Prevalence of physical activity and its associated sociodemographic factors among schoolchildren in Albania

Brizida Refatllari,[1] Jonida Stefa,[1] Migena Gega,[1] Grejd Hyska,[2] Gentiana Qirjako,[3,4] Genc Burazeri[3,5]

[1]Faculty of Technical Medical Sciences, University of Medicine, Tirana, Albania; [2]Global Studies Institute, University of Geneva, Geneva, Switzerland; [3]Faculty of Medicine, University of Medicine, Tirana, Albania; [4]Institute of Public Health, Tirana, Albania; [5]Department of International Health, CAPHRI (Care and Public Health Research Institute), Maastricht University, Maastricht, The Netherlands

Abstract

Physical Activity (PA) promotes health and wellbeing of children. Our objective was to assess the prevalence and the associated sociodemographic factors of PA among schoolchildren in a Southeastern European country. This was a cross-sectional study conducted in Albania in 2022 including a nationwide representative sample of 5454 schoolchildren aged 11-15 years (≈52% girls; ≈96% response). Data on children's PA and their sociodemographic factors were collected. Daily moderate-to-vigorous PA was more prevalent in boys, younger children and those from wealthier families (overall: ≈29%). Conversely, sedentary behaviour (moderate-to-vigorous PA ≤2 days/week) was more prevalent in girls, older children, rural children, those with unemployed parents and children from less affluent families (overall: ≈26%). Frequent vigorous PA (≥3 days/week) was more prevalent in boys, younger children and those from better-off families (overall: ≈64%). Our findings highlight potential advantages of PA engagement linked to both male gender and a higher socioeconomic status. This study underscores the need for targeted interventions to promote active lifestyles in children, particularly among groups at higher risk of sedentary behaviour which correspond to girls and disadvantaged socioeconomic categories.

Correspondence: Genc Burazeri, University of Medicine, Rr. "Dibres", No. 371, Tirana, Albania.
Tel.: +355674077260
E-mail: genc.burazeri@maastrichtuniversity.nl

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Introduction

Engagement in regular physical activity (PA) promotes physical health, as well as social and emotional development in children and adolescents.[1] PA supports healthy growth, strengthens bones and muscles, enhances cognitive abilities, and fosters psychoemotional well-being in children.[2-4] Additionally, PA helps reduce anxiety and depression, supporting better mental health and wellbeing in adolescents.[5] Also, regular PA improves concentration and fosters a range of positive social health outcomes,[6] as well as prevents child obesity and reduces body weight.[7]

According to the World Health Organization (WHO), children and young people aged 5-17 years should engage every day in at least 60 minutes of Moderate-to-Vigorous PA (MVPA).[7] The majority of these activities should be aerobic.[2] In addition, WHO recommends that children should engage at least three days a week in Vigorous PA (VPA), consisting of aerobic and/or activities that strengthen bones and muscles.[2]

However, most adolescents in the European Region do not meet the recommended PA guidelines.[8] Instead, MVPA levels remain steadily low, tend to decrease with age during adolescence, and have shown little improvement over the past two decades.[9,10] Conversely, engagement in VPA is relatively high among children in many European countries and seems to have remained steady between 2002 and 2014, with a modest upward trend in girls,[9] and among adolescents from families with moderate to high socioeconomic status.[11]

The Health Behaviour in Schol-aged Children (HBSC) study is a well-structured school-based survey conducted every four years across multiple countries (including Europe, Central Asia and Canada).[1,12] The HBSC survey gathers essential data on various health behavioural characteristics and health status of schoolchildren aged 11, 13 and 15 years.[1,12] The last round of

HBSC survey was carried out during 2021-2022 in 44 countries including Albania.[1,12,1] Alongside numerous health outcomes and behavioural factors, the survey included also questions assessing engagement in PA among schoolchildren aged 11-15 years.[1,12]

