sciendo 10.2478/sjph-2025-0017 Zdr Varst. 2025;64(3):133-142

Stefa J, Gega M, Refatllari B, Hyska G, Qirjako G, Burazeri G. Prevalence and sociodemographic correlates of nutritional habits among schoolchildren aged 11-15 years in Albania. Zdr Varst. 2025;64(3):133-142. doi: 10.2478/sjph-2025-0017.

PREVALENCE AND SOCIODEMOGRAPHIC CORRELATES OF NUTRITIONAL HABITS AMONG SCHOOLCHILDREN AGED 11-15 YEARS IN ALBANIA

RAZŠIRJENOST IN SOCIODEMOGRAFSKI KORELATI PREHRANJEVALNIH NAVAD MED ŠOLARJI, STARIMI OD 11 DO 15 LET, V ALBANIJI

Jonida STEFA[1], Migena GEGA[1], Brizida REFATLLARI[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

Received: Nov 27, 2024
Accepted: Mar 24, 2025

Original scientific article

ABSTRACT

Objective
Healthy nutritional habits during childhood promote healthy growth and development and foster psycho-emotional wellbeing. Our aim was to assess the prevalence and sociodemographic correlates of selected nutritional habits among Albanian schoolchildren.

Methods
A cross-sectional study was conducted in Albania in 2022, in the framework of the Health Behaviour in School-aged Children survey, including a nationwide representative sample of 5,454 schoolchildren aged 11-15 years (≈52% girls; ≈96% response). Data on nutritional habits were gathered, along with the children's sociodemographic factors. Binary logistic regression was used to assess the associations of nutritional habits with sociodemographic factors.

Results
In multivariable-adjusted analysis, the odds of daily breakfast consumption on weekdays were significantly higher among males (OR=1.3, 95%CI=1.2-1.5), younger children (OR=2.7, 95%CI=2.4-3.2) and those from more affluent families (OR=1.2, 95%CI=1.1-1.4). Conversely, the odds of daily consumption of fruits and/or vegetables were lower among males (OR=0.8, 95%CI=0.7-0.9 and OR=0.7, 95%CI=0.6-0.7, respectively), but higher in younger children (OR=1.5, 95%CI=1.3-1.8 and OR=1.4, 95%CI=1.2-1.6, respectively) and those from wealthier families (OR=1.3, 95%CI=1.2-1.5 and OR=1.2, 95%CI=1.0-1.3, respectively). Additionally, the odds of daily consumption of sweets were lower among males (OR=0.7, 95%CI=0.6-0.8) and younger children (OR=0.5, 95%CI=0.5-0.6). Also, the odds of daily consumption of sugary soft drinks were lower in younger children (OR=0.6, 95%CI=0.5-0.6) and urban residents (OR=0.8, 95%CI=0.7-0.9).

Conclusions
Our findings provide useful insights into the complex interplay of sociodemographic characteristics in shaping nutritional practices of children. There is a need for targeted nutritional interventions based on the specific sociodemographic backgrounds of children in Albania and elsewhere, ultimately supporting healthier nutritional habits.

Keywords
Albania
Breakfast
Nutrition
Schoolchildren
Fruits and vegetables

IZVLEČEK

Cilj
Zdrave prehranjevalne navade v otroštvu spodbujajo zdravo rast in razvoj ter krepijo psihično in čustveno dobro počutje. Naš cilj je bil oceniti razširjenost in sociodemografske korelate izbranih prehranjevalnih navad med albanskimi šolarji.

Metode
V Albaniji je bila leta 2022 v okviru raziskave o vedenju šoloobveznih otrok v zvezi z zdravjem izvedena presečna študija, v katero je bil vključen reprezentativni vzorec 5.454 šolarjev, starih od 11 do 15 let (≈52 % deklet; ≈96-% odziv). Zbrani so bili podatki o prehranjevalnih navadah in sociodemografski dejavniki otrok. Za oceno povezanosti prehranjevalnih navad s sociodemografskimi dejavniki je bila uporabljena binarna logistična regresija.

Rezultati
V multivariatno prilagojeni analizi je bila verjetnost vsakodnevnega uživanja zajtrka ob delavnikih znatno večja pri fantih (RO = 1,3, 95-% IZ = 1,2-1,5), mlajših otrocih (RO = 2,7, 95-% IZ = 2,4-3,2) in otrocih iz premožnejših družin (RO = 1,2, 95-% IZ = 1,1-1,4). Nasprotno je bila verjetnost dnevnega uživanja sadja in/ali zelenjave nižja pri fantih (RO = 0,8, 95-% IZ = 0,7-0,9 oziroma RO = 0,7, 95-% IZ = 0,6-0,7), višja pa pri mlajših otrocih (RO = 1,5, 95-% IZ = 1,3-1,8 oziroma RO = 1,4, 95-% IZ = 1,2-1,6) in otrocih iz premožnejših družin (RO = 1,3, 95-% IZ = 1,2-1,5 oziroma RO = 1,2, 95-% IZ = 1,0-1,3). Poleg tega je bila verjetnost dnevnega uživanja sladkarij manjša pri fantih (RO = 0,7, 95-% IZ = 0,6-0,8) in mlajših otrocih (RO = 0,5, 95-% IZ = 0,5-0,6). Tudi verjetnost dnevnega uživanja sladkih brezalkoholnih pijač je bila manjša pri mlajših otrocih (RO = 0,6, 95-% IZ = 0,5-0,6) in živečih v mestih (RO = 0,8, 95-% IZ = 0,7-0,9).

