

Health behavior inequalities among Lithuanian, Polish and Russian school-aged children in Lithuania

Research Article

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Abstract: The aim of this study was to compare and get a deeper insight into issues of the health and health behavior inequalities among Lithuanian, Polish and Russian school-aged children in national and international contexts. Investigations were carried out in the framework of Health Behavior in School-aged Children (HBSC) study - a WHO collaborative cross-national survey. Five thousand seven hundred and seventy six randomly selected students aged 11, 13, and 15 years of age answered questionnaires in the classroom in 108 schools located in different regions in Lithuania in March-April of 2006. Questions on perceived health and health related behaviors were addressed to the respondent (response rate was 95 %). 5632 questionnaires were selected for further analysis by the international data center in Bergen. SPSS version 11.5 and multilevel analysis program MLwiN 2.0 was applied for statistical analysis of data. Relatively minor inequalities in health and health behavior were established when comparing different health and health behavior indicators in Lithuanian, Polish and Russian school-aged children in Lithuania. These disparities are lower in comparison with differences, which were established among respondents of HBSC international studies. Odds ratios to have negative self-rated health evaluation were higher in girls of Russian (OR=1.71, $p<0.05$) and Polish (OR=1.62, $p<0.05$) nationality. Therefore, Russian and Polish students were tending to have higher odds ratios for perception of happiness ($p<0.05$). Respondents of Russian nationality have expressed less somatic and psychological complaints. Polish boys (OR=1.38, $p<0.05$) were tending for higher prevalence of headache, but have expressed fewer complaints for depression (OR=0.65, $p<0.05$), anxiety (OR=0.71, $p<0.05$). Chances to be involved in risk taking behaviors (alcohol consumption, smoking, drug use) were lower among Polish and Russian respondents. In schools with Lithuanian language based-school, health and health behavior indicators were more negative in Polish and Russian respondents in comparisons with their Lithuanian peers. However, Lithuanian students, who were enrolled in Russian and Polish schools, tending to have better perceived health evaluation and better health behavior in comparison with their peers of Polish and Russian nationality. Analysis shows, that Polish and Russian students are integrated well into Lithuanian society and being a member of the minority class is not related to poor health or negative lifestyle. Therefore, with few exceptions universal health promotion programs should be provided to school-aged children of all ethnicities and cultural backgrounds.

Keywords: Adolescents • Ethnicity • Self-rated health • Health behavior • Inequalities

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1. Introduction

Health inequalities, which are dependent on social class and place of residence, were analyzed extensively in many countries worldwide including Lithuania during the last decades [1-4]. Therefore, as the result of the postwar European divisions and political sensitivity of the problem, significantly smaller attention was paid by researchers for investigation and getting deeper insight into health

and behavioral issues in context of ethnicity, racial features or religion.

Recently health strategies have been more focused on childhood and adolescent years – the time when behavioral determinants of non-communicable diseases such as problems of maturation, school health issues such as harmful forms of behaviors (smoking, alcohol and drug use, unbalanced nutrition, accidents, violence) start to rise [5,6]. International comparison of some behavioral health indicators (smoking, alcohol and drug

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use, early sexual involvement, bullying at school, and perceived health and perceived happiness evaluation) gave evidence that health related behavior of Lithuanian school-aged children is unsatisfactory [7,8].

Several European studies, such as HBSC or ESPAD, have demonstrated large variety of prevalence in health behaviors among the youth in the different countries in Europe [7,9]. Twofold and even fourfold difference in prevalence of smoking, alcohol use, physical activity, perception of self-rated health and life satisfaction were established among the countries. Analysis points to the idea of an existing similarity in health behaviors and an even smaller probability of such similarities when comparing nutrition, alcohol consumption behaviors between distant regions such as Southern Europe, Nordic countries or Central/East European Countries. Today researchers pay special attention to the various aspects of globalization and also on issues of migration, cultural diversity and health disparities, which are related to ethnicity. Evidence from many countries indicate an existing significant trend of disappearing cultural, social and health behavior disparities between minorities and the majority population as the result of integration and acculturation. Young children are more likely to be incorporated into a community because of the ease of integration [10]. This is why our investigation of health in ethnic minorities provides more evidence in filling the gap about health behaviours of school-aged children. This also contributes to better understanding the rapid changes in social and behavioural determinants of health in Lithuania.