Albania, a post-communist country in Southeastern Europe, has been characterized in the past three decades by a rapid political and socioeconomic transition which has been also associated with behavioural changes.[14] Nevertheless, according to the most recent estimates available from the Global Burden of Disease Study,[15] the age-standardized mortality rate attributed to low levels of PA has remained almost unchanged in the past three decades (with about 6 deaths per 100,000 population). Regarding children, a recent study from Albania has shown that almost 1/3rd of schoolchildren aged 12-15 years (N=7831) do not exhibit the best attitudes toward health promotion, a composite indicator including also children's attitudes toward PA (16). According to this study, significant independent sociodemographic correlates of poorer attitudes toward health promotion (ability to maintain and improve health) consisted of older age, a lower maternal education, and a lower family income.[16] Within this context, the aim of our analysis was to assess the prevalence of PA and its associated sociodemographic factors among schoolchildren, based on the last HBSC round carried out in Albania in 2022.[13] Based on the findings from previous HBSC rounds, we hypothesized a higher prevalence of PA among boys and younger children.[1,12]

Materials and Methods

A cross-sectional study (corresponding to the last round of HBSC survey) was conducted in Albania in 2022.[13]

Participants included a nationwide representative sample of 5454 schoolchildren aged 11, 13 and 15 years (2844 girls, ≈52% of the sample). The overall response rate was ≈96%.[13]

The survey instrument consisted of an internationally standardized self-administered questionnaire which included information on a wide range of behavioural factors and sociodemographic factors of schoolchildren.[1,12]

Measurement of PA consisted of assessment of the frequency of moderate-to-vigorous PA (MVPA) and vigorous PA (VPA).

MVPA was measured based on the following question: *"Over the past seven days, on how many days were you physically active for a total of at least 60 minutes per day?"*. Possible answers ranged from 0 (zero days) to 7 (seven days). In the analysis, MVPA was also dichotomized into: "7 days/week" (referred to as "daily MVPA") vs. "≤6 days/week", as well as into: "0-2 days/week" (referred to as "sedentary lifestyle/behaviour") vs. "≥3 days/week".[1,12] VPA was measured based on the following question: *"How often do you usually exercise in your free time, outside of school hours, so much that you get out of breath or sweat?"*. Possible answers ranged from 1 (every day) to 8 (never). In the analysis, VPA was also dichotomized into: "≥3 days/week" (referred to as "frequent VPA") vs. "≤2 days/week".[1,12]

Sociodemographic factors consisted of children's gender (boys vs. girls), age (11, 13, and 15 years), place of residence (urban vs. rural areas), mother's and father's current employment status (for each: yes vs. no), and family affluence scale (less affluent vs. more affluent families).[12]

The Ethics Committee of Tirana Medical University endorsed the study (approval ID: No.700/1). All schoolchildren were informed about the objectives and procedures of the survey, with a focus on the aspects related to the survey anonymity and the aggregated statistical analysis.

General linear model was used to compare the mean values of PA variables (expressed as numerical terms) by sociodemographic factors of schoolchildren. Crude (unadjusted) mean values and their respective 95% confidence intervals (95%CIs) and p-values were calculated (Table 1).

On the other hand, binary logistic regression was employed to assess the associations of PA indices (introduced as categorial terms) with sociodemographic factors of schoolchildren. Crude (unadjusted) models were run (Table 2). Odds ratios (ORs) and their respective 95%CIs and p-values were calculated for each PA index (daily MVPA, sedentary behaviour, and frequent VPA).

In all cases, $P \leq 0.05$ was considered as statistically significant. All the statistical analyses were conducted by use of the Statistical Package for the Social Sciences (SPSS, version 19.0).

