

# ABILITY TO MAINTAIN AND IMPROVE HEALTH AND SOCIO-DEMOGRAPHIC CORRELATES AMONG CHILDREN IN ALBANIA

## SPOSOBNOST OHRANJANJA IN IZBOLJŠANJA ZDRAVJA TER SOCIODEMOGRAFSKI KORELATI PRI OTROCIH V ALBANIJI

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### ABSTRACT

**Objective:** Our aim was to assess the level and socio-demographic correlates of the ability to maintain health among children in Albania, a post-communist country in the Western Balkans.

### Keywords:

Ability to maintain health  
Albania  
Children  
Health promotion  
Health protection  
Schoolchildren  
Sociodemographic factors

**Methods:** A cross-sectional study was conducted in Albania in September 2022. The study population consisted of a nationwide representative sample of 7,831 schoolchildren (=54% girls) aged 12-15 years. A structured self-administered and anonymous questionnaire inquired about the children's attitudes toward health promotion (ability to maintain and improve health) and a range of key dimensions on knowledge and practices regarding healthcare services. Socio-demographic data were also collected. Binary logistic regression was used to assess the socio-demographic correlates of children's ability to maintain health.

**Results:** Overall, about 71% of schoolchildren exhibited the best attitudes toward health promotion (ability to maintain and improve health). In the multivariable adjusted logistic regression models, poorer attitudes toward health promotion (ability to maintain and improve health) were significantly related to older age (OR=1.2, 95%CI=1.0-1.3), middle/low maternal education (OR=1.2, 95%CI=1.1-1.3), poor/very poor economic situation (OR=1.5, 95%CI=1.2-1.8), lack of appropriate knowledge about rights to healthcare (OR=1.3, 95%CI=1.1-1.5), lack of knowledge about obtaining healthcare services (OR=1.7, 95%CI=1.4-2.2), and lack of consultations/visits with health professionals excluding vaccinations (OR=1.2, 95%CI=1.1-1.4).

**Conclusions:** Almost 1/3<sup>rd</sup> of Albanian schoolchildren included in this study did not exhibit the best attitudes toward health promotion (ability to maintain and improve health). The best attitudes were related to a higher socioeconomic level and adequate knowledge and practices regarding healthcare services. There is thus a need to increase health literacy levels among children in order to ultimately induce sustainable healthy behavioural/lifestyle practices.

### IZVLEČEK

**Cilj:** Naš cilj je bil oceniti raven in sociodemografske korelate sposobnosti ohranjanja zdravja pri otrocih v Albaniji - postkomunistični državi na Zahodnem Balkanu.

### Ključne besede:

sposobnost ohranjanja zdravja  
Albanija  
otroci  
spodbujanje zdravja varovanja zdravja  
šolarji  
sociodemografski dejavniki

**Metode:** Presečno študijo smo opravili septembra 2022 v Albaniji. Populacijo študije je sestavljal reprezentativni vzorec 7831 šolarjev (=54% deklic), starih 12-15, ki prihajajo iz celotne države. V strukturiranem samoocenjevalnem in anonimnem vprašalniku so otroci odgovarjali na vprašanja o odnosu do spodbujanja zdravja (sposobnosti ohranjanja in izboljšanja zdravja) in vrsti ključnih razsežnosti glede znanja in praks v zvezi z zdravstvenimi storitvami. Zbrali smo tudi sociodemografske podatke. Za ocenjevanje sociodemografskih korelatov sposobnosti otrok za ohranjanje zdravja smo uporabili binarno logistično regresijo.

