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Underweight among Adolescents in Denmark: Prevalence, Trends (1998-2018) and Association of Underweight with Socio-Economic Status

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Key messages

- Underweight in adolescence may reflect an underlying chronic condition
- Prevalence, time trends and social inequality in underweight are understudied
- Among 11- to 15-year-olds, 3.1% of boys and 5.3% of girls were underweight
- The prevalence of underweight was stable from 1998 to 2018
- Contrary to overweight, underweight was not associated with socioeconomic status
- Underweight adolescents may need a careful medical examination

Abstract

Background: Underweight among adolescents is an important clinical and public health issue. It is associated with adverse health outcomes throughout the life-span and may reflect food poverty, unhealthy eating habits or some underlying health conditions.

Objective: To study prevalence and trends in underweight among adolescents 1998-2018, to examine social inequality in underweight, and whether social inequality changed over time.

Methods: Data was derived from six cross-sectional school-surveys from The Health Behaviour in School-aged Children (HBSC) study in Denmark. The study included 11-, 13- and 15-year-old schoolchildren in random samples of schools in 1998, 2002, 2006, 2010, 2014 and 2018 (N=22,177). Underweight was determined by BMI-for-age thinness grade 2-3 (the Cole & Lobstein method). SES was determined using occupational social class (the Danish OSC Measurement).

Results: The overall prevalence of underweight was 3.1% among boys and 5.3% among girls ($p<0.0001$) and decreased by age ($p<0.0001$) among both boys and girls. The prevalence of underweight was almost stable from 1998 to 2018. There was no observed absolute or relative social inequality in prevalence of underweight among boys or girls.

Conclusion: The prevalence of underweight in 11- to 15-year-olds was significantly higher among girls than boys. The prevalence remained stable from 1998 to 2018. There was no significant association between SES and prevalence of underweight. It is important to elucidate the underlying causes of underweight such as malnutrition, eating disorder, eating problems, loss of appetite, chronic diseases, insufficient knowledge of nutrients effects on bodily functions, and persistent pain.

Key words

Adolescents; Denmark; Socioeconomic status (SES); Thinness; Trend study; Underweight.

Lay summary

Underweight among adolescents is an important clinical and public health issue as it may reflect food poverty, unhealthy eating habits or some underlying health problem. The aim was to study prevalence and trends in underweight among adolescents 1998-2018 and to examine social inequality in underweight.

We used data from six cross-sectional school-surveys from Denmark. Across all surveys, the number of participants was 22,177 11-, 13- and 15-year-old students. The prevalence of thinness grades 2 and 3 were taken as indicators of underweight and was 3.1% among boys and 5.3% among girls. This prevalence was almost stable from 1998 to 2018. Contrary to overweight, which is usually more prevalent in lower socioeconomic groups, underweight was not associated with socioeconomic status. There were two exceptions: the prevalence of underweight among girls was highest in those from high socioeconomic groups in1998, while the prevalence among boys was highest in those from low socioeconomic groups in 2018. Underweight conditions in adolescents need careful medical examinations to elucidate the underlying causes of underweight, for example, malnutrition, eating disorders, eating problems, loss of appetite, voluntary uptake of fad diets, chronic disease, insufficient knowledge of nutrients that impact their bodily functions, mental health problems, and persistent pain.

Background

Underweight among adolescents may reflect food poverty, undernutrition, unhealthy eating habits or some underlying health problem.[1] It is associated with mental health problems such as body dissatisfaction, poor self-esteem, internationalizing and externalizing problems [1, 2] and physical health problems such as low muscular strength, inhibited growth, menstrual irregularity, failure to thrive, and compromised immune system. [1] In short, underweight or other forms of malnutrition in children and adolescents are associated with adverse health outcomes throughout the life-span. [1] The prevalence of underweight among adolescents varies considerably across countries. [3] Studies from high-income English-speaking and European countries generally show prevalences between 5 and 10%. [4] Underweight among adolescents is an important public health issue because of the associated health problems and the high prevalence. We study underweight among adolescents in Denmark, a high-income country with relatively low income inequality, low child poverty rate, free and comprehensive health care services, and systematic monitoring of child health, including their weight status. Therefore, the study illustrates the prevalence of underweight in a country where food shortage, food poverty, malnutrition, and inaccessible health care plays a minor role for adolescents' weight status.