Zaključki
Naše ugotovitve ponujajo koristen vpogled v zapleten preplet sociodemografskih značilnosti pri oblikovanju prehranjevalnih navad otrok. Potrebni so ciljno usmerjeni prehranski ukrepi, ki temeljijo na posebnih sociodemografskih značilnostih otrok v Albaniji in drugod, kar bi na koncu prispevalo k bolj zdravim prehranjevalnim navadam.

Ključne besede
Albanija
zajtrki
prehranjevanje
šolarji
sadje in zelenjava

***Correspondence:** genc.burazeri@maastrichtuniversity.nl

1 INTRODUCTION

Poor nutritional habits constitute an important risk factor for ill-health and premature mortality (1). Inducement to healthy nutritional practices starting from an early age is crucial, as behavioural patterns developed in childhood and adolescence often carry over into adulthood (2, 3). Unhealthy dietary patterns and practices during childhood and adolescence contribute to the development of obesity and increased body fat (4, 5), a higher incidence of dental caries (6), increased blood pressure, poorer mental health and a lower quality of life (5, 7, 8). Conversely, healthy nutritional habits during childhood and adolescence not only reduce the risk of developing chronic conditions and noncommunicable diseases later in life (1), but also promote healthy growth and development (9, 10), and foster psycho-emotional wellbeing (5, 7, 8).

Regular breakfast consumption is one of the main indicators of healthy nutritional practices in children (11) and has been convincingly linked to a healthier body mass index (BMI), better mental health, improved school performance and improved overall diet quality (11-14). Indeed, a comprehensive systematic review including about 290,000 children and adolescents in 33 countries (15) has reported that breakfast consumption among children and adolescents is associated with a lower BMI, better nutritional intake (16) and better cognitive status (17).

Regarding specific food items, consumption of fruit and vegetables is essential for the good physical and mental health of children (11, 18). Therefore, the World Health Organization (WHO) recommends consumption of at least five portions of fruit and vegetables per day and reduction of the consumption of free sugars to less than 10% of daily energy intake (11, 18).

Reports from many countries have linked various sociodemographic factors with the eating habits of children (11, 18). Thus, fairly recent evidence indicates that breakfast consumption levels are higher among boys, younger children (11 years) and those from more affluent families (11). Conversely, daily consumption of fruit and/or vegetables has been reported to be higher among girls, younger children and those from more affluent families (11). Furthermore, daily consumption of sweets has been reported to be higher among girls, whereas the association with other sociodemographic factors is seemingly not consistent (11). Regarding daily consumption of sugary soft drinks, the available evidence indicates a higher level of consumption among boys and children from less affluent families (11).

The Health Behaviour in School-aged Children (HBSC) study is a large school-based survey conducted every four years in many countries in Europe, Central Asia and Canada (11, 19). The HBSC survey collects important information on several health behaviours, health outcomes and the social environments of children aged 11, 13 and 15 years (11, 19). The last round of the HBSC survey was conducted in 2021-2022 in 44 countries including Albania (11, 19, 20). In addition to many health outcomes and behavioural factors, the survey included a set of questions measuring selected nutritional habits among schoolchildren aged 11-15 years (11, 19).

Fairly recent evidence from Albania indicates that almost 1/3 of schoolchildren aged 12-15 years do not exhibit the best attitudes towards health promotion, including the ability to maintain and improve health (21). Furthermore, a previous study reported a strong and consistent positive relationship between breakfast skipping and obesity, but not overweight among Albanian children aged 7-10 years (22).

In this framework, the objective of our study was to assess the prevalence and sociodemographic correlates of selected nutritional habits among schoolchildren, based on the data obtained from the last round of the HBSC survey conducted in Albania in 2022 (20). In line with the evidence obtained from the previous rounds of HBSC surveys (11, 19), we hypothesised a higher prevalence of breakfast consumption among boys, younger children and those from more affluent families. Conversely, we hypothesised a higher consumption of fruits and vegetables among girls, younger children and those from more affluent families, based on indications from previous HBSC rounds (11, 19). Additionally, we hypothesised a higher consumption of sweets among girls, but a higher consumption of sugary soft drinks in boys and children from less affluent families (11, 19). On the other hand, in the absence of supporting literature, we did not formulate any hypotheses regarding the association of eating habits with place of residence or parental employment status.

2 METHODS

2.1 Design and study population

The data presented in this article were obtained from a cross-sectional study corresponding to the last round of the HBSC survey, which was carried out in Albania and in many other countries in Europe and beyond during the period 2021-2022 (11, 19).

The study population comprised a nationwide representative sample of schoolchildren aged 11, 13 and 15 years (stratified multistage cluster sampling with probability proportional to size) (20). Stratification was based on prefectures (regions) of Albania, which ensured an adequate representativeness of the sample at a national level. Overall, of 5,700 targeted children for inclusion in the study, the sample included 5,454 schoolchildren aged 11, 13 and 15 years (2,844 girls, or ≈52% of the total sample). The overall response rate was: 5,454/5,700≈96% (20). There was no need for weighting the data as the distribution of gender, age and geographical region in the final study sample corresponded to the target population (i.e., the overall number of schoolchildren in Albania).