**Rezultati:** Skupno je približno 71 % otrok izkazalo najboljši odnos do spodbujanja zdravja (sposobnosti ohranjanja in izboljšanja zdravja). V modelih multivariatne prilagojene logistične regresije je bil slabši odnos do spodbujanja zdravja (sposobnosti ohranjanja in izboljšanja zdravja) pomembno povezan z višjo starostjo (RO = 1,2, 95-% IZ = 1,0-1,3), nizko/srednjo izobrazbo matere (RO = 1,2, 95-% IZ = 1,1-1,3), slabimi/zelo slabimi gospodarskimi razmerami (RO = 1,5, 95-% IZ = 1,2-1,8), pomanjkanjem ustreznega znanja o pravicah do zdravstvenega varstva (RO = 1,3, 95-% IZ = 1,1-1,5), pomanjkanjem znanja o pridobitvi zdravstvenih storitev (RO = 1,7, 95-% IZ = 1,4-2,2) in pomanjkanjem posvetovanja z zdravstvenimi delavci ali njihovih obiskov, razen za cepljenja (RO = 1,2, 95-% IZ = 1,1-1,4).

**Zaključki:** Skoraj 1/3 albanskih šolarjev, ki so bili vključeni v študijo, ni izkazala najboljšega odnosa do spodbujanja zdravja (sposobnosti ohranjanja in izboljšanja zdravja). Najboljši odnos je povezan z višjo družbeno-gospodarsko ravno ter ustreznim znanjem in praksami glede zdravstvenih storitev. Treba je izboljšati raven zdravstvene pismenosti pri otrocih za spodbujanje trajnostnih zdravih vedenjskih praks in življenjskega sloga.

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## 1 INTRODUCTION

Wellness encompasses individual characteristics, physical and living environment conditions, as well as social and socioeconomic factors (1). Wellness is a self-conscious, self-directed, evolving process of achieving one's full potential or the ability to function optimally within a given current environment (2), contributing to both health and wellbeing. In this context, health promotion (ability to maintain and improve health) also becomes a personal responsibility, depending on an individual's behaviour and lifestyle choices, besides relying on external factors (3). According to UNESCO, education is the foundation of health and wellbeing through enabling knowledgeable actions to prevent disease and promote health (4), with optimal health being both the start and endpoint. Such skills, values and attitudes that enable citizens to lead healthy and fulfilled lives, make informed decisions and respond to changing circumstances, are largely taught during childhood and adolescence. This teaching occurs through formal and informal education and continuous interactions with others at various levels and settings. Skills and attitudes are also maintained and reinforced repeatedly during a person's entire lifecycle (5, 6). Formal education is critical to protect and maintain health and wellbeing throughout one's life, because lifestyle patterns begin in early childhood and persist during later life (7). At least 80% of all cases of major chronic disease could be prevented through adequate health education and promotion activities in school settings (8), preferably started as early as possible (7, 8).

Children are also responsible for their health choices, but this depends on their level of health literacy. The more health literate children are, the more they are inclined to make sound health decisions (9, 10), whereas children with low health literacy are more likely to be involved in unhealthy behaviours (11). Even very young children (under the age of eight) are able to understand the relationship between health and nutrition, and the importance of oral health, and they are able to be actively involved in decision-making related to their own health (12).

While childhood health literacy is still a complex and under-researched concept (6, 9), the current findings link childhood health literacy (or the ability to maintain and improve health) with various factors. Besides education, parental health literacy in particular affects children's behaviour, health literacy levels and ultimately their health and wellbeing. Among German children, a higher parental health literacy was associated with a healthier lifestyle, including more physical activity, healthier nutrition and regular toothbrushing (13). Moreover, own consumption of sweets and spicy/salty foods as well as TV viewing time were inversely associated with maternal education level among very young children, whereas the consumption of fruits and vegetables and outdoor time were positively

associated with it (7). A similar association between the health literacy of parents/guardians and children's time spent watching TV and playing outside was reported by a Japanese study (14). Other research has indicated that parental educational level is an important predictor of child literacy (15) and achievement (16), even though this relationship is complex.