Results

Table 1 presents the distribution of scores of PA variables by sociodemographic factors of schoolchildren included in this study. Overall, mean score of MVPA was about 4.3 [range from 0 (zero days) to 7 (seven days)]. It was significantly higher in boys than in girls (4.7 vs. 3.9, respectively; P<0.01). There was evidence of a graded inverse relationship with age (overall P<0.01), with the youngest children exhibiting considerably higher mean MVPA scores compared to their oldest counterparts (4.8 vs. 3.8, respectively). Furthermore, mean MVPA scores were somehow higher among schoolchildren whose fathers and/or mothers were employed (4.3 for both) than among those whose parents were unemployed (3.9 for father's unemployment and 4.2 for mother's unemployment). Also, mean MVPA score was higher among children pertinent to more affluent families than in those from less affluent families (4.5 vs. 4.1, respectively; P<0.01). Overall, mean score of VPA was around 3.2 [range from 1 (every day) to 8 (never)]. It was lower in boys than in girls (2.8 vs. 3.6, respectively; P<0.01). There was a positive linear relationship with age (overall P<0.01), with older children displaying the highest mean VPA scores and the youngest children exhibiting the lowest VPA scores (3.6 vs. 2.8, respectively). Additionally, mean VPA scores were lower among children with employed fathers compared with those with unemployed fathers (3.2 vs. 3.5, respectively; P<0.01) and in children belonging to more affluent families than in those with a lower family wealth (3.0 vs. 3.4, respectively; P<0.01).

The overall prevalence of daily MVPA was about 29% (Table 3). Daily MVPA was substantially more prevalent in boys than in girls (36% *vs*. 22%, respectively); among the youngest children compared to their oldest counterparts (37% *vs*. 21%, respectively); among children whose fathers were employed than in those with unemployed fathers (29% *vs*. 24%, respectively); and in children from more affluent families than in those with a lower family wealth (31% *vs*. 27%, respectively). On the whole, the prevalence of a sedentary lifestyle (MVPA: 0-2 days/week) was around 26%. Sedentary behaviour was much more prevalent in girls than in boys (33% *vs*. 19%, respectively); among the oldest children than their youngest counterparts (32% *vs*. 20%, respectively); among children whose fathers were unemployed compared to those with employed fathers (33% *vs*. 25%, respectively); among children with unemployed mothers than in those whose mothers were employed (28% *vs*. 25%, respectively); and among children pertinent to less affluent families than in those from better-off families (31% *vs*. 22%, respectively). Overall, the prevalence of frequent

VPA (at least three days a week) was approximately 64%. Frequent VPA was considerably higher in boys than in girls (74% *vs*. 54%, respectively); among the youngest children than in the oldest individuals (72% *vs*. 54%, respectively); among children with employed fathers than in those whose fathers were unemployed (64% *vs*. 58%, respectively); and in children from more affluent families than in those from poorer families (68% *vs*. 59%, respectively). Table 2 presents binary logistic regression results of the associations between PA indices (categorial terms) and sociodemographic factors of schoolchildren. There was evidence of positive and significant associations of daily MVPA with male gender (OR=1.9, 95%CI=1.7-2.2), a younger age (OR=2.3, 95%CI=2.0-2.7), father's employment (OR=1.3, 95%CI=1.1-1.7), and family affluence (OR=1.3, 95%CI=1.1-1.4). Conversely, sedentary behaviour (MVPA: 0-2 days) was inversely related to male gender (OR=0.5, 95%CI=0.4-0.5), a younger age (OR=0.5, 95%CI=0.5-0.6), urban residence (OR=0.9, 95%CI=0.8-1.0), father's employment (OR=0.7, 95%CI=0.6-0.9), mother's employment (OR=0.8, 95%CI=0.7-1.0), and family affluence (OR=0.6, 95%CI=0.6-0.7). On the other hand, frequent VPA (≥3 days/week) was positively associated with male gender (OR=2.5, 95%CI=2.2-2.8), a younger age (OR=2.2, 95%CI=1.9-2.5), father's employment (OR=1.3, 95%CI=1.1-1.6), and family wealth (OR=1.5, 95%CI=1.3-1.7).

Discussion

Main findings of our study conducted in Albania indicate that demographic and socioeconomic factors play a significant role in children's PA patterns. Our analysis provided evidence of consistent positive links between male gender, younger age and family wealth with higher levels of both MVPA and VPA. In contrast, sedentary behaviour (MVPA: 0-2 days per week) was more common among girls, older children, and those from a lower socioeconomic background.