2.2 Data collection

Data collection was conducted in May 2022. A structured self-administered and anonymous internationally standardised questionnaire included, among other health behavioural characteristics, assessment of nutritional habits (breakfast consumption and consumption of selected food items) and information on sociodemographic factors of schoolchildren (11, 19).

Measurement of breakfast consumption on weekdays was based on the following question (19): "During weekdays, how often do you usually have breakfast (more than a glass of milk or fruit juice)?". Potential response categories were as follows: "never", "one day", "two days", "three days", "four days", "five days". In the analysis, breakfast consumption was dichotomised into: "daily" (5 days) vs. "non-daily" (0-4 days).

Conversely, measurement of the frequency of consumption of selected food items was based on the following questions (19): "How many times a week do you usually eat or drink: fruits, vegetables, sweets, and sugary soft drinks?". Potential response categories for each food item were as follows: "never", "less than once a week", "once a week", "2-4 days a week", "5-6 days a week", "once a day, every day", and "every day, more than once". In the analysis, the frequency of consumption of each food item was dichotomized into: "daily" (≥1/day) vs. "non-daily" (≤5-6/week) (19).

Sociodemographic characteristics included 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 (dichotomised into: less affluent [below median scores] vs. more affluent families [above median scores]) (19).

2.3 Ethical aspects

The study was approved by the Ethics Committee of Tirana Medical University (approval ID: No.700/1). All schoolchildren were informed about the objectives and procedures of the study, as well as the aspects regarding the anonymity of the survey and the subsequent aggregated data analysis. Furthermore, passive consent was sought from the parents through the teachers from each respective school.

2.4 Statistical analysis

Binary logistic regression was used to assess the association of nutritional habits with sociodemographic characteristics of schoolchildren. Initially, crude (unadjusted) models were run (Table 2). Odds ratios (ORs) and their respective 95% confidence intervals (95%CIs) and p-values (P) were calculated for each nutritional habit. Next, all sociodemographic factors (gender, age, residence, mother's and father's employment status, and family affluence scale) were entered simultaneously into the logistic regression models (Table 3). Multivariable-adjusted ORs and their respective 95%CIs and p-values were calculated for each of the nutritional habits (breakfast intake, and consumption of fruits, vegetables, sweets and sugary soft drinks). For all the multivariable-adjusted logistic regression models, a Hosmer-Lemeshow test was used to assess the goodness-of-fit; all multivariable-adjusted models fit the Hosmer-Lemeshow criterion (23). For all statistical tests employed, P≤0.05 was considered statistically significant. Statistical Package for the Social Sciences (SPSS, version 19.0) was used for all the statistical analyses.

3 RESULTS

Table 1 presents the distribution of nutritional habits by sociodemographic characteristics of the schoolchildren. The overall prevalence of daily breakfast consumption was about 48%.

Daily breakfast consumption was more frequent among boys, 11-year-olds, children living in urban areas, those whose parents were both employed and children from more affluent families. The overall prevalence of daily fruit and/or vegetable consumption was around 59% and 47%, respectively. Fruit and/or vegetable consumption was more frequent among girls, youngest children, those whose fathers were employed and in children from more affluent families. The overall prevalence of daily consumption of sweets was about 36%. Consumption of sweets was more frequent for girls among the oldest children, in those from rural areas and in children with unemployed fathers. The overall prevalence of daily consumption of sugary soft drinks was around 29%. Consumption of sugary soft drinks was more frequent among the oldest children, in those from rural areas and in schoolchildren whose mothers were unemployed.

Table 2 presents the crude/unadjusted associations of nutritional habits with sociodemographic characteristics of the schoolchildren.

Table 1. Distribution of selected nutritional habits by sociodemographic characteristics in a nationwide sample of Albanian schoolchildren, HBSC 2022.

Sociodemographic characteristics	Daily consumption				
	Breakfast	Fruit	Vegetables	Sweets	Sugary soft drinks
Total sample (n=5454)	2461 (48.2) [a]	3174 (58.8)	2549 (47.3)	1911 (35.5)	1582 (29.4)
Gender:					
Boys (n=2610)	1265 (52.1)	1434 (55.7)	1072 (41.9)	791 (30.9)	766 (29.9)
Girls (n=2844)	1196 (44.7)	1740 (61.5)	1477 (52.3)	1120 (39.7)	816 (28.9)
Age:					
11 years (n=1784)	1023 (62.2)	1145 (64.7)	946 (53.5)	495 (28.1)	409 (23.2)
13 years (n=1785)	754 (45.6)	1004 (57.0)	759 (43.3)	631 (35.9)	524 (29.9)
15 years (n=1877)	681 (37.9)	1021 (54.8)	841 (45.3)	782 (42.1)	647 (34.8)
Residence:					
Urban areas (n=3648)	1676 (48.8)	2125 (58.7)	1701 (47.2)	1253 (34.8)	1007 (27.9)
Rural areas (n=1806)	785 (46.9)	1049 (58.9)	848 (47.6)	658 (36.9)	575 (32.3)
Father's employment:					
Yes (n=4928)	2260 (49.0)	2897 (59.3)	2327 (47.8)	1697 (34.8)	1424 (29.2)
No (n=479)	190 (42.0)	248 (52.2)	204 (43.3)	193 (40.8)	142 (30.1)
Mother's employment:					
Yes (n=3676)	1701 (49.3)	2164 (59.4)	1710 (47.1)	1259 (34.6)	1033 (28.4)
No (n=1710)	734 (45.9)	975 (57.6)	814 (48.3)	623 (36.9)	528 (31.3)
Family affluence:					
Less affluent (n=2600)	1113 (45.8)	1434 (55.5)	1179 (45.9)	898 (34.9)	747 (29.1)
More affluent (n=2715)	1290 (50.4)	1657 (61.7)	1303 (48.6)	962 (35.9)	798 (29.8)