Other factors are associated with children's health promotion (ability to maintain and improve health), too. In a review study, a high level of physical activity was associated with younger age, male gender, higher parental education, higher family income, and higher adolescent education level, whereas a highly sedentary lifestyle was associated with lower parental education and a low family income (17). Furthermore, low physical activity, high sedentary behaviour, high screen time and high consumption of fat/high sugar snacks were all associated with being overweight or obese (17). In a study among teenagers, low health literacy levels were associated with more risky behaviour such as smoking and drinking (18), implying lower health protection behaviour and worse health maintenance. Peer pressure is another important risk factor for young children's involvement in behaviours that put their health at risk (19).

In contrast with the increasing amount of information linking child health protection behaviour with various external factors, the scientific evidence about the level and predictors of health promotion (ability to maintain and improve health) among Albanian children is rather scarce. In this context, we aimed for assessing the attitudes and selected correlates of the ability to maintain and improve health among schoolchildren in Albania, a post-communist country in south-eastern Europe that has been undergoing profound socioeconomic changes in the past few decades. We hypothesized a lower ability to maintain and improve health among schoolchildren belonging to low socioeconomic groupings and/or those with inadequate knowledge and practices regarding healthcare services.

## 2 METHODS

A cross-sectional study was conducted in September 2022, including a nationwide sample of children aged 12-15 years in Albania.

### 2.1 Study population

The study population consisted of a nationwide sample of Albanian schoolchildren attending grades 6-9 (age-group: 12-15 years). The sampling frame (registered schoolchildren pertinent to grades 6-9) is available from the General Directorate of Pre-University Education. WIN-PEPI (<http://www.brixtonhealth.com/pepi4windows.html>) was used to calculate the sample size based on different hypotheses

tapping selected aspects of children's knowledge and practices regarding healthcare services. Based on conservative assumptions, the minimum required sample size was estimated at around 1,400 participants. However, we decided to invite all registered schoolchildren belonging to grades 6-9 in Albania (N=123,998), as this was an online survey. However, as the survey was available online for the whole duration of September 2022, the number of participants substantially exceeded the minimum required sample size.

At the end of September 2022, when the online survey was closed, there were 7,928 participants (6.4% of all registered schoolchildren in grades 6-9) who had completed the questionnaire. Of these, 97 questionnaires were either partially completed (n=59), or invalid (n=38). The final sample included in the analysis thus consisted of 7,831 schoolchildren (about 54% girls) aged 12-15 years (grades 6-9). Participating children (n=7,928) had similar socio-demographic characteristics (gender, age, place of residence) as the overall number of registered schoolchildren belonging to grades 6-9 (N=123,998).

## 2.2 Data collection

Data collection consisted of the use of Google Forms (a survey administration platform), and self-administration by the children of an online structured and anonymous questionnaire that was hosted there. The schoolchildren used the computer labs available at their respective schools and/or their personal/family devices (PCs, tablets, or smartphones) to complete the survey.

Health promotion (ability to maintain and improve health) was assessed based on the following four items/statements (all measured using a Likert-scale ranging from 0 [strongly disagree] to 3 [strongly agree]):

- i) "Healthy nutrition is important for children's health and wellbeing";
- ii) "Physical activity is important for children's health and wellbeing";
- iii) "Mental health is important for children's physical health and wellbeing";
- iv) "Good hygiene is important for children's health and wellbeing".

A summary score was calculated based on each of the four statements about schoolchildren's attitudes to health promotion (ability to maintain and improve health). The summary score for each participant ranged from 0 (strongly disagreeing with all four statements on health protection) to 12 (strongly agreeing with all four statements about health protection). In the analysis, the summary score was dichotomized into: "best attitudes" including children who strongly agreed with all four statements (score: 12) vs. "poor attitudes" consisting of children with a range of scores from 0 to 11.

In addition, the questionnaire asked about the children's knowledge of their rights to healthcare services, barriers to accessing healthcare services, knowledge on obtaining healthcare services, knowledge about the location of healthcare facilities in the children's respective home areas, and visits/consultations with health professionals, excluding the mandatory vaccination calendar. Potential responses to each of these items were: "yes" vs. "no".

