
Living with parents†				
Both of them	94.16 (93.63 to 94.65)	93.76 (92.75 to 94.63)	94.06 (93.6 to 94.49)	0.40
One of them	4.56 (4.15 to 5.0)	4.59 (3.89 to 5.40)	4.56 (4.21 to 4.95)	
None of them	1.28 (1.01 to 1.61)	1.65 (1.17 to 2.31)	1.37 (1.13 to 1.66)	
TV watching (hour/day)†				
≤2 hours	47.44 (46.12 to 48.77)	55.27 (52.76 to 57.75)	49.34 (48.18 to 50.51)	>0.001
>2 hours	52.56 (51.23 to 53.88)	44.73 (42.25 to 47.24)	50.66 (49.49 to 51.82)	
Leisure time computer use (hour/day)†				
≤2 hours	88.72 (87.89 to 89.51)	95.5 (94.52 to 96.31)	90.37 (89.68 to 91.01)	>0.001
>2 hours	11.28 (10.49 to 12.11)	4.504 (3.69 to 5.483)	9.63 (8.99 to 10.32)	
Screen time (hour/day)†				
≤2 hours	78.63 (77.49 to 79.73)	89.89 (88.44 to 91.18)	81.38 (80.43 to 82.29)	>0.001
>2 hours	21.37 (20.27 to 22.51)	10.11 (8.816 to 11.56)	18.62 (17.71 to 19.57)	
Physical activity†				
Mild	34.87 (33.21 to 36.58)	31.74 (28.85 to 34.77)	34.11 (32.66 to 35.58)	0.14
Moderate	36.5 (35.24 to 37.78)	37.66 (35.28 to 40.1)	36.78 (35.66 to 37.92)	
Vigorous	28.63 (27.15 to 30.15)	30.6 (27.8 to 33.55)	29.11 (27.8 to 30.46)	
Passive smoker†	43.87 (42.57 to 45.17)	43.87 (41.3 to 46.47)	43.87 (42.73 to 45.01)	0.99
Active smoker†	3.01 (2.57 to 3.52)	1.27 (0.89 to 1.80)	2.58 (2.24 to 2.989)	>0.001
SES†				
Low	24.94 (23.5 to 26.45)	59.46 (56.43 to 62.42)	33.47 (32.02 to 34.95)	>0.001
Middle	34.37 (33.12 to 35.64)	29.21 (27.06 to 31.44)	33.09 (32.01 to 34.19)	
High	40.69 (38.77 to 42.64)	11.34 (9.396 to 13.62)	33.44 (31.82 to 35.1)	

*Data are mean (95% of mean).

†Data are percentage (95% CI of percentage).

BMI, body mass index; SES, socioeconomic status.

areas, the corresponding values was 24.9% and 40%, respectively. In contrast, the frequency of reporting symptoms of depression, feeling worthless, anger, getting worried, insomnia and anxiety was significantly higher in students living in urban areas than in their counterparts in rural areas. However, rates of bullying and physical fights were not significantly different. Self-reported smoking was higher in participants living

in urban areas than in rural inhabitants (3% vs 1.2%); however, the passive smoking rate was not significantly different between urban and rural areas. Students in urban areas had a higher BMI (19.2 vs 17.5 kg/m²) and lower PA levels compared with those in rural areas.

Table 2 presents the association of psychiatric problems and violent behaviours with SES. With increasing SES, the prevalence of two variables of getting worried

Table 2 Prevalence of psychiatric problems and violent behaviours in children and adolescents according to socioeconomic status: the CASPIAN-IV study

SES categories	Psychiatric distress						
	Worthless	Angriness	Worried	Insomnia	Confusion	Depression	Anxiety
Low	11.1 (10.0 to 12.3)	36.7 (34.7 to 38.7)	26.9 (25.1 to 28.8)	15.8 (14.4 to 17.2)	10.5 (9.4 to 11.6)	20.7 (19.1 to 22.2)	25.9 (24.2 to 27.7)
Middle	9.6 (8.6 to 10.7)	37.9 (36.1 to 39.7)	29.1 (27.3 to 30.9)	15.9 (14.6 to 17.2)	8.2 (7.3 to 9.2)	20.6 (19.1 to 22.1)	24.9 (23.3 to 26.5)
High	10.1 (9.0 to 11.2)	37.2 (35.3 to 39.2)	31.5 (29.7 to 33.5)	15.6 (14.4 to 17.0)	6.7 (5.9 to 7.7)	20.6 (19.1 to 22.1)	23.9 (22.3 to 25.6)
p Value*	0.12	0.62	0.001	0.96	<0.001	0.99	0.19
p Trend†	0.19	0.68	<0.001	0.90	<0.001	0.95	0.09

	Violent behaviours		
	Victim	Bully	Physical fights
Low	27.21 (25.52 to 28.97)	17.28 (15.88 to 18.78)	40.55 (38.6 to 42.52)
Middle	27.97 (26.45 to 29.54)	18.5 (17.72 to 19.84)	41 (39.14 to 42.89)
High	27.26 (25.59 to 29)	16.83 (15.58 to 18.15)	37.92 (35.97 to 39.92)
p Value*	0.74	0.16	0.03
p Trend†	0.97	0.63	0.06

All data are percentage (95% CI of percentage).