A pretty recent report informing about PA levels among all 44 participating countries in the last HBSC survey round conducted in 2021-22[1] and employing the same measuring instrument[1,12] indicated that the average proportion of adolescents across countries and regions reporting daily 60 minutes of MVPA was 25% for boys and 15% for girls, which is lower than our findings pertinent to Albanian children (36% in boys and 22% in girls). In most countries and regions included in the last HBSC survey round caried out in 2021-22, and across all age groups, girls had a significantly lower prevalence of daily MVPA compared to boys,[1] which is in line with our findings. Girls in several countries have reported a low prevalence of daily MVPA (≤10%), including Italy, Greece, France, Greenland (Denmark) and Lithuania (1). Of note, the prevalence of daily MVPA was the lowest among Italian girls aged 15 years (only 3%) and the highest among Serbian boys aged 11 years (49%).[1]

Our findings on a positive link between daily MVPA and family wealth are in line with the multi-country HBSC 2021-22 report.[1] Hence, among all 44 participating countries,[1] the prevalence of daily MVPA among boys pertinent to more affluent families was 32% compared to 20% among those from lower affluent families (in our study: 38% vs. 33%, respectively; *data not shown in the tables*). In girls, these estimates were 19% and 13%, respectively[1] – in our study: 24% vs. 21%, respectively (*not shown*).

On the whole, there were no considerable changes in the levels of daily MVPA between 2018 and 2022 which consist of the two last rounds conducted in the HBSC participating countries,[1] whereas in Albania there is evidence of 10% increase in boys and 5% increase in girls (data not shown). Conversely, there are countries

Table 1. Distribution of *scores* of physical activity variables by sociodemographic factors in a nationwide sample of Albanian schoolchildren, HBSC 2022 survey.

Sociodemographic factors	Moderate-to-vigorous physical activity (MVPA)		Vigorous physical activity (VPA)	
	Mean (95%CI)*	P*	Mean (95%CI)	P
Total sample (n=5454)	4.32 (4.26-4.38)	-	3.18 (3.12-3.23)	-
Gender		<0.001		<0.001
Boys (n=2610)	4.74 (4.66-4.83)		2.74 (2.66-2.82)	
Girls (n=2844)	3.89 (3.81-3.97)		3.61 (3.53-3.69)	
Age		<0.001 (2)†		<0.001 (2)
11 years (n=1784)	4.76 (4.66-4.87)	<0.001	2.82 (2.72-2.91)	<0.001
13 years (n=1785)	4.32 (4.21-4.43)	<0.001	3.12 (3.02-3.21)	<0.001
15 years (n=1877)	3.82 (3.72-3.93)	-	3.63 (3.53-3.72)	-
Residence		0.617		0.490
Urban areas (n=3648)	4.31 (4.23-4.38)		3.21 (3.14-3.28)	
Rural areas (n=1806)	4.27 (4.17-4.38)		3.17 (3.07-3.27)	
Father's employment		<0.001		0.004
Yes (n=4928)	4.34 (4.27-4.40)		3.17 (3.11-3.23)	
No (n=479)	3.90 (3.97-4.11)		3.46 (3.27-3.65)	
Mother's employment		0.031		0.732
Yes (n=3676)	4.34 (4.27-4.41)		3.19 (3.12-3.26)	
No (n=1710)	4.20 (4.09-4.30)		3.21 (3.11-3.31)	
Family affluence		<0.001		<0.001
Less affluent (n=2600)	4.06 (3.97-4.15)		3.41 (3.33-3.49)	
More affluent (n=2715)	4.51 (4.42-4.60)		3.00 (2.92-3.08)	

* Mean values and their respective 95% confidence intervals and p-values from the General Linear Models. Range of scores for MVPA: from 0 (0 days) to 7 (seven days); hence, higher MVPA scores denote a higher frequency of physical activity. Range of scores for VPA: from 1 (every day) to 8 (never); thus, higher VPA scores indicate less frequent vigorous physical activity. †Overall p-value and degrees of freedom (in parentheses).