Socio-demographic information was also collected, including gender ("boys" vs. "girls"), age (in the analysis dichotomized into: "12-13 years" vs. "14-15 years"), place of residence ("urban" vs. "rural" areas), ethnicity (ethnic "Albanians" vs. "Roma/Egyptian" communities), maternal education (in the analysis dichotomized into: "high" vs. "middle/low"), and family economic situation (in the analysis dichotomized into: "not poor" vs. "poor/very poor").

## 2.3 Statistical analysis

Fisher's exact test was employed to compare the distribution of socio-demographic factors between schoolchildren with "best attitudes" vs. those with "poor attitudes" toward health promotion (ability to maintain and improve health) [Table 1]. Likewise, Fisher's exact test was used to compare the distribution of selected key dimensions on knowledge and practices regarding healthcare services between children with "best attitudes" vs. those with "poor attitudes" toward health protection (Table 2).

Conversely, binary logistic regression was employed to assess the association of attitudes toward health promotion (ability to maintain and improve health) [dependent variable] with socio-demographic characteristics (gender, age, place of residence, ethnicity, maternal education, and family economic situation) [Table 3]. Initially (left panel), crude (unadjusted) odds ratios [OR: "poor attitudes" vs. "best attitudes" toward health promotion (ability to maintain and improve health)], their respective 95% confidence intervals (95% CIs) and p-values were calculated. Next (right panel), all sociodemographic factors were entered simultaneously into the binary logistic regression models and multivariable-adjusted ORs, and their respective 95% CIs and p-values were calculated.

Subsequently (Table 4), all sociodemographic characteristics and the other important dimensions of knowledge and practices regarding healthcare services (knowledge about rights to healthcare; knowledge about obtaining healthcare; knowledge about the location of health facilities in their respective home areas; perceived barriers to healthcare services; and consultations/visits with a health professional, excluding vaccinations) were entered into the logistic regression models in a backward stepwise elimination procedure with a P-value to exit set at  $P > 0.10$ . Multivariable-adjusted ORs, their respective 95% CIs and p-values

were calculated from the final models. The Hosmer-Lemeshow test was used to assess the overall goodness-of-fit of the multivariable-adjusted regression models, and the final model fit the criterion (footnote to Table 4).

For all the statistical analyses, a p-value <0.05 was considered as statistically significant. The Statistical Package for Social Sciences (SPSS, version 19.0) was employed for all the statistical analyses.

#### 2.4 Ethical considerations

The study was approved by the Albanian Ministry of Education and Sport in June 2022. All schoolchildren were informed by their respective teachers about the aim and procedures of the study, and all the aspects of the survey were explained in sufficient detail, including the aim and objectives, the content of all sections of the questionnaire and particularly the aspects related to the anonymity of the survey and the successive aggregated data analysis. Passive consent was sought from the parents through teachers from each of the schools involved.

### 3 RESULTS

Overall, 38% of study participants were from rural areas; 33% reported a higher maternal education; 40% reported a very good economic situation; and 2.3% of the children were part of the Roma and/or Egyptian communities (data not shown in the tables).

Of the 7,831 schoolchildren included in the survey, the best attitudes toward health promotion (ability to maintain and improve health) were evident in 5,534 (71%) of them (Table 1).

The best attitudes toward health promotion (ability to maintain and improve health) were slightly more prevalent in younger children (12-13 years) compared to their older counterparts (72% vs. 69% respectively,  $p=0.02$ ) [Table 1]. Furthermore, the best attitudes toward health promotion (ability to maintain and improve health) were more prevalent among children who reported a higher maternal education than those with middle/low maternal education (74% vs. 70% respectively,  $P<0.01$ ). In addition, the prevalence of the best attitudes toward health promotion (ability to maintain and improve health) were substantially lower among children who reported a poor economic situation compared with their better-off peers (61% vs. 72% respectively,  $P<0.01$ ). On the other hand, there were no significant differences regarding the gender, place of residence, or ethnicity of the children (Table 1).