The prevalence of overweight and obesity among children and adolescents is highest in lower socioeconomic status (SES) groups [5] but few studies have addressed the association between SES and underweight. An early study by Stunkard et al. 1972 [6] applied triceps skin-fold measures of US children and observed that thinness among girls, but not boys, was more common in higher socioeconomic strata. More recent studies using objective data on height and weight disagree about the association between underweight and SES among adolescents. Studies from Spain [7] and Poland [8,9] found the highest prevalence of underweight in lower SES families while studies from

England [10] and Australia [11] found no social inequality in underweight. A study of adolescents in Germany used self-reported height and weight and found higher prevalences of underweight with higher educated parents. [12] The scarcity of studies and the diverse findings calls for further efforts to examine the association between SES and underweight among children and adolescents.

Trend studies report very different findings. Studies based on objective height and weight data showed increasing prevalence of underweight among adolescents during the few past decades in Greece, [13] Spain [14] and West Australia, [15] decreasing prevalence in Poland [16] and no change in Sweden, [17] the Netherlands, [18] Spain, [19] England [10] and Germany. [20] An analysis of pooled population data from high-income English-speaking and European countries showed slightly decreasing prevalence of objectively measured underweight among children and adolescents over the past few decades. [4] Lazzeri et al. [21] used self-reported height and weight data from ten European countries and the USA and found decreasing prevalences of thinness 1998-2006 with some country variation, e. g. increasing prevalence among girls in France.

The association between SES and underweight may change over time but little is known about this topic. Martínez-Vizcaíno et al. [7] showed that objectively measured underweight was more frequent among Spanish children from high SES families in 1999-2000 while the association had the opposite direction in 2008-2009. White et al. [10] found no social inequality in objectively measured underweight in England from 2007 to 2012. Ząd zińska et al. [9] found increasing prevalence of objectively measured underweight in low parental education families from 1977 to 2004 in Poland. Again, there are few studies with very different findings. The aims of this study were therefore to: (a) study trends in underweight among Danish adolescents from 1998 to 2018, (b) determine whether the prevalence and trends were associated with SES, and (c) determine whether the association between SES and underweight changed over time.

Methods

Design and study population: We pooled data from six nationally representative cross-sectional surveys of adolescents from 1998, 2002, 2006, 2010, 2014 and 2018, the Danish arm of the international Health Behaviour in School-aged Children (HBSC) study. [22] These surveys were comparable because of standardized procedures for sampling, data collection and measurements. Each wave of data collection included all students in the fifth, seventh and ninth grades (corresponding to 11-, 13- and 15-year-olds) from a random sample of schools drawn from complete lists of public and private schools. Across all six waves of the study, the response rate was 87.7%, N=30,068 of which 22,177 had data on SES and weight status (Table 1).

Data collection and measurements: The students completed the internationally standardised HBSC questionnaire in their classroom. [23] Weight and height were self-reported by students: Questions for determining weight status included: 'How much do you weigh without clothes?' and 'How tall are you without shoes?' Body mass index (BMI = kg/m^2) was calculated and underweight defined using Cole & Lobstein's [24] internationally recommended age- and sex-specific cut-points, defined to pass through BMI of 17.0 kg/m^2 at the age of 18, often labeled thinness grade 2 and 3. Self-reported height and weight data may result in possible misclassification of weight status. [25-27] A validation study among 11-, 13- and 15-year-olds was conducted as a supplement to the Danish HBSC study to estimate this misclassification. [28] The difference in BMI calculated from self-reported and objective data was modest: Boys and girls underestimated their weights, on average by 0.8 kg for boys and 1.8 kg for girls. Boys but not girls overestimated their heights, but the overestimation was minimal. A study from Estonia reported slightly larger differences in BMI calculated from self-reported and objective data among children; the difference was larger among children aged 11-years than among those aged 15-years. [29]

Socioeconomic status (SES) was measured by occupational social class (OSC). The students answered six questions about parents' occupation: "Does your father (mother) have a job?" "If yes, please write exactly what job he (she) does -----". "Please say in what place he (she) works ------". The research team coded the responses into the Danish OSC Measurement [30] from (I) high to (V) low and added a category (VI) for parents receiving unemployment benefits, disability pension and other kinds of transfer income. Each student was categorized by the highest-ranking parent into high OSC (I-II, e. g. professionals and managerial positions), middle OSC (III-IV, e. g. technical and administrative staff, skilled workers) and low OSC (V, e. g. unskilled workers and VI, economically inactive). The coding procedure was similar in all six surveys. Adolescents were able to report their parents' occupation with a fair validity [31] and OSC is an appropriate SES indicator in studies of adolescents. [32]

Statistical analyses: All analyses separated boys and girls. The prevalence of underweight was standardized by age group. We tested for homogeneity by Chi-square test. We analysed social inequality in two ways: 1) Absolute social inequality as prevalence difference in underweight between low and high OSC and 2) relative social inequality by multilevel logistic regression analysis adjusted for age group and survey year and a final model including an interaction term (survey year * OSC). The multilevel modelling accounted for the applied cluster sampling (PROC GLIMMIX in SAS).