Legend: [a] Absolute numbers and their respective percentages (in parentheses). For nutritional habits, there were the following missing values: breakfast consumption (n=349), fruit consumption (n=53), vegetable consumption (n=70), consumption of sweets (n=68), and consumption of sugary soft drinks (n=70). 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).

Table 2. Associations of nutritional habits with sociodemographic characteristics of schoolchildren; results from unadjusted binary logistic regression models.

Daily consumption	Demographic variables					
	Male		Age 11 [b]		Urban areas	
	OR (95%CI) [a]	P [a]	OR (95%CI)	P	OR (95%CI)	P
Breakfast	1.35 (1.21-1.51)	<0.001	2.70 (2.35-3.09)	<0.001	1.08 (0.96-1.21)	0.199
Nagelkerke R^2	0.01		0.05		<0.01	
Area under the curve (AUC)	54%		60%		51%	
Fruit	0.79 (0.71-0.88)	<0.001	1.51 (1.32-1.73)	<0.001	0.99 (0.89-1.12)	0.917
Nagelkerke R^2	0.01		0.01		<0.01	
AUC	47%		54%		50%	
Vegetables	0.66 (0.59-0.73)	<0.001	1.39 (1.22-1.59)	<0.001	0.98 (0.88-1.10)	0.759
Nagelkerke R^2	0.02		0.01		<0.01	
AUC	45%		55%		50%	
Sweets	0.68 (0.61-0.76)	<0.001	0.54 (0.47-0.62)	<0.001	0.91 (0.81-1.02)	0.114
Nagelkerke R^2	0.01		0.02		<0.01	
AUC	46%		45%		49%	
Sugary soft drinks	1.05 (0.93-1.18)	<0.001	0.57 (0.49-0.65)	<0.001	0.81 (0.72-0.92)	<0.001
Nagelkerke R^2	<0.01		0.02		<0.01	
AUC	51%		45%		48%	
Daily consumption	**Socioeconomic variables**					
	Father employed		Mother employed		More affluent	
	OR (95%CI) [a]	P [a]	OR (95%CI)	P	OR (95%CI)	P
Breakfast	1.32 (1.09-1.61)	0.005	1.15 (1.02-1.29)	0.024	1.21 (1.08-1.35)	0.001
Nagelkerke R^2	<0.01		<0.01		<0.01	
Area under the curve (AUC)	54%		52%		52%	
Fruit	1.34 (1.11-1.61)	0.003	1.08 (0.96-1.21)	0.210	1.29 (1.16-1.44)	<0.001
Nagelkerke R^2	<0.01		<0.01		0.01	
AUC	54%		51%		53%	
Vegetables	1.20 (0.99-1.45)	0.064	0.95 (0.85-1.07)	0.416	1.12 (1.00-1.24)	0.047
Nagelkerke R^2	<0.01		<0.01		<0.01	
AUC	52%		49%		51%	
Sweets	0.78 (0.64-0.94)	0.010	0.91 (0.80-1.02)	0.112	1.04 (0.93-1.17)	0.463
Nagelkerke R^2	<0.01		<0.01		<0.01	
AUC	47%		49%		51%	
Sugary soft drinks	0.96 (0.78-1.18)	0.700	0.87 (0.77-0.99)	0.030	1.03 (0.92-1.17)	0.578
Nagelkerke R^2	<0.01		<0.01		<0.01	
AUC	50%		49%		50%	

Legend: [a] Odds ratios and their respective 95% confidence intervals (in parentheses), as well as p-values from crude (unadjusted) binary logistic regression models. Reference groups for nutritional habits were as follows: "non-daily" (0-4 days) for breakfast consumption during weekdays, and "non-daily" (≤5-6/week) for the other dietary practices. [b] Compared to age 15.

Table 3. Independent associations of sociodemographic factors with nutritional habits; results from multivariable-adjusted binary logistic regression models.

