SOCIOECONOMIC STATUS, HEALTH RELATED BEHAVIOUR, AND SELF-RATED HEALTH OF CHILDREN LIVING IN ROMA SETTLEMENTS IN HUNGARY

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SUMMARY

Objective: The poor health of Roma is well documented, but there is only limited data regarding the health of Roma children. The aim of this study was to describe the socioeconomic status, health related behaviour, and health of children living in segregated Roma settlements, and to compare the data with that of non-Roma children.

Methods: In March–April of 2011, a cross-sectional questionnaire-based survey among 11-year-old (211 boys and 252 girls) and 13-year-old (205 boys and 247 girls) children living in Roma settlements was performed (response rate: 91.5%). These data were compared with data from the Health Behaviour in School-Aged Children (HBSC) survey carried out in 2009/2010.

Results: The parents of Roma children were substantially less educated and less likely to be actively employed, and Roma children reported lower material welfare than non-Roma ones. The prevalence of consuming sweets and soft drinks at least 5 times per week was 1.5−2 times higher among Roma children. The prevalence of regular intense physical activity was higher at the age of 13 years among Roma boys, while physical inactivity was substantially higher in both age groups among Roma girls. Almost one quarter of Roma children and approximately 14% of non-Roma children had tried smoking at the age of 11. More Roma boys tried alcohol at the age of 11 than non-Roma ones. One in ten Roma children was obese in both age groups. The self-rated health status of Roma children was worse than that of non-Roma children.

Conclusions: Children living in Roma settlements reported poorer socioeconomic conditions, higher consumption of sweets and soft drinks, earlier smoking and alcohol initiation, and worse self-rated health, but with some exceptions do not differ in fruit or vegetable consumption and BMI from general child population. To promote health of children living in Roma settlements, a multi-sector approach, special health education, plus social and health promotion programmes are needed.

INTRODUCTION

Roma are the largest ethnic minority group, and depending on the source (many Roma do not indicate themselves as Roma in official censuses, while Roma organizations frequently overestimate their number) there are an estimated 11−15 million individuals in the European Region (1). The number of Roma is highest in Romania (approximately 1.2–2.5 million, 8.3% of the population) and Bulgaria (700,000–800,000, 10.3% of the population), while in Hungary the Roma population accounts for approximately 7.05%

(400,000–1,000,000) of the total population, and their number is continuously increasing (1). It is well known that the health status of an individual is determined not only by genetics, physical environment and the access and use of the health care system, but also by the social environment (2−4). In most of central, eastern and southern Europe, the Roma population lives in poor conditions (e.g., poorly-equipped and crowded houses without tap water, heating or electricity), and in some areas in segregated settlements (5, 6). The proportion of Roma population living in segregated conditions varies in different countries, e.g. in Hungary it is 20–26% (4).

Nevertheless, the European Union will need to assess the Roma population, especially their health problems, because of their increasing population, which is occurring mainly in the post-communist countries. The severity of this problem was recognized by Hungary and other central and eastern European countries before they joined the European Union, and an international regional conference was held in 2003 in Budapest entitled "Roma in an Expanding Europe: Challenges for the Future." This launched the development of a European Union-wide 10-year programme called the Decade of Roma Inclusion 2005–2015 (7). In Hungary, several programmes were compiled and launched that aimed to improve their housing and environment, as well as to sell off the Roma settlements and to promote their lifestyle. A new long-lasting comprehensive programme entitled "Hungarian National Social Inclusion Strategy – Extreme Poverty, Child Poverty, Roma (2011–2020)" was prepared in accordance with the document "An EU Framework for National Roma Integration Strategies up to 2020" that was published by the European Commission (1). Although many policy initiatives have been designed over the past two decades to tackle Roma's adverse social conditions in central and south-eastern Europe, they have had limited success (8, 9).

Although morbidity and mortality data regarding the health of Roma are often insufficient due to missing records on ethnic status, some recent studies from Bulgaria and Serbia have shown that their mortality is significantly higher compared to the general population or to other ethnic/religious groups, furthermore, excess mortality has been observed for every cause of death examined (10, 11). These results have strengthened the estimation that life expectancy for Roma is shorter compared to the general population (12). The discrepancy in morbidity and mortality can be explained by the socioeconomic status and behaviour of people living in Roma settlements in Hungary (13, 14).