which exhibit a decrease in the prevalence of daily MVPA such as Lithuania, Armenia, Greenland (Denmark) and North Macedonia.[1]

Regarding VPA, 60% of adolescents in the 44 HBSC participating countries met the WHO recommendation for engaging in VPA at least three times a week,[1] which is slightly lower than our findings pertinent to Albanian children (about 64%). In most countries, boys reported higher levels of VPA than girls across all age groups,[1] which is in line with our findings from Albania. Of 44 countries included in the multi-country analysis, frequent VPA decreased significantly with age in 37 countries and regions for girls and 21 for boys.[1]

Likewise daily MVPA, there was evidence of a positive relationship of frequent VPA with family affluence in most HBSC participating countries,[1] which is compatible with our findings from Albania. According to the multi-country HBSC report,[1] the prevalence of frequent VPA among children from more affluent families was 77% in boys and 61% in girls, whereas among children from less affluent families it was 61% in boys and 42% in girls (in our study: 77% in boys and 58% in girls from more affluent families, and 70% in boys and 49% in girls from less affluent families – *data not shown*).

As for the sedentary lifestyle, on average, 24% of adolescents from 44 participating HBSC countries were highly inactive (MVPA≤2 days/week),[1] which is quite similar with our findings (26%). The prevalence of sedentary lifestyle was the highest (60%) in Greenland (Denmark) and the lowest (<10%) in Slovenia, Finland and Ireland.[1] There was evidence of an inverse association with socioeconomic status, with children from high-affluence fam-

Table 2. Associations of physical activity indices with sociodemographic factors of schoolchildren; results from binary logistic regression models

Physical activity indices	Demographic factors			
	Male		Age 11†	
	OR (95%CI) *	P *	OR (95%CI)	P
MVPA: 7 days/week	1.93 (1.71-2.18)	<0.001	2.29 (1.97-2.66)	<0.001
MVPA: 0-2 days/week	0.47 (0.42-0.54)	<0.001	0.54 (0.46-0.63)	<0.001
VPA≥3 days/week	2.46 (2.19-2.76)	<0.001	2.17 (1.89-2.49)	<0.001
Physical activity indices	**Socioeconomic factors**			
	Father employed		Mother employed	
	OR (95%CI) *	P *	OR (95%CI)	P
MVPA: 7 days/week	1.32 (1.06-1.65)	0.014	1.07 (0.94-1.22)	0.297
MVPA: 0-2 days/week	0.70 (0.57-0.86)	<0.001	0.84 (0.74-0.96)	0.009
VPA≥3 days/week	1.29 (1.06-1.56)	<0.001	1.01 (0.89-1.13)	0.925

* Odds ratios and their respective 95% confidence intervals (in parentheses), as well as p-values from crude (unadjusted) binary logistic regression models. †Compared to age 15.

Table 3. Distribution of physical activity *categories* by sociodemographic factors of schoolchildren included in the HBSC 2022 survey in Albania.

Sociodemographic factors	Moderate-to-vigorous physical activity (MVPA). 7 days/week	0-2 days/week	Vigorous physical activity (VPA) VPA≥3 days/week
Total sample (n=5454)	1535 (28.8)*	1381 (25.9)	3416 (63.5)
Gender			
Boys (n=2610)	908 (35.8)	470 (18.6)	1900 (74.1)
Girls (n=2844)	627 (22.4)	911 (32.6)	1516 (53.8)
Age			
11 years (n=1784)	650 (37.2)	355 (20.3)	1262 (71.9)
13 years (n=1785)	505 (29.0)	436 (25.0)	1142 (65.1)
15 years (n=1877)	377 (20.6)	588 (32.1)	1007 (54.1)
Residence			
Urban areas (n=3648)	1012 (28.4)	892 (25.1)	2284 (63.6)
Rural areas (n=1806)	523 (29.6)	489 (27.6)	1132 (63.3)
Father's employment:			
Yes (n=4928)	1415 (29.4)	1218 (25.3)	3112 (64.0)
No (n=479)	112 (23.9)	152 (32.5)	274 (57.9)
Mother's employment:			
Yes (n=3676)	1050 (29.2)	893 (24.8)	2308 (63.5)
No (n=1710)	464 (27.8)	471 (28.2)	1067 (63.4)
Family affluence			
Less affluent (n=2600)	674 (26.5)	776 (30.5)	1507 (58.6)
More affluent (n=2715)	822 (30.9)	573 (21.6)	1825 (67.9)