**Table 1.** Attitudes toward health promotion (ability to maintain and improve health) by socio-demographic factors in a nationwide sample of schoolchildren in Albania, 2022.

Socio-demographic factor	Best attitudes (N=5534)	Poor attitudes (N=2297)	P <sup>b</sup>
<b>Gender:</b>			
Girls	2,987 (71.1) <sup>a</sup>	1,217 (28.9)	0.426
Boys	2,547 (70.2)	1,080 (29.8)	
<b>Age:</b>			
12-13 years	2,755 (72.0)	1,074 (28.0)	0.015
14-15 years	2,779 (69.4)	1,223 (30.6)	
<b>Place of residence:</b>			
Urban areas	3,427 (70.8)	1,411 (29.2)	0.701
Rural areas	2,086 (70.4)	876 (29.6)	
<b>Ethnicity:</b>			
Roma/Egyptian community	116 (66.7)	58 (33.3)	0.206
Ethnic Albanian	5,188 (71.1)	2,111 (28.9)	
<b>Mother's education:</b>			
High	2,213 (73.8)	785 (26.2)	<0.001
Middle/Low	3,299 (69.8)	1,424 (30.2)	
<b>Economic situation:</b>			
Not poor	5,234 (72.0)	2,033 (28.0)	<0.001
Poor/very poor	289 (61.1)	184 (38.9)	

<sup>a</sup> Absolute numbers and their respective row percentages (in parentheses). Discrepancies in the totals are due to the missing covariate values.

<sup>b</sup> P-values from Fisher's exact test.

Better attitudes to health promotion (ability to maintain and improve health) were positively associated with other important dimensions of knowledge and practice regarding healthcare services (Table 2), including knowledge of the rights to healthcare services (79% among children with the best attitudes vs. 73% among those with poor attitudes), knowledge about obtaining healthcare services (96% vs. 92%, respectively), knowledge about the location of health facilities in the home area (89% vs. 85%, respectively), perceived barriers to accessing health services (41% vs. 44%, respectively), and consultations/visits with health professionals other than mandatory vaccinations (75% vs. 70%, respectively) [all  $P \leq 0.03$ , Table 2].

In the crude (unadjusted) binary logistic regression analysis (Table 3, left panel) poorer attitudes toward health promotion (ability to maintain and improve health) were positively related to the older age of the schoolchildren (OR=1.1, 95%CI=1.0-1.2), middle/low maternal education (OR=1.2, 95%CI=1.1-1.3), and especially a poor/very poor economic situation (OR=1.6, 95%CI=1.3-2.0). Conversely, no significant relationships were evident for the other socio-demographic factors. Upon simultaneous multivariable adjustment for all socio-demographic characteristics (Table 3, right panel), the associations with age, maternal education and economic situation persisted.

**Table 2.** Attitudes toward health promotion (ability to maintain and improve health) by other dimensions of knowledge and practices regarding healthcare services.

Knowledge about and use of healthcare services	Best attitudes (N=5534)	Poor attitudes (N=2297)	P <sup>b</sup>
<b>Do you know your rights to healthcare services?</b>			
Yes	4,357 (79.4) <sup>a</sup>	1,579 (72.7)	<0.001
No	1,129 (20.6)	592 (27.3)	
<b>Do you know where to receive healthcare services?</b>			
Yes	5,278 (96.0)	1,989 (91.7)	<0.001
No	220 (4.0)	179 (8.3)	
<b>Do you know the location of health facilities in your area?</b>			
Yes	4,883 (89.0)	1,841 (85.3)	<0.001
No	603 (11.0)	318 (14.7)	
<b>Do you perceive any barriers to accessing healthcare services?</b>			
No	3,216 (58.9)	1,208 (56.0)	0.022
Yes	2,241 (41.1)	948 (44.0)	
<b>Excluding the vaccination calendar, have you ever consulted/visited a health professional?</b>			
Yes	4,121 (75.3)	1,498 (69.8)	<0.001
No	1,352 (24.7)	648 (30.2)	

<sup>a</sup> Absolute numbers and their respective column percentages (in parentheses).