*p values resulted from χ^2 test.

†p values for trend analysis.

SES, socioeconomic status.

and confusion showed a linear decrease. The frequency of physical fights was significantly higher in the low and middle SES groups than in the high SES group. The relationship of SES with other psychiatric problems and violent behaviours was not statistically significant.

The results of the logistic regression model for possible interaction of SES categories with psychiatric problems and violent behaviours across gender and living area showed that stratification by gender and living area did not change the results of the SES association with psychiatric problems and violent behaviours.

The results of logistic regression analysis are provided in table 3. In the multivariate model, the OR for depression was lower in students with a high SES (OR=0.82; 95% CI 0.72 to 0.94) compared with low SES students. The same trend was reported for anxiety (OR=0.76; 95% CI 0.66 to 0.86), feeling worthless (OR=0.76; 95% CI 0.64 to 0.91), anger (OR=0.82; 95% CI 0.72 to 0.92), insomnia (OR=0.79; 95% CI 0.68 to 0.92) and confusion (OR=0.58; 95% CI 0.47 to 0.70). Although, physical fights was lower in the high SES group compared with the low SES group (OR=0.84; 95% CI 0.75 to 0.95), bullying history or being victimised was not associated with SES.

DISCUSSION

The present study underlines the importance of SES in the mental health of children and adolescents. It is the first study conducted in West Asia and North Africa evaluating the association of psychiatric problems and violent behaviours with family SES in a nationally representative sample of paediatric subjects.

In previous studies a considerably higher rate of psychiatric problems, especially regarding estimates for depression, in a paediatric population was documented.^{13 34 35} The current findings also detected a higher frequency of anxiety disorders, bullying and violence compared with some studies conducted in other parts of the world.^{13 36 37}

On the other hand, the present study showed that children and adolescents in the higher SES groups were generally at greater risk of psychiatric problems. Depression and anxiety decreased linearly in the higher SES groups; this finding is in concordance with previously reported evidence.³⁷

This can be explained by the fact that children in the lower SES groups might consider themselves deprived of many opportunities that their higher SES peers enjoy. Such inequalities may lead to emotional stress and depression or anxiety. Odds of insomnia also decreased linearly with SES. As insomnia is a sign of depression and anxiety, higher rates of anxiety and depression in this group may explain the higher frequency of insomnia in the low SES group.

In contrast, a similar investigation reported that adolescents with a lower socioeconomic position had poorer mental health status.^{38 39} In this regard, a set of known/unknown complex of effective factors are recognised as predisposing factors, which would lead to more difficulty in different processes from detection to treatment.⁴⁰

A remarkable association was observed between higher levels of behavioural problems and socially disadvantaged neighbourhoods and lower household SES.⁴¹ Possible pathways that socioeconomic factors might

Table 3 Association of socioeconomic status with psychiatric problems and violent behaviours in logistic regression analysis: the CASPIAN- IV study