The gap between the health status of Roma and non-Roma populations can be observed even in early childhood. Preterm birth and/or low birth weight, as well as infant mortality, are higher in the Roma population than in the general population (15–17).

A comprehensive survey that takes complex lifestyle factors into consideration in Roma children is rare in the literature (18−21). Therefore, the aim of our study was to describe the socioeconomic status, health related behaviour, and self-rated health of 11 and 13-year-old children living in Roma settlements. Using the methodology of Health Behaviour in School-Aged Children Study (22) provides a unique opportunity to compare selected characteristics with those of peers from the general child population.

The Health Behaviour in School-Aged Children Study (HBSC) is a collaborative cross-national study launched in 1983 by the World Health Organization (WHO), which has been conducted in an increasing number of countries (43 at last count) every 4 years and collects data on the health, well-being, social environment and health behaviours of 11, 13 and 15 years old boys and girls across the WHO European Region and North America.

MATERIALS AND METHODS

We compared data from two surveys, conducted one year apart, which were based on the same internationally recognized methodology (23). The first was the HBSC survey of 2009/2010 including the school-aged population of Hungary (24). In Hungary the survey was led by the National Institute of Child Health (OGYEI – Hungarian acronym) in cooperation with the World Health Organization (25). The target populations were young people aged 11, 13 and 15, but in Hungary it was extended to schoolchildren aged 17. Cluster samplings were used where one sampling unit was a school class. In Hungary, the planned sampling frame was 2,000 pupils per age group. The response rate was 82.6%, a total of 8,114 pupils filled in the questionnaires and 8,096 (3,957 boys and 4,139 girls) were evaluated (25). The research was approved by the Scientific and Research Ethics Committee of the Medical Research Council. A detailed description of the study methodology is described elsewhere (26).

The second targeted survey (Roma HBSC) took place in the north-eastern part of Hungary with the highest Roma population density. This survey was conducted by our research team in March–April of 2011 among school-aged children living in segregated settlements in the following three counties: Borsod-Abaúj-Zemplén, Hajdú-Bihar and Szabolcs-Szatmár-Bereg.

Sampling and Data Collection among School-aged Population Living in Roma Settlements

Between 2001 and 2003, a detailed environmental survey was conducted in Hungary in the above mentioned three counties with the aim of identifying settlements (whose inhabitants are almost exclusively Roma) and ascertaining the number of people living in these settlements (4). Settlements identified in this environmental survey with capitation of at least 100 people formed the basis of the sampling.

The sampling frame of the research was provided by the number of pupils with mean ages of 11.5 and 13.5 (3,781 students) who lived in Roma settlements in three counties. The planned sample size was 1,000 pupils. Data collection was carried out in primary schools using a method similar to the HBSC research method.

During the first stage of sample selection we identified the schools where the number of pupils living in Roma settlements was high. An informative letter was sent to the school principals requesting their permission to conduct data collection. One thousand pupils were selected by a multistage, stratified (by counties and age groups) and random sampling procedure in these schools. Thus far, 915 (91.5%) questionnaires have been returned, and we have analysed the data from 463 11-year-old (211 boys and 252 girls) and 452 13-year-old (205 boys and 247 girls) pupils living in Roma settlements.

Questionnaire and Data Collection

We used the same questionnaires that were used in the 2009/2010 HBSC Hungarian national survey for children with mean ages of 11.5 and 13.5 years.

The questionnaire covers the following main subjects: demographic factors, social background and context, subjective health outcomes, and health behaviours including risk behaviours.

Questionnaires were filled either by pupils individually or in case of need via assisted administration by a trained interviewer in groups with a maximum of 3 pupils.

We sent an informative letter to the parents of the involved children to inform them about the purpose of the research and asked them to give their passive consent. The research was approved by the Regional and Institutional Ethics Committee of the University of Debrecen and by the Scientific and Research Ethics Committee of the Medical Research Council.