Results

Prevalence and trends: Table 1 shows the study population by sex, age group, OSC, and survey year. Table 2 shows the prevalence of underweight which was 4.3% in the entire study population, 3.1% among boys and 5.3% among girls ($p<0.0001$). Assessed by confidence intervals, there was no significant change in prevalence by year except a lower prevalence among girls in 2002. Table 2

also shows the prevalence of underweight by OSC and survey year. There was no systematic increasing or decreasing trend in underweight in any OSC-group. This observation was supported by Figure 1 which shows the age-standardized percent underweight by survey year and OSC. The prevalence of underweight was 6.7%, 6.0% and 3.2% respectively ($p<0.0001$) among 11-, 13-year-old and 15-year-old girls. The underweight prevalence data for boys were respectively 4.2%, 3.4% and 1.7% ($p<0.0001$) in corresponding age groups (not shown in Table). The prevalence of underweight among 1743 boys and 1455 girls without data on OSC was 2.9% and 6.0% respectively, i. e. almost similar to the figures for participants with data on OSC (not shown in table, not included in analyses).

Social inequality: Table 2 shows that in the entire study population of boys, the prevalence of underweight in high, middle, and low OSC was 3.2%, 3.1% and 3.3% ($p=0.1755$). The corresponding figures for girls were 6.8%, 6.1% and 5.1% ($p=0.3088$), i. e. there was no absolute social inequality in the prevalence of underweight. Table 2 also shows the results of the logistic regression analyses. There was no relative social inequality in underweight in the entire study population nor in the analyses stratified by survey year with two exceptions: In the 1998-study there was a significantly lower prevalence of underweight among girls in low than in high OSC, OR=0.56 (0.32-0.97) and in the 2018-study there was a significantly higher prevalence of underweight among boys in middle OSC (OR=2.25 (1.09-4.65)) and low OSC (OR=3.27 (1.36-7.86)) than in high OSC. There was no interaction between survey year and OSC ($p_{boys}=0.0717$, $p_{girls}=0.2113$).

Discussion

Main findings: The prevalence of underweight was fairly stable from 1998 to 2018 among boys and girls. This finding of stability corresponds with studies among adolescents in Sweden, [17] the Netherlands, [18] Spain, [19] England [10] and Germany [20] but contradicts the general finding of a

decreasing trend in high-income English-speaking and European countries. [4] Overall, there was no social inequality in the prevalence of underweight with two exceptions: the prevalence was highest in high OSC among girls in 1998 (6.8%) and highest in low OSC among boys in 2018 (6-0%). Recent studies from England, [10] Australia [11] and Germany [12] confirmed the pattern of similar prevalence of underweight across socioeconomic strata. The social inequality among boys in 2018 (highest prevalence in low OSC) may reflect an emerging social inequality in underweight, which was also observed in studies from Spain [7] and Poland. [9] We would expect such a trend because many other health problems among adolescents are most common in lower SES groups. [22]

The finding of no social inequality in underweight is an interesting contrast to the consistent finding of a higher prevalence of overweight and obesity among adolescents in low OSC. [5,33-36] The reason for lack of social inequality in underweight may be that some causal factors behind underweight are more common in high OSC while other causal factors are more common in low OSC. Our study does not include data to explore this idea, but it is an important issue to address in future research.

Limitations: The strength of the study is the inclusion of six comparable and nationally representative surveys of adolescents over a twenty-year period. One important limitation may be possible selection bias: Approximately one quarter of the study population had missing data on weight status and/or OSC but the prevalence of underweight was the same among students with and without data on OSC. Self-reported data on height and weight may result in misclassification of weight status but an initial validation study suggested that population data on BMI calculated from self-reported data were not significantly different from BMI calculated from objective measures of height and weight. [28] It is likely that this bias is less pronounced for underweight because the misclassification is worse for overweight adolescents. [25,26] Age group did not predict misclassification in the study by Elgar et al. [25] Perez et al. [27] concluded that when direct measurement is not practical, self-reported measurements provide a reliable proxy measure across

age, sex, and race/ethnicity subpopulations of adolescents. Still, there is a need for more studies of the validity of self-reported data for identifying underweight adolescents and to assess whether the validity is related to SES and BMI cut point.