Lithuania is currently a multiethnic society. The Lithuanian population constitutes the majority of its composition (84.3%) and Polish (6.2%), Russian (5.0%) ethnic groups are the largest ethnical minorities according to the Resident's register data [11]. In our research we have focused our efforts on school-aged children of three nationalities in schools: Lithuanian, Polish and Russian teaching languages.

The major aim of our research analysis was to compare and get deeper insight into issues of the health and health behavior inequalities among Lithuanian, Polish and Russian school-aged children from a national and international perspective.

2. Material and Methods

2.1. Study population and survey procedures

Our research was carried out in the framework of Health Behavior in School-Aged Children (HBSC) study, which was initiated by WHO. All survey procedures

(sampling, elaboration of survey instrument, conducting questionnaire survey, data collection and management) were developed and carried out according to international protocol [12]. The questionnaire survey was conducted among the national representative sample of 11, 13, and 15-year-old school-aged children during the months of March and April of 2006. A stratified cluster sampling design was applied, in which schools and school classes were used as sampling units. Samples of students were drawn to be representative by age, gender, place of residence (urban and rural) and teaching language at school in five regions of the country. Recommended sample sizes were at least 1500 students per age group. In order to achieve a relevant representation of national minorities, the schools from municipalities of ethnically diverse regions in Eastern part of Lithuania, were involved in the survey. In total 108 schools with 307 classes of students were covered by the study.

Quality of data collection was ensured and HBSC protocol was followed strictly. The investigation was conformed to the principles outlined in the Declaration of Helsinki. Survey permission was approved by the Ministry of Education as well as by Kaunas regional committee for biomedical ethics. Specially trained personnel, teachers, and school nurses administered the completion of questionnaires in school classrooms. The survey was anonymous. The completed forms were collected in individually sealed envelopes.

In total, 5,746 questionnaire forms were collected. It constituted 95% of all selected sample subjects. Upon the completion of the fieldwork, the data were prepared using standard documentation and submitted to the HBSC International Data Bank at the University of Bergen in Norway. The analysis presented here is based on the total number of 5632 records selected by quality criteria of the international HBSC database.

2.2. Questionnaire and variables

Topics of Questionnaire and separate items for HBSC surveys were discussed and approved by the international experts involved in HBSC. Lithuanian national questionnaire was adopted after the translation of questionnaire from the Standard English version into the Lithuanian language and retranslation it to English.

Two independent variables were used in our analysis: 1) ethnicity declared by the respondent in the questionnaire (Lithuanian, Polish, Russian); and 2) teaching language at school. Also we applied such independent variables as gender and the age group in our analysis.

A set of health and health behavior indicators was used as dependant variables. For evaluation of self-rated health a question „Would you say your health is?”

Table 1. Distribution of respondents in questionnaire survey by nationality (Lithuanian Russian, Polish) in schools with different teaching languages.

Teaching language at school	Number (percentage)			Total
	Lithuanians	Russians	Poles	
Lithuanian	4832 (97.5)	45 (0.9)	80 (1.6)	4957 (100)
Russian	50 (15.9)	228 (72.6)	36 (11.5)	314 (100.)
Polish	10 (3.6)	1 (0.4)	264 (96.0)	275 (100)
Total	4892 (88.2)	274 (4.9)	380 (6.9)	5546 (100)

was included. One out of four categories of answers (“excellent“, “good“, “fair“, “poor“) were offered to the respondent. In further analysis we have merged two positive categories into “good health“ and two latter more negative categories into „poor health“. Life satisfaction was rated by selecting proper category from 11 grades scale (from 0 “worst possible life“ to 10 “best possible life“). In our analysis numerical values of 0 to 6 were attributed to “low life satisfaction“, grades 7-10 as “high life satisfaction“. Questions about experiencing the following symptoms and complaints were included: headache, stomach-ache, back ache, feeling low, irritability and bad temper, feeling nervous, difficulties in getting sleep, feeling dizzy. It was defined that “frequent complains“ are in case they occur “about every week“, “more than once a week“ or “about everyday“.

Substance use such as tobacco smoking, alcohol and drug use was also covered by questionnaire. Current smoking was categorized into three categories: smoking “everyday“, “at least once a week but not every day“ and “less than once a week“. Respondents who used alcohol “every week“ or “every day“ were analyzed as “regular alcohol users“. To the category of “drug users“ all respondents, who answered positively at least one of the questions on cannabis, glue or solvents and other possible drugs use in life, were attributed.