Daily consumption	Demographic variables					
	Male		Age 11 [b]		Urban areas	
	OR (95%CI) [a]	P [a]	OR (95%CI)	P	OR (95%CI)	P
Breakfast	1.30 (1.16-1.46)	<0.001	2.73 (2.37-3.15)	<0.001	1.08 (0.95-1.22)	0.229
Fruit	0.76 (0.68-0.85)	<0.001	1.52 (1.33-1.75)	<0.001	0.99 (0.87-1.11)	0.809
Vegetables	0.65 (0.58-0.72)	<0.001	1.40 (1.22-1.60)	<0.001	0.99 (0.89-1.12)	0.974
Sweets	0.68 (0.61-0.77)	<0.001	0.54 (0.47-0.62)	<0.001	0.90 (0.79-1.02)	0.086
Sugary soft drinks	1.08 (0.95-1.22)	0.228	0.55 (0.48-0.64)	<0.001	0.79 (0.70-0.90)	<0.001
Daily consumption	**Socioeconomic variables**					
	Father employed		Mother employed		More affluent	
	OR (95%CI) [a]	P [a]	OR (95%CI)	P	OR (95%CI)	P
Breakfast	1.18 (0.96-1.45)	0.116	1.11 (0.98-1.25)	0.113	1.21 (1.08-1.36)	0.002
Fruit	1.21 (0.99-1.47)	0.062	1.06 (0.94-1.19)	0.379	1.33 (1.18-1.49)	<0.001
Vegetables	1.16 (0.95-1.42)	0.141	0.95 (0.85-1.08)	0.437	1.16 (1.04-1.30)	0.009
Sweets	0.82 (0.67-1.01)	0.056	0.93 (0.82-1.05)	0.237	1.07 (0.95-1.21)	0.258
Sugary soft drinks	1.02 (0.83-1.27)	0.834	0.89 (0.78-1.01)	0.078	1.03 (0.91-1.17)	0.601

Legend: [a] Odds ratios and their respective 95% confidence intervals (in parentheses), as well as p-values from crude (unadjusted) binary logistic regression models. Reference groups for nutritional habits were as follows: "non-daily" (0-4 days) for breakfast consumption during weekdays, and "non-daily" (≤5-6/week) for the other dietary practices. [b] Compared to age 15.

The odds of daily breakfast consumption were significantly higher among males (OR=1.4, 95%CI=1.2-1.5), in the youngest children (OR=2.7, 95%CI=2.4-3.1), in those whose fathers and/or mothers were employed (OR=1.3, 95%CI=1.1-1.6 and OR=1.2, 95%CI=1.0-1.3, respectively), and among children from more affluent families (OR=1.2, 95%CI=1.1-1.4). Conversely, the odds of daily fruit consumption were significantly lower among males (OR=0.8, 95%CI=0.7-0.9), but higher among younger children (OR=1.5, 95%CI=1.3-1.7), in those whose fathers were employed (OR=1.3, 95%CI=1.3-1.6) and among children from more affluent families (OR=1.3, 95%CI=1.2-1.4). Likewise, the odds of daily vegetable consumption were significantly lower among males (OR=0.7, 95%CI=0.6-0.7), but higher among younger children (OR=1.4, 95%CI=1.2-1.6) and those from more affluent families (OR=1.1, 95%CI=1.0-1.2). In turn, the odds of daily consumption of sweets were significantly lower among males (OR=0.7, 95%CI=0.6-0.8), children aged 11 (OR=0.5, 95%CI=0.5-0.6) and those whose fathers were employed (OR=0.8, 95%CI=0.6-0.9). Furthermore, the odds of daily consumption of sugary soft drinks were significantly lower among the youngest children (OR=0.6, 95%CI=0.5-0.7), urban residents (OR=0.8, 95%CI=0.7-0.9) and those whose mothers were employed (OR=0.9, 95%CI=0.8-1.0).

In multivariable-adjusted binary logistic regression models (Table 3), the odds of daily breakfast consumption were significantly higher among males (OR=1.3, 95%CI=1.2-1.5), children aged 11 (OR=2.7, 95%CI=2.4-3.2) and those from more affluent families (OR=1.2, 95%CI=1.1-1.4).

Conversely, the odds of daily fruit intake were significantly lower among males (OR=0.8, 95%CI=0.7-0.9), but higher in children aged 11 (OR=1.5, 95%CI=1.3-1.8) and those from more affluent families (OR=1.3, 95%CI=1.2-1.5). Furthermore, the odds of daily vegetable intake were significantly lower among males (OR=0.7, 95%CI=0.6-0.7), but higher in younger children (OR=1.4, 95%CI=1.2-1.6) and those from more wealthy families (OR=1.2, 95%CI=1.0-1.3). Additionally, upon multivariable adjustment, the odds of daily consumption of sweets were significantly lower among males (OR=0.7, 95%CI=0.6-0.8) and children aged 11 (OR=0.5, 95%CI=0.5-0.6). In turn, the odds of daily consumption of sugary soft drinks were significantly lower in younger children (OR=0.6, 95%CI=0.5-0.6) and urban residents (OR=0.8, 95%CI=0.7-0.9).

4 DISCUSSION

In our study, daily breakfast consumption among Albanian schoolchildren aged 11-15 years was more frequent among boys, younger individuals and those from more affluent families, highlighting the role of socioeconomic factors in dietary habits. In contrast, fruit and vegetable intake were more frequent among girls, younger children and those from more affluent families. Daily sweets consumption was

more frequent among girls and younger children, whereas sugary soft drink intake was more prevalent among older children and those from rural areas.

A fairly recent report indicating the same nutritional habits among all 44 participating countries in the last HBSC survey round conducted in 2021-22 (11) indicates that only half of adolescents (51%) eat breakfast daily on weekdays, which is slightly higher than our finding related to Albanian children of the same age group (48%). Daily breakfast consumption has been reported as low as 8% among 15-year-old girls in North Macedonia to 86% among 11-year-old boys in the Netherlands (11). Generally, a significant decline between 2018 and 2002 in daily breakfast consumption was observed in more than half of the countries included in the last HBSC round (11). In Albania, there is evidence of a small decline. Conversely, the largest decrease is evident in North Macedonia (29% and 28% decreases among boys and girls respectively), whereas Serbia is the only country with an increase in daily breakfast consumption across all gender and age groups (11).