Use of OSC as indicator of SES may cause troubles because the labour market, jobs and occupation labels change over time. We have attempted to increase comparability of OSC over time by coding OSC by two general features which are more stable than jobs themselves, namely required educational qualifications and control (over capital or people) connected with the occupation. [30]

Clinical implications: Underweight among adolescents should attract more attention among health professionals because of the relatively high prevalence and its association with health problems. First, there is a need for more preventive efforts. Underweight tracks from early childhood into adolescence. [37] Therefore, it is possible to detect underweight before children turn into adolescents and to intervene against underweight in early childhood. Second, if patients are underweight at levels which might be considered problematic, there is a need for proper medical examination to elucidate the underlying causes of underweight. These causes include malnutrition, eating disorders, eating problems, loss of appetite, stomach problems such as nausea, vomiting or diarrhoea, infection in the digestive system, and thyroid problems. Other possible causes are voluntary uptake of fad diets, insufficient knowledge of nutrients and their bodily functions, mental health problems such as anxiety and stress, and persistent pain. [1,2]

Conclusion: There is far more focus on overweight than underweight in the public health debate and among health professionals. [1] Underweight among adolescents should attract more attention in the health care system because of the high prevalence and its association with other health problems. It is important to monitor weight status among adolescents and to develop intervention strategies to prevent unhealthy weight development.

Declaratios

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Ethical approval and informed consent: There is no formal agency for approval of questionnaire-based surveys in Denmark. Therefore, we asked the school board as the parents' representative, the headmaster, and the students' council in each of the participating schools to approve the study. The participants received oral and written information that participation was voluntary, and that data were treated confidentially. The study complies with national standards for data protection. The Danish Data Protection Authority has granted acceptance for the 2014 survey (Case No. 2013-54-0576) and the 2018 survey (Case 10 622, University of Southern Denmark).

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Conflict of interest: None.

*Data availability***:** The data underlying this article will be shared on reasonable request to the Principal Investigator, Dr. Katrine Rich Madsen (krma@sdu.dk).

Authorship: All authors have contributed substantially to the conception and design of the paper and to the interpretation of data. BEH, MTD, KRM and TPP collected the data. BEH and MTD performed the analyses. BEH wrote the first draft of the manuscript. All authors contributed to the writing of the manuscript and a critical revision of the intellectual content. All authors have approved the final version of the manuscript and are accountable for all aspects of the work.

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Figure legend

Figure 1 Age-standardized percent underweight by survey year and occupational social class, by sex. Data from the Health Behaviour in School-aged Children (HBSC) study in Denmark 1998, 2002, 2006, 2010, 2014 and 2018.

Table 1 Study population by survey year, sex, age group and occupational social class (OSC). [a]

	1998	2002	2006	2010	2014	2018	Total
Response rate [b]	89.9%	89.3%	88.8%	86.3%	85.7%	84.8%	87.7%
N	5205	4824	6269	4922	4534	4314	30,068
N included in this study [c]	4193	3828	4264	3454	3687	2751	22,177
Boys, %	49.6	47.9	48.8	48.2	48.4	49.7	48.7
Girls, %	50.4	52.1	51.2	51.9	51.6	50.4	51.3
11-year-olds, %	32.4	34.1	34.5	34.5	29.5	33.6	33.6
13-year-olds, %	35.0	33.2	36.3	33.5	35.3	34.8	34.8
15-year-olds, %	32.6	32.7	29.2	32.0	35.2	31.6	31.6
High OSC, %	28.5	25.4	28.8	40.0	42.7	43.7	34.1
Middle OSC, %	49.6	54.2	48.9	42.3	41.2	44.4	47.1
Low OSC, %	21.9	20.4	22.2	17.7	15.8	11.9	18.8

[a] Data from the Health Behaviour in School-aged Children (HBSC) study in Denmark 1998, 2002, 2006, 2010, 2014 and 2018.

[b] Number of participants as percentage of schoolchildren enrolled in the participating classes.

[c] Students with data on all applied variables.