As the indicator for balanced or unbalanced nutrition the consumption of the followings foods items were analyzed: fruits, vegetables, sweets (candies and chocolate), cakes and biscuits, coke or soft drinks that contain sugar, potato chips, fast food (hamburgers, hotdogs). Adolescents who consumed the previously mentioned food products “2-4 days a week“ or more frequently were considered as a “frequent users“, the rest as an “infrequent users“.

Two criteria for insufficient physical activity were applied for evaluation of physical fitness: 1) involvement in intensive physical exercises less than 2 hours a week; or 2) being physically active for a total of at least 60 minutes per day for less than 5 days a week.

To the group of “high suicidal risk“ were attributed the respondents who have answered positively about attempts of suicide in the past, or were planning to commit suicide, or who had often thinking about suicide.

For evaluation the extent of bullying problem at school 2 questions were addressed for the students: 1) How often have you been bullied at school in the past couple months? 2) How often you taken part in bullying another student(s) at school in the past? Frequency of “2-3 times a month“ or more often were classified as a “frequent bullying“ at school.

2.3. Statistical analysis

Two types of analysis were performed in our research. The first had focused its attention on individual variation and the second has considered both - an individual and a school (as a group) variation.

For individual variation analysis we used SPSS for Win (version 11.5) statistical package [13]. Z and χ^2 tests were applied for evaluation of statistical hypotheses on difference in distribution of variables between groups of respondents. The level of statistical significance was established as $p < 0.05$.

For two-level analysis (individuals and schools) multilevel statistical packages MLwiN 2.0 was adopted [14]. Multilevel logistic regression analysis was performed and coefficients of logistic regression as well as odds ratio was calculated. Both variations of dependant variables in individuals and in schools with different teaching languages were evaluated by this technique.

Direct standardisation procedure was applied for comparison of international data by taking into consideration the equal number of respondents aged 11, 13, and 15 years in the population surveyed.

3. Results

Five thousand six hundred seven (99.6%) respondents have indicated on their nationality in 2006 Lithuanian HBSC survey: 4891 (87.2%) were Lithuanians, 274 (4.9%) – Russians, 380 (6.8%) – Polish. Only 61(1.1%) reported other nationality, this is why only 3 major ethnical groups were involved in our analysis (Table 1).

We have analyzed 10 health and health complaint indicators (Table 2) and 20 other health behavior parameters (Table 3). Odds ratios for these indicators

Table 2. Odds ratios for ten indicators for self-related health, life satisfaction or health complaints by nationality and gender.

Indicators for self related health, life satisfaction or health complaints		Gender	Odds ratio (OR) adjusted by age		
			Lithuanians	Russians#	Poles#
Self-related health and life satisfaction					
1.	Poor self-related health	Boys	1	0.96	0.91
		Girls	1	1.71*	1.62*
2.	Low life satisfaction	Boys	1	0.67*	0.82
		Girls	1	0.78	0.70*
Multiple health complaints					
3.	Headache complaints	Boys	1	0.70	1.38*
		Girls	1	1.08	1.05
4.	Stomach-ache complaints	Boys	1	0.37*	1.31
		Girls	1	1.28	1.36
5.	Back ache	Boys	1	0.70	1.10
		Girls	1	0.79	0.91
6.	Feeling dizzy	Boys	1	0.64	1.22
		Girls	1	1.35	0.91
7.	Feeling low	Boys	1	0.87	1.09
		Girls	1	0.84	0.65*
8.	Irritability or bad temper	Boys	1	0.87	0.97
		Girls	1	0.79	0.71*
9.	Feeling nervous	Boys	1	0.88	0.97
		Girls	1	0.89	0.83
10.	Difficulties in getting sleep	Boys	1	0.74	1.34
		Girls	1	0.55*	1.01

Compared with Lithuanian respondents

* Statistically significant ($p < 0.05$)

of Polish and Russian respondents were calculated and compared with Lithuanian students as a reference group. Only statistically significant differences ($p < 0.05$) were counted as important and analyzed.