Discrepancies in the totals are due to the missing covariate values.

<sup>b</sup> P-values from Fisher's exact test.

A backward stepwise elimination procedure was used with the P-value to exit set at  $P > 0.10$  in the multivariable-adjusted logistic regression models controlling for socio-demographic variables and the other dimensions related to knowledge and practices on healthcare services (variables presented in Table 2), and the results showed that poorer attitudes toward health promotion (ability to maintain and improve health) were positively related to (Table 4): older age (OR=1.2, 95%CI=1.0-1.3), middle/low maternal education (OR=1.2, 95%CI=1.1-1.3), poor/very poor economic situation (OR=1.5, 95%CI=1.2-1.8), lack of appropriate knowledge about rights to healthcare (OR=1.3, 95%CI=1.1-1.5), lack of knowledge about obtaining healthcare services (OR=1.7, 95%CI=1.4-2.2), and lack of consultations/visits with health professionals excluding vaccinations (OR=1.2, 95%CI=1.1-1.4).

**Table 3.** Association of attitudes toward health promotion (ability to maintain and improve health) with the socio-demographic factors of the schoolchildren, with the results from the binary logistic regression.

Variable	Left panel: unadjusted models		Right panel: multivariable-adjusted models	
	OR (95%CI)	P	OR (95%CI)	P
<b>Gender:</b>				
Girls	1.00 (reference)	0.422	1.00 (reference)	0.951
Boys	1.04 (0.94-1.15)		1.01 (0.91-1.11)	
<b>Age-group:</b>				
12-13 years	1.00 (reference)	0.015	1.00 (reference)	0.006
14-15 years	1.13 (1.02-1.24)		1.15 (1.04-1.28)	
<b>Place of residence:</b>				
Urban areas	1.00 (reference)	0.700	1.00 (reference)	0.507
Rural areas	1.02 (0.92-1.13)		0.96 (0.87-1.07)	
<b>Ethnicity:</b>				
Ethnic Albanian	1.00 (reference)	0.206	1.00 (reference)	0.273
Roma/Egyptian	1.23 (0.89-1.69)		1.20 (0.87-1.67)	
<b>Mother's education:</b>				
High	1.00 (reference)	<0.001	1.00 (reference)	0.001
Middle/Low	1.22 (1.10-1.35)		1.19 (1.07-1.33)	
<b>Economic situation:</b>				
Not poor	1.00 (reference)	<0.001	1.00 (reference)	<0.001
Poor/very poor	1.64 (1.35-1.99)		1.54 (1.26-1.88)	

**Table 4.** Multivariable-adjusted association of attitudes toward health promotion (ability to maintain and improve health) with socio-demographic factors and knowledge and practices regarding healthcare services, with the results from the binary logistic regression.

Variable	OR <sup>a</sup>	95%CI <sup>a</sup>	P <sup>a</sup>
<b>Age-group:</b>			
12-13 years	1.00	reference	0.008
14-15 years	1.16	1.04-1.28	
<b>Mother's education:</b>			
High	1.00	reference	0.001
Middle/Low	1.21	1.09-1.35	
<b>Economic situation:</b>			
Not poor	1.00	reference	<0.001
Poor/very poor	1.49	1.21-1.84	
<b>Do you know your rights to healthcare services?</b>			
Yes	1.00	reference	<0.001
No	1.31	1.15-1.49	
<b>Do you know where to receive healthcare services?</b>			
Yes	1.00	reference	<0.001
No	1.75	1.39-2.19	
<b>Excluding the vaccination calendar, have you ever consulted/visited a health professional?</b>			
Yes	1.00	reference	<0.001
No	1.24	1.09-1.40	

<sup>a</sup>The table presents only the variables which were retained into the final model (Hosmer Lemeshow test for the overall goodness-of-fit of the final model: chi-square statistic=3.8, d.f.=7, P=0.803).