*Absolute numbers and their respective percentages (in parentheses). For the physical activity variables, there were the following missing values: MVPA (n=125); and VPA (n=72). In addition, there were the following missing values for sociodemographic factors: age of schoolchildren (n=8), father's employment status (n=47); mother's employment status (n=68); and family affluence score (n=139).

ilies exhibiting lower levels of physical inactivity compared to their low-affluence counterparts,[1] which is in line with our findings from Albania.

According to the multi-country HBSC report,[1] the prevalence of sedentary lifestyle was higher among girls (29%) than boys (20%), a gender-difference which is compatible with our findings too (33% vs. 19%, respectively). Gender differences in the prevalence of sedentary lifestyle range from 3% in Norway to 20% in Italy,[1] whereas in our study the gender gap was 14%.

Lack of PA and sedentary behaviours are significant public health issues that contribute to the onset of obesity and various chronic diseases later in life, including cardiovascular diseases, diabetes, some types of cancers and hypertension.[17-19] The shift from adolescence to adulthood involves numerous life changes that impact lifestyle habits[17,20,21] of which, physical inactivity is an important risk factor for ill-health and premature mortality.[22] Hence, regardless of the proven health benefits of PA, most of the studies have revealed that it decreases during the transition from adolescence to adulthood and is replaced by increased time spent on sedentary activities.[17,23,24]

Our study included a large nationwide representative sample of schoolchildren and employed an internationally standardized instrument.[12] Nevertheless, lack of generalizability to out-of-school Albanian children aged 11-15 years may be a potential limitation of this study. Additionally, there is a potential for information bias, particularly social desirability bias (overreporting PA frequency) or intentional misreporting. Also, the cross-sectional design of the study may represent another limitation, as it prevents the determination of causal relationships.

Nonetheless, our study provides useful evidence on the prevalence and sociodemographic factors associated with PA among schoolchildren in Albania. Policymakers and decisionmakers in Albania and in other countries should consider effective measures and implementation of cost-effective programs which increase engagement in PH among children and adolescents. Such programs should be implemented in school settings, as an umbrella systematic review[25] has persuasively indicated that the availability of PA programs and equipment within schools are positively associated with PA levels in children and adolescents.[25-27] At the same time, there is need for interventions at community level, as such neighbourhood characteristics as pedestrian and cyclist safety structure has been also convincingly linked to increased PA levels among children and adolescents.[25,26] Therefore, it has been suggested that, considering that PA practices among children are influenced by factors at different levels including home, school and neighbourhood environment,[27] interventions should target all these levels and also consider elements of the macro environment in order to effectively address the problem of physical inactivity among children and adolescents.[2527]

Conclusions

In conclusion, our study caried out in post-communist Albania highlights significant disparities in PA patterns among children based on gender, age and socioeconomic status (operationalized through parental employment status and family affluence scale). Boys, younger children, and those from wealthier families consistently exhibited higher levels of MVPA and VPA, suggesting that access to resources and social support in Albania may play a critical role in encouraging active lifestyles. Conversely, girls, older children, rural children, and especially those from less affluent families seem more prone to sedentary behaviour, potentially placing them at higher risk for health issues associated with physical inactivity.

Addressing these disparities in Albania requires targeted interventions that promote equitable access to PA opportunities, especially for vulnerable groups, to foster healthier lifestyles across all sociodemographic population categories. On an international scale, our findings underscore the need for globally coordinated efforts to reduce disparities in PA among children, as inequities in access to active lifestyles may contribute to broader health and development inequalities across countries worldwide.

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