Data from Table 2 show that in Russian and Polish girls chances for negative self-related health evaluation were statistically higher. However, opposite ratio of proportions was observed, when we made comparison of other health indicator -“life satisfaction”: Russian and Polish respondents of both genders had better perceived feeling of life satisfaction ($p < 0.05$ in Russian boys and Polish girls). In addition, Polish and Russian students have expressed less complaints on stomach aches ($p < 0.05$ for Russian boys) on “feeling low”, “irritability and bad temper” ($p < 0.05$ for Polish girls), “feeling nervous” or less “difficulties in getting to sleep” ($p < 0.05$ for Russian girls). On another hand, Polish boys were tending for higher frequency of headache in comparison with Lithuanian peers.

It was observed higher odds ratios for consumption of fruits among Russian girls and boys (Table 3). In addition Russian boys were tending for more frequent consumption of vegetables ($p < 0.05$). However, they

have reported more frequent use of sweets and potato chips. Similarly, Polish girls reported higher rates of fruit consumption as well as sweet use. Polish girls and boys were also more exposed to unhealthy nutrition behavior such as eating of “fast food” ($p < 0.05$ for girls) and consumption of potato chips ($p < 0.05$ for boys).

Substance use behaviors (smoking, alcohol and drug use) were more moderate in Russian and Polish school-aged children in comparison with Lithuanian respondents. It was observed that Polish boys ($p < 0.05$) were less frequently involved in bullying to others, also Polish girls ($p < 0.05$) were reported bullied less frequently by their peers.

Multilevel logistic regression analysis was performed in order to analyze relation between nationality, language of teaching at school and health behaviors. We have hypothesized about differences in psychosocial environmental of schools with Lithuanian, Polish and Russian teaching languages as possible reason for inequalities in health and health behavior. Table 4 presents such examples of our analysis, which illustrate calculation framework for the question “Have you ever smoked tobacco?” Parameter Ω_u shows the variance of

Table 3. Odds ratios for twenty health behavior indicators by nationality and gender.

Health behavior indicators	Gender	Odds ratio (OR) adjusted by age		
		Lithuanians	Russians#	Poles#
Nutrition behaviors				
1. Frequent consumption of fruits	Boys	1	2.33*	1.35
	Girls	1	1.75*	1.79*
2. Frequent consumption of vegetables	Boys	1	1.45*	1.27
	Girls	1	0.99	1.03
3. Frequent consumption of sweets (candy or chocolates)	Boys	1	1.59*	1.14
	Girls	1	1.00	1.41
4. Frequent consumption of Coke or other soft drinks that contain sugar	Boys	1	0.92	1.14
	Girls	1	1.18	1.16
5. Frequent consumption of cakes and pastries	Boys	1	1.37	0.89
	Girls	1	1.26	1.20
6. Frequent consumption of chips	Boys	1	0.60*	1.41*
	Girls	1	0.96	1.21
7. Frequent consumption of fast food (hamburgers, hotdogs)	Boys	1	1.34	1.65*
	Girls	1	1.36	2.47*
Physical activity				
8. Insufficient physical activity (<5 days a week)	Boys	1	0.94	1.13
	Girls	1	1.23	1.04
9. Insufficient physical activity(<5 hours a week)	Boys	1	0.81	0.94
	Girls	1	1.20	1.27
Substance use: tobacco smoking, alcohol, drugs				
10. Tried smoking	Boys	1	0.43*	0.53*
	Girls	1	0.70	0.63*
11. Smoking	Boys	1	0.50*	0.74
	Girls	1	1.33	0.83
12. Weekly any alcohol drinking	Boys	1	0.85	0.89
	Girls	1	1.23	0.97
13. Weekly beer drinking	Boys	1	1.04	1.25
	Girls	1	1.44	1.11
14. Weekly alcopops/cider drinking	Boys	1	0.78	0.52*
	Girls	1	0.63	0.90
15. Drunkenness at least twice	Boys	1	0.74	0.77
	Girls	1	1.20	0.98
16. Lifetime use of any drugs(only for 15 years olds)	Boys	1	0.89	0.71
	Girls	1	1.52	0.76
Risk behavior: early sexual activity, bullying at school, suicide risk				
17. An early sexual activity (only for 15 years olds)	Boys	1	0.90	0.90
	Girls	1	1.31	1.57
18. Regular experience of being bullied	Boys	1	0.79	1.03
	Girls	1	0.98	0.71*
19. Regular experience bullying others	Boys	1	0.85	0.72*
	Girls	1	1.50	1.06
20. High suicide risk	Boys	1	1.05	0.74
	Girls	1	1.19	0.60

Compared with Lithuanian respondents

* Statistically significant ($p < 0.05$)

Table 4. Analysis of data of respondents, who “tried smoking” by nationality and teaching language at school: results of multiple regression analysis.