Table 2 Underweight by occupational social class among boys and girls: age-standardized prevalences, prevalence difference, and adjusted OR (95% CI) for underweight [a]

	Absolute social inequality: age standardized percent (95% CI) with underweight					Relative social inequality: OR (95% CI) for underweight [b]		
	Occupational social class					Occupational social class		
	High	Middle	Low	Total population	Prevalence difference [c]	High	Middle	Low
Boys								
1998 (n=2079)	3.2 (1.8-4.6)	3.1 (2.0-4.1)	3.4 (1.7-5.1)	3.2 (2.4-3.9)	0.2	1	0.94 (0.53-1.67)	0.99 (0.50-1.99)
2002 (n=1833)	2.0 (0.8-3.3)	2.1 (1.2-3.0)	1.6 (0.3-2.9)	2.0 (1.3-2.6)	-0.4	1	0.98 (0.45-2.12)	0.73 (0.26-2.03)
2006 (n=2081)	2.1 (1.0-3.2)	4.3 (3.1-5.6)	2.8 (1.3-4.3)	3.3 (2.6-4.1)	0.7	1	2.18 (1.16-4.11)	1.32 (0.61-2.89)
2010 (n=1663)	3.1 (1.8-4.3)	3.5 (2.1-4.8)	2.5 (0.7-4.2)	3.1 (2.3-4.0)	-0.6	1	1.17 (0.64-2.12)	0.80 (0.34-1.92)
2014 (n=1785)	3.6 (2.4-4.9)	3.8 (2.3-5.2)	5.3 (2.6-8.0)	3.9 (3.0-4.8)	1.7	1	1.01 (0.59-1.72)	1.44 (0.75-2.77)
2018 (n=1366)	1.8 (0.8-2.9)	4.1 (2.5-5.7)	6.0 (2.4-9.6)	3.3 (2.4-4.2)	4.2	1	2.25 (1.02-1.69)	3.27 (1.36-7.86)
Boys all years (n=10,807)	3.2 (1.8-4.6)	3.1 (2.0-4.1)	3.3 (2.5-4.0)	3.1 (2.8-3.5)	0.1	1	1.31 (1.02-1.69)	1.21 (0.88-1.67)
Girls								
1998 (n=2114)	6.8 (4.8-8.8)	6.1 (4.6-7.5)	4.2 (2.4-6.0)	5.9 (4.9-6.9)	-2.6	1	0.91 (0.60-1.37)	0.56 (0.32-0.97)
2002 (n=1995)	3.7 (2.0-5.4)	3.4 (2.3-4.4)	3.4 (1.7-5.2)	3.5 (2.7-4.3)	-0.3	1	0.91 (0.51-1.61)	0.92 (0.45-1.87)
2006 (n=2183)	4.7 (3.0-6.3)	4.8 (3.6-6.1)	4.7 (2.9-6.6)	4.8 (3.9-5.7)	0.0	1	1.06 (0.66-1.69)	1.04 (0.59-1.83)
2010 (n=1791)	5.8 (4.0-7.4)	5.2 (3.6-6.7)	5.2 (2.8-7.7)	5.4 (4.4-6.5)	-0.6	1	0.88 (0.56-1.38)	0.86 (0.48-1.55)
2014 (n=1902)	6.2 (4.4-7.9)	6.2 (4.6-7.9)	8.1 (5.1-11.1)	6.5 (5.4-7.6)	1.9	1	0.98 (0.69-1.49)	1.17 (0.71-1.95)
2018 (n=1385)	7.3 (5.2-9.4)	5.5 (3.8-7.3)	6.9 (3.0-10.8)	6.4 (5.1-7.7)	-0.4	1	0.75 (0.47-1.20)	0.90 (0.45-1.74)
Girls all years (n=11,370)	6.8 (4.8-8.8)	6.1 (4.6-7.5)	5.1 (4.2-6.0)	5.3 (4.9-5.8)	-1.7	1	0.92 (0.76-1.10)	0.88 (0.69-1.11)

[a] Data from the Health Behaviour in School-aged Children (HBSC) study in Denmark 1998, 2002, 2006, 2010, 2014 and 2018.

[b] Multilevel logistic regression analyses adjusted by age group; all years combined also adjusted for survey year.

[c] Percent point difference between low and high occupational social class.