	Model I* OR (95% CI)	Model II† OR (95% CI)	Model III‡ OR (95% CI)
<i>Worthlessness</i>			
SES			
Low	1	1	1
Middle	0.85 (0.72 to 0.99)	0.81 (0.70 to 0.95)	0.76 (0.65 to 0.89)
High	0.89 (0.75 to 1.05)	0.81 (0.69 to 0.96)	0.76 (0.64 to 0.91)
p Trend	0.19	0.02	0.004
<i>Anger</i>			
SES			
Low	1	1	1
Middle	1.05 (0.95 to 1.16)	1.01 (0.92 to 1.12)	0.93 (0.84 to 1.03)
High	1.02 (0.91 to 1.14)	0.93 (0.83 to 1.05)	0.82 (0.72 to 0.92)
p Trend	0.67	0.25	0.001
<i>Worried</i>			
SES			
Low	1	1	1
Middle	1.11 (0.99 to 1.24)	1.03 (0.93 to 1.15)	0.98 (0.87 to 1.10)
High	1.25 (1.10 to 1.41)	1.07 (0.95 to 1.21)	0.98 (0.86 to 1.11)
p Trend	<0.001	0.24	0.77
<i>Insomnia</i>			
SES			
Low	1	1	1
Middle	1.00 (0.88 to 1.14)	0.97 (0.85 to 1.10)	0.90 (0.78 to 1.03)
High	0.99 (0.86 to 1.14)	0.90 (0.78 to 1.03)	0.79 (0.68 to 0.92)
p Trend	0.90	0.14	0.004
<i>Confusion</i>			
SES			
Low	1	1	1
Middle	0.76 (0.64 to 0.89)	0.74 (0.63 to 0.87)	0.73 (0.62 to 0.87)
High	0.61 (0.51 to 0.74)	0.57 (0.47 to 0.68)	0.58 (0.47 to 0.70)
p Trend	<0.001	<0.001	<0.001
<i>Depression</i>			
SES			
Low	1	1	1
Middle	0.99 (0.88 to 1.11)	0.94 (0.84 to 1.06)	0.91 (0.80 to 1.02)
High	0.99 (0.87 to 1.13)	0.87 (0.77 to 0.99)	0.82 (0.72 to 0.94)
p Trend	0.95	0.04	0.007
<i>Anxiety</i>			
SES			
Low	1	1	1
Middle	0.94 (0.84 to 1.05)	0.91 (0.81 to 1.02)	0.87 (0.77 to 0.98)
High	0.89 (0.79 to 1.01)	0.80 (0.71 to 0.91)	0.76 (0.66 to 0.86)
p Trend	0.088	0.001	<0.001
<i>Victimised</i>			
SES			
Low	1	1	1
Middle	1.03 (0.93 to 1.15)	1.02 (0.92 to 1.13)	0.98 (0.88 to 1.09)
High	1.00 (0.88 to 1.13)	0.98 (0.87 to 1.11)	0.95 (0.83 to 1.08)
p Trend	0.97	0.82	0.44
<i>Bully</i>			
SES			
Low	1	1	1
Middle	1.08 (0.96 to 1.22)	1.11 (0.99 to 1.26)	1.04 (0.91 to 1.19)
High	0.97 (0.85 to 1.10)	0.98 (0.86 to 1.13)	0.90 (0.78 to 1.05)
p Trend	0.63	0.82	0.18

Continued

Table 3 Continued

	Model I* OR (95% CI)	Model II† OR (95% CI)	Model III‡ OR (95% CI)
<i>Physical fight</i>			
SES			
Low	1	1	1
Middle	1.01 (0.92 to 1.12)	1.02 (0.92 to 1.13)	0.98 (0.88 to 1.09)
High	0.89 (0.80 to 1.00)	0.88 (0.79 to 0.99)	0.84 (0.75 to 0.95)
p Trend	0.05	0.04	0.007

*Without adjusted (crude models).

†Adjusted for age, sex and living place.

‡Additionally adjusted for body mass index, family size, physical activity, screen time activity, smoking status, birth order and living with parents.

SES, socioeconomic status.

influence the risk of behaviour problems are associated with multiple residential moves, physical inactivity and longer duration of ST.

Children in the lower SES group were more likely to engage in a physical fight. Such physical adversities were also observed in children in previous studies; however, none directly related physical fights with SES.^{42–44} Bullying and being a victim of bullying did not show any relation with SES. A recent meta-analysis reported similar results, and offers a comprehensive intervention against bullying in all school aged children, not just those in the low SES group.²¹

Feelings of worthlessness and anger also decreased linearly with higher SES levels. Another investigation showed that feeling worthless and anger was related to low SES.⁴¹ The current findings showed that the middle and high SES groups had the same risk of feeling worthless. Feeling of worthlessness might be observed only in extremes of poverty or inequality.

The current findings suggest that favourable household socioeconomic circumstances are significantly associated with a reduced risk of psychiatric problems in children and adolescents and may reduce overall child health inequalities. Hence it would be plausible to pursue a social security programme for children of a lower SES background to provide them with a minimum standard.

Strengths and limitations

The present study enjoys some advantages. The sample size of over 13 000 participants is much larger than that of most other studies. Furthermore, a more comprehensive set of data was used to determine SES using factor analysis. Many known confounders, such as rural or urban residence and smoking, were adjusted for in the final analysis.

One of the main limitations of this study is its cross sectional design, which made it difficult to interpret causal inferences of these associations. In common with other similar questionnaire based studies, the problems of underestimation or overestimation of the time spent on activities such as ST or PA and recall bias should be

considered. The results of such studies should not be over generalised, and differences between populations should be taken into account. One of the main recommendations according to the findings is that efforts should be made to identify factors that alleviate the burden of low SES on children's and adolescents' psychiatric problems and physical fights. School based interventions may be sufficiently effective strategies to alleviate psychiatric problems and violent behaviours. However, there are many similarities between neighbouring countries, and this research study could help policy makers and researchers, especially in non-Western populations.

CONCLUSION

The current study found that children with a low SES were at higher risk of psychiatric problems and violent behaviours. Mental health policy makers and mental health interventional strategies should consider the SES of families. Such evidence indicates that efforts should be made to identify factors that might alleviate the burden of low SES on children and adolescents. School based interventions may be sufficiently effective strategies to alleviate psychiatric problems and violent behaviours.

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