	Model 1: by nationality	Model 2: by teaching language at school	Model 3: by nationality and teaching language at school
Ω_u	0.171(0.038)*	0.144(0,034)*	0.146(0.035)*
β_0	-0.841(0.076)*	-0.795(0.074)*	-0.803(0.075)*
β_k :			
Nationality (Lithuanians as a reference group):			
Russians	-0.379(0.184)*		0.214(0.240)
Poles	-0.350(0.173)*		0.255(0.241)
Teaching language at school (Lithuanians as a reference group):			
Russians		-0.850(0.198)*	-1,027(0.264)*
Poles		-0.753(0.220)*	-0.990(0.315)*
Gender (boys as a reference group):			
Girls	-0.851(0.064)*	-0.855(0.064)*	-0.856(0.064)*
Age (11 year olds as a reference group):			
13 years old	1.473(0.076)*	1.477(0.076)*	1.479(0.076)*
15 years old	2.646(0.084)*	2.655(0.084)*	2.658(0.084)*

Ω_u – variation between schools, β_0 – null coefficient, β_k – coefficients of variables listed below (standard deviations in brackets)

* Statistically significant ($p < 0.05$)

health behaviors among the schools and, specifically in this example, indicates on considerable difference among schools in percentage of respondents who reported “ever smoked tobacco” in their life. Coefficient β_0 shows on high prevalence of smoking among school-aged children.

Three models are presented in the Table 4. The first model is quite identical to one-way analysis. Only one independent variable – ethnicity – is used in this model and also gender variable is involved as covariance. Analysis of these data indicate that respondents from Russian and Polish schools in comparison with Lithuanian schools had less opportunities for smoking initiation (negative coefficient shows such relation). The second model relates type of school with smoking initiation. Also this model indicates a correlation to the type of school (specifically Russian and Polish) with fewer chances for smoking initiation. Third model includes both variables – ethnicity and language at school. In this combination language at school becomes the most important determinant for smoking initiation.

Table 5 involves conclusive data of multilevel analysis of all 30 health and health behavior indicators. Lithuanian respondents, who were enrolled in schools with Lithuanian teaching language, were selected as a reference group.

In schools with Lithuanian teaching language health and health behavior indicators were more negative in

Polish and Russian respondents in comparisons with their Lithuanian peers. Russian students in Lithuanian schools were less susceptible to bullying, had more positive nutrition behaviors (more frequent use of fruits, less frequent use of potato chips). However, they were more exposed to alcohol consumption and more risk for attempts of suicide. Polish students in schools with the Lithuanian language being taught, had more negative than positive health behaviors in comparison with Lithuanian peers: had lower perceived health evaluation, were exposed for more frequent alcohol consumption.

In contrast, Lithuanian students in Polish and Russian schools have demonstrated healthier lifestyles: they are less likely to start smoking, use alcohol or be exposed for health complaints. In Russian schools Lithuanian students were less frequently exposed to be bullied, lower risk for attempt of suicide, in Polish schools – less probability to start early sexual involvements. Only few negative health behaviors were established for Lithuanian students in schools with Russian teaching language – higher probability to use drugs and also to consume fast food. We also noticed that in Polish schools students of other ethnical groups (Lithuanians and Russians) were exposed to more healthy conscious environments overall.

Table 6 presents comparative data on such health indicators as self-rated health, life satisfaction, substance use (smoking, alcohol use) among three major ethnic

Table 5. Odds ratios for health behavior indicators by nationality and teaching language at school*.