Furthermore, according to the multi-country HBSC 2021-22 report (11), a higher proportion of boys (56%) reported daily breakfast consumption compared to girls (46%), a gender-difference which is similar to our findings (52% in boys vs. 45% in girls).

Our finding regarding an inverse relationship of breakfast consumption with age is in line with a fairly recent systematic review which has convincingly documented that the frequency of breakfast consumption decreases across the primary-school transition (24). According to this review, it may be possible that, as children transition into adolescence, their daily sleep patterns evolve, which may lead to a reduced sense of hunger upon waking in the morning (24, 25). Other influencing factors for skipping breakfast among older children may include their growing autonomy and increased peer pressure (24, 26).

In our study, boys and girls from more affluent families were more likely to eat breakfast daily, a finding which is compatible with the multi-country HBSC 2021-22 report (11). It has been convincingly shown that parents from wealthier families, among other things, play a significant role as a positive model for their children in acquir¬ing and adopting healthy dietary patterns (27). Also, in the Albanian context, this may be presumably due to a greater awareness about the importance of breakfast intake among children from a wealthier background, or due to a more structured family routine as parents from affluent backgrounds often have more flexible work schedules, allowing for a more organised morning routine that includes breakfast. Conversely, Albanian children from less affluent families may skip breakfast due to economic hardship, or lack of time and/or limited parental supervision.

The recent multi-country HBSC report indicates that only 38% of children consume fruits and vegetables daily (11), which is lower than our findings in Albania (59% for fruits and 47% for vegetables). Regarding the relationship with gender and age, in our study, consumption of fruits and vegetables was higher in girls than in boys and declined with age in both genders – findings which are compatible with the multi-country HBSC 2021-22 report (11). Also, we found the same social gradient in daily consumption of fruits and/or vegetables as evidenced in the recent multi-country HBSC report, with higher levels among schoolchildren from more affluent families (11). Daily fruit and vegetable consumption may be higher among schoolchildren from more affluent families in Albania due to greater financial ability to purchase these products, higher parental education levels, and an increased awareness of healthy eating habits. In contrast, less affluent families in Albania may rely more on cheaper, calorie-dense foods, leading to lower intake of fruits and vegetables among their children.

In 2018-2022, on average, fruit and vegetable consumption remained almost stable in HBSC participating countries, which is also the case of Albania and several neighbouring countries except North Macedonia, which exhibited a notable decrease in daily vegetable consumption (11).
In our study, more than 1/3 of children (36%) reported daily consumption of sweets, which is higher than the average estimate of the recent multi-country HBSC report (25%) (11). Generally, girls reported eating sweets more often than boys in countries which participated in the last HBSC round (11), which is in line with our findings. On the other hand, daily consumption of sweets was generally higher among schoolchildren from high-affluence families according to the HBSC multi-country report (11), a finding which was not evident in our study. On the other hand, between 2018 and 2022, daily consumption of sweets decreased in Albania (4% in boys and 5% in girls), a reduction which was higher than in Serbia, Croatia, North Macedonia, or the Republic of Moldova (11).

The overall prevalence of daily consumption of sugary soft drinks in our study (29%) was almost twice as high as the multi-country average (15%). Generally, boys were more likely than girls to consume sugary soft drinks daily in countries which participated in the last HBSC round (11), a finding which was not also evident in our study. Furthermore, we did not find an association of sugary soft drinks with family wealth, in contrast to several former communist countries (including the Republic of Moldova and Poland) where the consumption was more frequent among children from more affluent families (11).

In our study, there was no evidence of significant associations between place of residence and nutritional habits, except for sugary soft drinks. This may be due to the relatively homogeneous food environment across urban

and rural settings in Albania, where access to food options does not differ substantially. Furthermore, we did not find any significant associations between parental employment status and nutritional habits of schoolchildren. Seemingly, employment status does not strongly influence children's dietary patterns in the Albanian context, probably due to the extended family structures and strong cultural norms around family meals which likely reduce the direct impact of parental employment on children's dietary patterns, as grandparents or other family members often take responsibility for meal preparation and supervision. However, our findings related to parental employment and place of residence should be confirmed in future studies.

A major strength of our study consists of the large nationwide representative sample of schoolchildren and the use of an internationally standardised instrument (19). Yet, regarding external validity, a potential limitation of this study may include the lack of generalisability to out-of-school Albanian children aged 11-15 years. Furthermore, there is a possibility of information bias including in particular social desirability bias (over-reporting of fruit and vegetable intake and/or under-reporting of consumption of sweets and sugary soft drinks), or intentional misreporting. Additionally, validation studies in Belgian and Italian schoolchildren have indicated that overestimation must be considered while estimating consumption frequencies in the HBSC surveys (28). Also, the cross-sectional study design may constitute another limitation, preventing the establishment of causal relationships.