## 4 DISCUSSION

### 4.1 Main findings

The main finding of this study, which included a nationwide sample of Albanian schoolchildren aged 12-15 years old, consists of the fact that almost 1/3rd of participants did not exhibit the best attitudes toward health promotion (ability to maintain and improve health). It also found that the best attitudes toward health promotion (ability to maintain and improve health) were positively and significantly related to younger age, a higher maternal education, a more favourable economic situation, and a range of dimensions related to adequate knowledge and practices regarding healthcare services.

### 4.2 Comparisons with previous studies

The ability to protect and/or maintain health is important for children, since the behavioural patterns instilled during childhood will most likely be carried out in later life, and thus be associated with long-term health outcomes (20-22). Children's health attitudes and behaviour are formed gradually alongside the growing process and under the influence of formal education, experience and interaction with close family members and other individuals and the environment on multiple levels (23), not forgetting the role of the genetic uniqueness of every child, which largely determines their temperament and learning style (24, 25). These complex and dynamic factors will ultimately determine the attitudes, literacy, health literacy, health protection and health maintenance profiles of children, a profile that is unique for every child.

In this context, our findings might also be largely a reflection of such processes occurring in Albanian settings. We found that children of less educated mothers were significantly more likely to have suboptimal attitudes towards health promotion (ability to maintain and improve health) compared to children of highly educated mothers, which is in line with previous research (15).

Children's attitudes towards health are largely shaped by their parents' attitudes toward health (26, 27). More specifically, behaviour is determined generally by attitude and social/normative factors, interplaying with the motivation to comply, and changing/adapting to specific situations (28). Since parents' attitudes are rather stable over time and children have continuous direct experience with them, the attitudes and behaviour of the children are more likely to be influenced by their parents independently of other factors (29). In addition, parenting style also has psychological consequences for children's behaviour (25, 30), further highlighting the multiple influences of parents' attitudes/behaviours on children's attitudes/behaviours.

As for the association of low maternal education level with the suboptimal health attitudes of their children, this might be explained by the association of maternal education with

health behaviour and attitudes: lower education among mothers is associated with lower use of health services (31), higher risk of smoking (32), harmful alcohol use (33), lower physical activity (34), poor nutrition (35), poorer mental health (36), and so on, and such practices (and other associated behaviours) will be conveyed to their children. This thus generates a relationship between a mother's education level and her children's attitudes to health promotion (ability to maintain and improve health). However, this relationship was weak in the present study (Table 4).

In our study, older children were significantly more likely to have suboptimal attitudes toward health promotion (ability to maintain and improve health) compared to younger children. This finding might also be explained by the parents' effect on their children's attitudes, beliefs and behaviours, which tends to diminish as children grow older and other factors take precedence in shaping their attitudes. Indeed, while a child's behaviour is influenced by their parents' attitudes and attributes (accounting for 20%-50% of child behaviour variation), children also have the freedom and power to select which aspects of parental input they will attend and conform to (25). Hence, while growing, children learn and are willing to rely more often on other influences rather than their parents' system of attitudes, beliefs and behaviour, and so they come to rely more and more on their friends (37), or social networks and social support for their wellbeing as they grow older (38, 39).

The inverse significant association of children's suboptimal attitude toward health promotion (ability to maintain and improve health) with economic situation might also be explained through the influence of parental education, economic status and social class on children's behaviour, fitting the pathways discussed earlier. The socioeconomic-parenting association is likely to be mediated and moderated by parental knowledge and expectations, parental mental health, access to resources and cultural norms and values (40). Hence, poorer children are more likely to adopt suboptimal attitudes toward health promotion (ability to maintain and improve health).