Teaching language at school	Nationality of the respondent		
	Lithuanians	Russians	Poles
Lithuanian	(as a reference group)	Positive differences: <ul style="list-style-type: none"> • Lower probability for being bullied (OR=0.64) • Lower probability to eat fruits often (OR=1.79) • Lower probability to eat chips often (OR=0.60) Negative differences: <ul style="list-style-type: none"> • Higher probability to be drunken two or more times (OR=1.80) • Higher probability for suicidal risk (OR=2.22) 	Negative differences: <ul style="list-style-type: none"> • Higher probability for to be drunken two or more times (OR=2.15) • Higher probability for poor self-health evaluation (OR=1.55) • Higher probability for sleeping disorders (OR=1.63)
Russian	Positive differences: <ul style="list-style-type: none"> • Higher probability for life satisfaction (OR=1.89) • Lower probability to start smoking (OR=0.36) • Lower probability for high suicidal risk (OR=0.39) • Lower probability to be drunken two or more times (OR=0.40) • Lower probability to have backache (OR=0.53) Negative differences: <ul style="list-style-type: none"> • Higher probability to try drugs (OR=2.54) • Higher probability to eat fast food (OR=2.84) 	Positive differences: <ul style="list-style-type: none"> • Higher probability to eat fruits often (OR=2.08) • Lower probability to start smoking (OR=0.44) • Higher probability for life satisfaction (OR=1.61) 	Positive differences: <ul style="list-style-type: none"> • Higher probability for life satisfaction (OR=2.00) • Lower probability to start smoking (OR=0.46) • Lower probability for suicidal risk (OR=0.35) • Higher probability to have insufficient physical activity (OR=1.75) Negative differences: <ul style="list-style-type: none"> • Higher probability to try drugs (OR=2.24) • Higher probability to use fast food (OR=3.94) • Higher probability for early sexual activity (OR=3.32)
Polish	Positive differences: <ul style="list-style-type: none"> • Lower probability to start smoking (OR=0.37) • Lower probability for current smoking (OR=0.44) • Lower probability to be drunken two or more times (OR=0.29) • Lower probability for sleeping disorders (OR=0.61) • Lower probability for early sexual activity (OR=0.44) 	Positive differences: <ul style="list-style-type: none"> • Lower probability for eating fruits (OR=2.63) • Lower probability to start smoking (OR=0.46) • Lower probability for current smoking (OR=0.51) • Lower probability to be drunken two or more times (OR=0.52) • Lower probability to try drugs (OR=0.52) • Lower probability for early sexual activity (OR=0.28) • Lower probability for sleeping disorders (OR=0.56) Negative differences: <ul style="list-style-type: none"> • Higher probability to eat sweets (OR=1.79) 	Positive differences: <ul style="list-style-type: none"> • Lower probability to start smoking (OR=0.48) • Lower probability for current smoking (OR=0.54) Negative differences: <ul style="list-style-type: none"> • Higher probability to use fast food (OR=2.09)

* Odds ratios of Russian and Polish respondents are compared with the data of Lithuanian students, who are enrolled in schools with Lithuanian teaching language. ($p < 0.05$)

Table 6. Percentage of respondents by country and nationality, who reported negative perceived health, poor life satisfaction, smoking and episodes of drunkenness in Lithuania, Poland, Russia and among Lithuanian, Polish and Russian school-aged children in Lithuania.

Country/Nationality	Boys		Girls	
	HBSC international data by country	HBSC Lithuanian data by nationality	HBSC international data by country	HBSC Lithuanian data by nationality
Negative self-rated health evaluation				
Lithuania/Lithuanian	14.7	14.8	21.7	20.5
Russia/Russian	21.8	14.3*	30.6	30.3#
Poland/Polish	11.2	13.8	17.1	29.7#*
Poor life satisfaction				
Lithuania/Lithuanian	29.7	30.4	31.6	32.4
Russia/Russian	28.6	22.5#*	32.2	27.1*
Poland/Polish	25.5	26.6	31.7	25.7#*
Smoking				
Lithuania/Lithuanian	17.3	17.9	12.5	12.5
Russia/Russian	18.8	10.4#*	17.1	15.1
Poland/Polish	13.5	16.0*	11.5	10.9
Have been drunken two or more times				
Lithuania/Lithuanian	28.8	29.2	22.3	22.3
Russia/Russian	21.7	24.5#*	19.1	24.2*
Poland/Polish	22.5	28.0*	14.5	22.4*

$p < 0.05$ comparing with respondents of Lithuanian nationality, z test.