Nonetheless, our study provides useful evidence on the prevalence and sociodemographic distribution of several important nutritional habits among Albanian schoolchildren. Targeted interventions need to be implemented in Albania and elsewhere to help children develop healthier behaviours and prevent habits that could impact their current health and well-being, as well as their future health outcomes as adults (11). In any case, a variety of public health approaches are essential to effectively address the intricate factors influencing positive changes in nutritional habits among children (11). In the context of Albania, the government should act swiftly to limit the marketing of unhealthy foods and beverages, especially when such marketing is aimed at children and adolescents (11). Also, introduction of school-based programmes should be considered to encourage breakfast consumption among older children and those from less wealthy families. Furthermore, school-based programmes in Albania should consider the provision of free or subsidised fruits and vegetables, combined with interactive nutrition education and parental engagement, which can effectively increase their consumption among schoolchildren.

5 CONCLUSIONS

In conclusion, our study conducted in Albania provides useful insights into the complex interplay of sociodemographic characteristics in shaping nutritional practices of children. There is a need for targeted nutritional interventions based on specific sociodemographic backgrounds of children in Albania and in other countries, ultimately supporting healthier nutritional habits.

ACKNOWLEDGMENT

This study was conducted by the Faculty of Medicine, University of Medicine, Tirana, Albania.

INFORMED CONSENT

Written informed consent was obtained from all individual participants included in the study. This study was approved by the Ethics Committee of Tirana Medical University (approval ID: No.700/1, date: 05-04-2022), and all procedures were conducted in accordance with the Declaration of Helsinki.

CONFLICTS OF INTERESTS

None declared.

FUNDING

This study was funded by the following agencies: the United Nations Population Fund (UNFPA) Office in Albania, the United Nations Children's Fund (UNICEF) Office in Albania, and the Swiss Development and Cooperation (SDC) Agency through the project "Schools for Health" implemented in Albania.

ETHICAL APPROVAL

This study was approved by the Ethics Committee of Tirana Medical University (approval ID: No.700/1, date: 05-04-2022).

AVAILABILITY OF DATA AND MATERIALS

All data and materials used in this study are available upon reasonable request.

AUTHORS' CONTRIBUTIONS

Jonida Stefa, Gentiana Qirjako and Genc Burazeri contributed to the study conceptualisation and design, analysis and interpretation of the data and writing of the article. Migena Gega, Brizida Refatllari and Grejd Hyska commented comprehensively on the manuscript. All authors have read and approved the submitted manuscript.