As expected, significant associations were identified between suboptimal attitudes toward health promotion (ability to maintain and improve health) and children's knowledge of health rights, knowledge about where to receive healthcare and previous contacts with a health professional. These findings are compatible with the theory of parental influence over their children (26, 27). In addition, children are also able to understand, process and apply information and health information received through various sources (12). Young children (aged 8-11 years) have considerable knowledge about health, diseases and risks, they are health conscious and have positive attitudes toward health and health promotion (41). Hence, children who pay more attention, or are more interested in knowing about health issues have, logically, the best

attitudes toward health promotion (ability to maintain and improve health), in addition to the parental effects.

#### 4.3 Limitations and shortcomings

Our study may have some limitations related to sample representativeness, possibility of information bias, and the study design. Our study included a nationwide sample of schoolchildren aged 12-15 years. Of note, all registered schoolchildren of this age-group were invited to participate over a one-month period (September 2022). During this time period, 6.4% of schoolchildren (N=7,831) completed the online survey, which constitutes a much larger sample than the minimum required sample size (of ≈1,400 participants). Moreover, teachers had no role in the selection process. However, the respondents may still have been self-selected, an issue which may compromise the sample representativeness. Still, there were no significant differences regarding the distribution of socio-demographic factors between survey participants and the overall number of registered schoolchildren attending grades 6-9, which is reassuring. Furthermore, the instrument of data collection consisted of a previously validated, simple and anonymous questionnaire, although the possibility of information bias cannot be excluded completely. In particular, self-assessment of maternal education and especially economic status may have been subject to differential reporting. In addition, the findings from cross-sectional studies are not assumed to be causal.

## 5 CONCLUSIONS

Our findings offer useful evidence about the prevalence of the best attitudes toward health promotion (ability to maintain and improve health) and selected important correlates of this, including not only socio-demographic factors, but also a range of other key dimensions related to knowledge and practices about healthcare services. These findings should be replicated in future studies in Albania and other countries worldwide, employing similar instruments for measurement of health literacy levels and its related socio-demographic factors and other key determinants.

Curriculum development reforms in pre-university education in Albania should consider an increase in material related to health promotion in order to strengthen health literacy levels in children, as this is a prerequisite for the fostering of sustainable, healthy behaviours. Alongside this, there is need for further studies on the curriculum reforms and their relations to health literacy in children aged 12-15 years old in Albania and elsewhere.

Promoting health literacy among children is crucial for their overall wellbeing and development. Strengthening the health literacy of children should consist of the integration of health education into a age-specific school

curriculum focusing on a wide range of topics, such as healthy nutrition, the promotion of physical exercise, and prevention of accidents. Furthermore, strengthening of peer education programmes should be considered, as peers are key agents of change in this age group. In addition, there is need for establishment of health literacy libraries and other resource centres in schools with age-specific content. Importantly, there is need for the use of mobile applications to make the children's learning entertaining and engaging. Moreover, joint interventions targeting mothers and their children should be considered, in light of the relationship that children's health literacy has with their mothers' own health literacy.

In conclusion, our findings from Albania point to the need for increasing health literacy among children to ultimately encourage the adoption of sustainable, healthy behavioural practices.

#### CONFLICT OF INTERESTS

None declared.

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#### ETHICAL APPROVAL

The study was approved by the Albanian Ministry of Education and Sport in June 2022.

#### AVAILABILITY OF DATA AND MATERIALS

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

#### AUTHORS' CONTRIBUTIONS

Herion Muja and Genc Burazeri contributed to the study conceptualization and design, analysis and interpretation of the data and writing of the article. Suela Vasil, Dorina Toçi, Timo Clemens and Helmut Brand commented comprehensively on the manuscript. All authors have read and approved the submitted manuscript.

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