* $p < 0.05$ comparing with the respondents in Lithuania, z test.

groups in Lithuania and also provides country data on these indicators in Lithuania, Poland and Russia. It is evident that the percentage of respondents with low self-rated health was higher in Russia for both genders. Therefore, only Russian female students from Lithuania had similar quite low self-rated health level as their peers in Russia. Life satisfaction figures were similar in three countries. However, Russian and Polish students in Lithuania ($p < 0.05$ for Polish and Russian girls) had satisfaction higher satisfaction with life than Lithuanian peers.

Russian boys in Lithuania reported lower smoking frequency than their peers in Russia. In contrast, Polish boys in Lithuania were smoking more in comparison with their peers in Poland. Data on smoking among girls were more homogeneous and did not show significant differences both among the countries and among three Lithuanian ethnical groups.

Drunkenness prevalence was quite similar among three major Lithuanian ethnic groups. However, significant difference was established between percentages of drunkenness in comparison of Polish students in Lithuania with students in Poland (28.0% vs 22.5%, $p < 0.05$ for boys; 22.4% vs 14.5%, $p < 0.05$ for girls). Similarly, drunken behaviors were more prevalent in Russian students in Lithuania than among respondents in Russia.

4. Discussion

We hypothesized that health and health behavior could be related not only to ethnicity, but also with psychological and social environments such as school. Our research analysis showed that environmental determinants and school factors (it relates to a sense of community and community empowerment) could play an important role. This phenomenon was investigated by a modern statistical tool - multilevel modeling. The results of our analysis indicate that some health inequalities between three national groups of school-age children exist. In addition, some disparities inside schools with Lithuanian, Polish and Russian speakers could be observed. For example, one-way analysis showed that substance use behaviors (smoking, alcohol use) were more prevalent in Lithuanian respondents in comparison with Polish and Russian students in Lithuania. Therefore, after substance use behaviors by school type variable (language taught at school) was analyzed, it occurred that such statement is not the universal and could be applied only for schools with Polish and Russian teaching language. In contrast, for schools with Lithuanian teaching language the opposite statement was suitable – Polish and Russian students in schools with Lithuanian language were more exposed to smoking and alcohol. Such phenomenon could be explained by influence of multiple contexts;

better consolidation of communities of ethnic minorities, higher community empowerment and larger attention to health and health literacy issues at school and at home [15].

Health and health behavior inequalities were analyzed also in our previous investigations in the framework of HBSC surveys of 1994 and 1998 [16]. Therefore, these early studies based its focus on non direct self-reporting of ethnicity - only type of schools was included as an independent variable. These previous investigations of 1994-1998 also showed only small extent disparities among students of schools with Lithuanian, Polish and Russian teaching languages in Lithuania.

We have applied in resent studies, the method of parallel comparison of health behavior differences in Lithuanian, Polish and Russian school-aged children in Lithuania and comparison of the same indicators between the countries – Lithuania, Poland and Russia. This method provides more ground for answer the question - does ethnicity (traditions, mentality etc.) make the major contribution for the existing health disparities? Health behavior indicators which had large variations between the countries were analyzed. Our investigation showed that inequalities in health behavior of three ethnic groups (Lithuanian, Polish and Russians students) in Lithuania are smaller than health behavior differences of HBSC study respondents between the countries - Lithuania, Poland and Russia. This assumption gives an idea that other important determinants such as economic conditions and integration of ethnical minorities to Lithuanian society plays an important role in narrowing gap of health inequalities of school-aged children in the country.

Very few investigations were conducted in Central and Eastern Europe about health inequalities between ethnic groups until now. Similar studies were carried out among Serbian, Romanian, Croatian, German and Hungarian ethnic groups in South-Eastern region of Hungary. The authors of this study have concluded that self-reported health evaluation is determined by age, education, chronic disease status and also ethnicity [17]. Other investigators from United States, United Kingdom also confirmed the importance of social, economical and ethical factors for development of such health conditions as being overweight and other health behaviors such as smoking in school aged children. Higher probability for being overweight was established in students of American Indian origin, Indian/Pacific islanders, black race, or Hispanic origin in study in California [18] and in Bangladeshi, Indian and Pakistani boys in London [19]. Ethnic minority status, non-metropolitan residence, lower socioeconomic status and other determinants were established as predictors of obesity in children

aged 10-17 years in National Study of Children's Health in United States [20].