ORCID

Jonida Stefa:
http://orcid.org/0009-0006-2868-3837

Migena Gega:
http://orcid.org/0009-0009-7568-6012

Brizida Refatllari:
http://orcid.org/0009-0008-3157-0731

Grejd Hyska:
http://orcid.org/0009-0000-3775-0858

Gentiana Qirjako:
http://orcid.org/0000-0003-3179-9006

Genc Burazeri:
http://orcid.org/0000-0003-4813-4000

REFERENCES

1. World Health Organization. Saving lives, spending less: a strategic response to noncommunicable diseases [Internet]. Geneva: World Health Organization; 2018. [cited 2024 Nov 26]. Available from: https://iris.who.int/handle/10665/272534
2. Lioret S, Campbell KJ, McNaughton SA, Cameron AJ, Salmon J, Abbott G, Hesketh KD. Lifestyle patterns begin in early childhood, persist and are socioeconomically patterned, confirming the importance of early life interventions. Nutrients. 2020;12(3):724. doi: 10.3390/nu12030724.
3. Carlin A, Perchoux C, Puggina A, et al. A life course examination of the physical environmental determinants of physical activity behaviour: A "Determinants of Diet and Physical Activity" (DEDIPAC) umbrella systematic literature review. PLoS ONE. 2017;12(8):e0182083. doi: 10.1371/journal.pone.0182083.
4. de Menezes LRD, e Souza, RCV, Cardoso PC, dos Santos LC. Factors associated with dietary patterns of schoolchildren: A systematic review. Nutrients. 2023;15(11):2450. doi: 10.3390/nu15112450.
5. Dalwood P, Marshall S, Burrows TL, McIntosh A, Collins CE. Diet quality indices and their associations with health-related outcomes in children and adolescents: An updated systematic review. Nutr J. 2020;19(1):118. doi: 10.1186/s12937-020-00632-x.
6. Mahboubi Z, Pakdaman A, Yazdani R, Azadbakht L, Montazeri A. Dietary free sugar and dental caries in children: A systematic review on longitudinal studies. Health Promot Perspec. 2021;11(3):271–280. doi: 10.34172/hpp.2021.35.
7. Lane MM, Gamage E, Travica N, et al. Ultra-processed food consumption and mental health: A systematic review and meta-analysis of observational studies. Nutrients. 2022;14(13):2568. doi: 10.3390/nu14132568.
8. Wu XY, Zhuang LH, Li W, et al. The influence of diet quality and dietary behavior on health-related quality of life in the general population of children and adolescents: A systematic review and meta-analysis. Qual Life Res. 2019;28(8):1989–2015. doi: 10.1007/s11136-019-02162-4.
9. de Magalhães Cunha C, Costa PRF, de Oliveira LPM, de O Queiroz VA, Pitangueira JCD, Oliveira AM. Dietary patterns and cardiometabolic risk factors among adolescents: Systematic review and meta-analysis. Br J Nutr. 2018;119(8):859–879. doi: 10.1017/S0007114518000533.
10. Das JK, Salam RA, Thornburg KL, Prentice AM, Campisi S, Lassi ZS, et al. Nutrition in adolescents: Physiology, metabolism, and nutritional needs. Ann N Y Acad Sci. 2017;1393(1):21–33. doi: 10.1111/nyas.13330.
11. Rakić JG, Hamrik Z, Dzielska A, et al. A focus on adolescent physical activity, eating behaviours, weight status and body image in Europe, Central Asia and Canada [Internet]. Health Behaviour in School-aged Children international report from the 2021/2022 survey. Volume 4. Copenhagen: WHO Regional Office for Europe; 2024. [cited 2025 Feb 12]. Available from: https://iris.who.int/handle/10665/376772
12. Zahedi H, Djalalinia S, Sadeghi O, et al. Breakfast consumption and mental health: A systematic review and meta-analysis of observational studies. Nutr Neurosci. 2022;25(6):1250–1264. doi: 10.1080/1028415X.2020.1853411.
13. Poorolajal J, Sahraei F, Mohamdadi Y, Doosti-Irani A, Moradi L. Behavioural factors influencing childhood obesity: A systematic review and meta-analysis. Obesity Res Clin Pract. 2020;14(2):109–118. doi: 10.1016/j.orcp.2020.03.002.
14. Lundqvist M, Vogel NE, Levin L-Å. Effects of eating breakfast on children and adolescents: A systematic review of potentially relevant outcomes in economic evaluations. Food Nutr Res. 2019;12:63. doi: 10.29219/fnr.v63.1618.
15. Monzani A, Ricotti R, Caputo M, Solito A, Archero F, Bellone S, et al. A systematic review of the Association of Skipping Breakfast with Weight and Cardiometabolic Risk Factors in Children and Adolescents. What should we better investigate in the future? Nutrients. 2019;11(2):387. doi: 10.3390/nu11020387.
16. Ramsay SA, Bloch TD, Marriage B, Shriver LH, Spees CK, Taylor CA. Skipping breakfast is associated with lower diet quality in young US children. Eur J Clin Nutr. 2018;72(4):548–556. doi: 10.1038/s41430-018-0084-3.
17. Micha R, Rogers PJ, Nelson M. The glycaemic potency of breakfast and cognitive function in school children. Eur J Clin Nutr. 2010;64(9):948-957. doi: 10.1038/ejcn.2010.96.
18. World Health Organization. Increasing fruit and vegetable consumption to reduce the risk of noncommunicable diseases [Internet]. Geneva: World Health Organization; 2023. [cited 2024 Nov 26]. Available from: https://www.who.int/tools/elena/ interventions/fruit-vegetables-ncds
19. Inchley J, Currie D, Piper A, et al, editors. Health Behaviour in School-aged Children (HBSC) Study Protocol: Background, methodology, mandatory questions and optional packages for the 2021/22 survey [Internet]. Glasgow: The University of Glasgow, MRC/CSO Social and Public Health Sciences Unit; 2022. [cited 2025 Feb 12]. Available from: https://hbsc.org/publications/survey-protocols/#:~:text=Each%20protocol%20includes%20complete%20information%20on%20HBSC%E2%80%99s%20scientific,as%20technical%20appendices%20on-%20data%20collection%20and%20management
20. Çumashi R, Mone I, Burazeri G, Çela L, Mechili EA, Qirjako G. Prevalence and sociodemographic correlates of smoking among schoolchildren in Albania. Int J Environ Res Public Health. 2024;21(9):1145. doi: 10.3390/ijerph21091145.
21. Muja H, Vasil S, Toçi D, Clemens T, Brand H, Burazeri G. Ability to maintain and improve health and socio-demographic correlates among children in Albania. Zdr Varst. 2024;63(3):113–122. doi: 10.2478/sjph-2024-0016.
22. Burazeri G, Hyska J, Mone I, Roshi E. Breakfast skipping is an independent predictor of obesity but not overweight among children in a Southeastern European population. Int J Vitam Nutr Res. 2016;86(3-4):242–248. doi: 10.1024/0300-9831/a000272.

23. Hosmer D, Lemeshow S. Applied logistic regression. New York: Wiley & Sons; 1989.
24. Peral-Suárez A, Haycraft E, Blyth F, Holley CE, Pearson N. Dietary habits across the primary-secondary school transition: A systematic review. Appetite. 2024;201:107612. doi: 10.1016/j.appet.2024.107612.
25. Colrain IM, Baker FC. Changes in sleep as a function of adolescent development. Neuropsychol Rev. 2011;21(1):5–21. doi: 10.1007/s11065-010-9155-5.
26. Neufeld LM, Andrade EB, Suleiman AB, et al. Food choice in transition: Adolescent autonomy, agency, and the food environment. Lancet. 2022;399(10320):185–197. doi: 10.1016/S0140-6736(21)01687-1.
27. Luque V, Mucarzel F, Hertogs A, Seed PT, Flynn AC, Poston L, et al. Associations between maternal diet, family eating habits and preschool children's dietary patterns: Insights from the UPBEAT trial. Nutr J. 2024;23(1):115. doi: 10.1186/s12937-024-01023-2.
28. Vereecken C, Rossi S, Giacchi M, Maes L. Comparison of a short food frequency questionnaire and derived indices with a seven-day diet record in Belgian and Italian children. Int J Public Health. 2008;53(6):297–305. doi: 10.1007/s00038-008-7101-6.