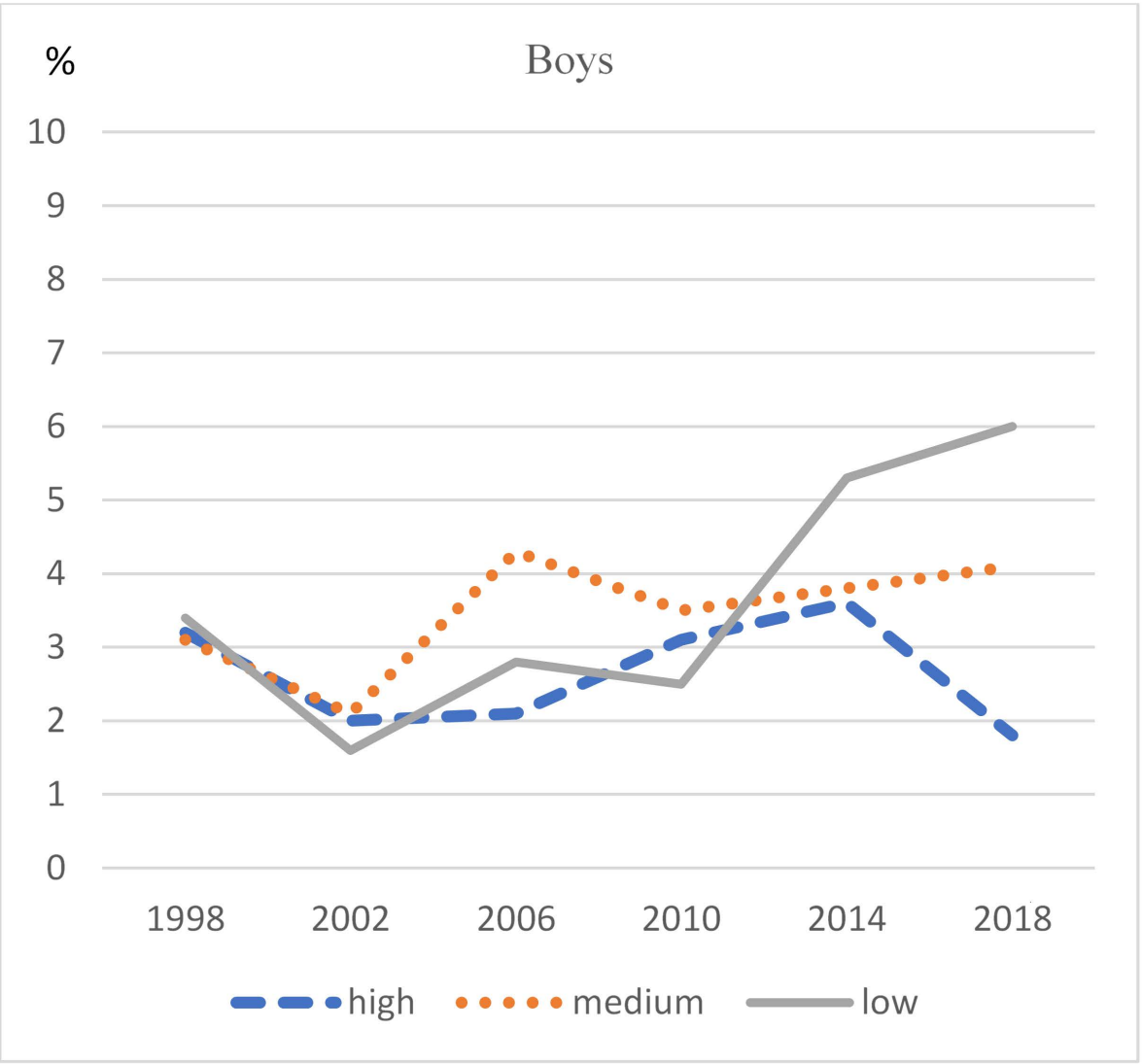
STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	3
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	6-7
Objectives	3	State specific objectives, including any prespecified hypotheses	7
Methods			
Study design	4	Present key elements of study design early in the paper	8
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	8-9
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	8
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8-9
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8-9
Bias	9	Describe any efforts to address potential sources of bias	8-9
Study size	10	Explain how the study size was arrived at	8
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	9
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	9
		(*b*) Describe any methods used to examine subgroups and interactions	9
		(*c*) Explain how missing data were addressed	8
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	9
		(*e*) Describe any sensitivity analyses	NA
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	8
		(b) Give reasons for non-participation at each stage	8
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	8-10 Table 1
Outcome data	15*	Report numbers of outcome events or summary measures	9-10 Table 2
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10 Table 2
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA

Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	9-10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11-12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	13

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.


Boys
%
10
9
8
7
6
5
4
3
2
1
0
1998
2002
2006
2010
2014
2018
high
medium
low


Girls
%
10
9
8
7
6
5
4
3
2
1