Researchers devote much attention a phenomenon called the "healthy migrant effect" [21]. In Lithuania, this concept is not applied, because of the difference in ethnic groups that make up the entire populous. However, this phenomenon is in the scope of researchers and is interesting and necessary for a more in-depth future investigation, because it provides some hypothesis as to why ethnic health disparities occur and reoccur. We do in fact use this phenomenon for reference because in our study some health and behavior indicators (low life satisfaction, smoking and alcohol use) were more favorable in ethnical minority groups in comparison with Lithuanian school-aged children.

Some similar findings were established by American researchers. They concluded that smoking was less prevalent among black school-aged children [22]. Therefore, the authors of this research attribute such phenomenon with non-ethnical determinants but indicate that more common factors (smoking of parents, peer pressure, child problem behavior, ineffective parenting) than unique factors predict smoking initiation among adolescents of different ethnicity. This is why these researchers suggest to provide universal anti-smoking interventions rather than to conduct special ethnically oriented interventions.

A different approach in explaining differences in smoking behavior was adopted by other researchers from United States. Lower prevalence of smoking among adolescents of Japanese and Chinese origin in Hawaii Islands was established [23]. This phenomenon was explained by a higher sense of coherence in respondents from these ethnic groups. Such statements expand the understanding of ethnicity and provide some more explanation of mechanism how ethnicity acts through attitudes and motivation.

Our research is a part of an international collaborative HBSC cross-country study. Strengths of the current research design are related with representativeness of the samples of 11, 13 and 15-year-old school children selected and high participation rate. In school year 2005/2006 91.3% of students were enrolled in schools with Lithuanian teaching language, 5.1% - in Polish and 3.6% - in Russian schools [24]. This is why we consider that our sample, which involves 89.3% of Lithuanian respondents, 5.7% Russian students and 5.0% Polish students, represents well three major ethnical minorities by language at school and by overall ethnical composition of the country. Percentage of respondents by gender was also taken into account and its variations in ethnical groups were not significant.

Another advantage of this study is the application of standardized methods including HBSC questionnaire, which was developed by international experts and involves questions that are important for this analysis such as ethnicity of the respondent and teaching language at school. Combination of two modern statistical methods we applied have resulted in providing deeper insight about health and health behavior disparities in school-aged children in major ethnic groups in Lithuania. The results of this study are a step forward in filling the gap of mapping and understanding health inequalities in context of ethnicity in Central and Eastern Europe.

Some limitations of this study are related to questionnaire survey and its validity. It is possible that an inherent problem when using self-reported data on substance use could lead to biased results. Some studies have demonstrated that there is tendency to under-report when asking questions on such sensitive risk taking behaviors as substance use, bullying at school, early sexual involvements [25]. To deal with this source of potential bias of self-reporting we made all possible efforts to guaranty anonymity of responses. Underreporting could occur also due to low participation rate. However in our survey overall response rate was 95 percent. This is why this is not a plausible reason for underreporting. Also we could mention such limitations of our study, which are related with the selected age range of respondents. We can not state that age groups of 11, 13 and 15-year old children represent the whole population of 6-19 year students, who are attending primary and secondary schools in the country. Regardless of the above mentioned and other possible limitations, such a study is important because it provides basic data that may guide the development of policy and interventions in tackling health inequalities among ethnical groups in Lithuania and other European countries.

Some health behavior inequalities, which were established (smoking initiation, alcohol use, self-rated health, life satisfaction) are not large and may be determined by other multi-contextual factors and by specific psychosocial environmental at these schools. These established inequalities are of less extent than

health and health behavior differences we opened in the international comparison between students of Lithuania, Poland and Russia. Our investigation have demonstrated that health perceptions and health behavior of students of Lithuanian nationality, who are enrolled in schools with Russian and Polish teaching language is often more positive in comparison with their peers of other nationality. In contrast, students of Polish and Russian nationality, who are enrolled in schools with Lithuanian teaching language, have demonstrated less positive health perception and less positive health behavior in comparison with their Lithuanian peers at the school.

Research evidence from other studies shows that universal health promotion and disease prevention programs could be effective enough [15,22]. Therefore, deepening the insight into the issues of ethnicity, improving the ethnical sensitivity, awareness and provision of special literature in their national languages for ethnical minorities could increase the quality and effectiveness of the health interventions [26]. This is why our research could have practical implications in promoting the development of policy and strategies for health promotion activities in multiethnic communities.

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