Measurements

We considered 11-year-old pupils to be those who were born between January 1, 1999 and December 31, 2000 and considered 13-year-olds to be those who were born between January 1, 1997 and December 31, 1998.

To describe the socioeconomic status of the pupils we analysed the following 4 factors: the educational status of their parents (primary education only versus university/academy); the employment status of the parents (both mother and father actively employed); and the material welfare of the family, which was measured by a summed score of the Family Affluence Scale (27) and then defined as low (0–3 points), medium (4–6 points) and high (7–9 points). The subjective rating of family wealth was measured by using the question 'How well off do you think your family is?' and the answer was rated as low (very bad or bad), average, or high (very good or good).

Eating habits were described by the consumption of fruits, vegetables, sweets and soft drinks in three categories: students who consumed them never or less than once a week, those who consumed them irregularly, and those who consumed them at least 5 times a week (regular).

Physical activity was analysed by the frequency of intense exercises performed out of school only. We formed the following three categories: pupils who exercised intensely regularly (at least 4 times per week) in addition to the physical education (PE) lessons at school; students who more rarely exercised but who exercised at least once a week; and those who never exercised or exercised intensely once per month only.

To determine the nutritional status of pupils based on their reported height and weight, we used the body mass index (BMI). Categories (underweight, normal, overweight, and obese) were classified according to the reference BMI-for-age tables suggested by the WHO (28, 29). We considered median BMI between −2SD and +1 SD for boys and girls as normal (for 11 years old boys 16.91–19.20 kg/m², for 11 years old girls 17.21–19.90 kg/m²; and for 13 years old boys 18.21–20.80 kg/m², for 13 years old girls 18.81–21.80 kg/m²), the ≤ −2SD as underweight (for 11 years old boys ≤ 16.90 kg/m², for 11 years old girls ≤ 17.20 kg/m²; and for 13 years old boys ≤ 18.20 kg/m², for 13 years old girls ≤ 18.80 kg/m²), between ≥+1SD and ≤+2SD as overweight (for 11 years old boys 19.21–22.50 kg/m², for 11 years old girls 19.91–23.70 kg/m²; and for 13 years old boys 20.81–24.80 kg/m², for 13 years old girls 21.81–26.20 kg/m²) and >+2SD as obese (for 11 years old boys ≥ 22.51 kg/m², for 11 years old girls ≥ 23.71 kg/m²; and for 13 years old boys ≥ 24.81 kg/m², for 13 years old girls ≥ 26.21 kg/m²).

Risk behaviours were examined using the frequency of trying tobacco, the frequency of smoking (regular smokers were those who smoked daily or more than once a week; irregular smokers were those who smoked once a week or less than weekly – occasionally). We also measured the frequency of trying alcohol and the occurrence of drunkenness.

Self-rated health was analysed with the question "What do you think of your health condition?" Three categories were made: excellent or good, fair, and poor.

Statistical Analysis

Data were stratified by gender in the two age groups. The following statistical parameters and procedures were used in the analysis: prevalence and distributions with 95% confidence intervals (CIs). Data were analysed by using the SPSS 15.0 (SPSS Inc., Chicago, IL, USA) software package.

RESULTS

Socioeconomic Characteristics

The parents of Roma children were substantially less educated and less likely to be actively employed compared to the sample from the general population (Table 1). Among the parents of Roma children, the proportion of actively employed fathers was substantially higher than that of mothers. The Roma children reported lower material welfare measured by both the objective scale – Family Affluence Scale (FAS) and the subjective perception of family wealth. The proportion of Roma families belonging to the low FAS category was more than twice as high, and their proportion in the lowest category of subjective financial status was more than four times higher than that of the families in the national sample.

Eating Habits, Physical Activity, BMI

The eating habits of Roma children were very unfavourable regarding the consumption of sweets and soft drinks (Table 2). Although approximately two-thirds of children in both age groups and in both populations consumed fruit every day, more Roma girls at age 11 reported lower fruit consumption. A large difference was observed between two population groups in the consumption of sweets and soft drinks. Among Roma children, the prevalence of regular (at least 5 times per week) consumption of sweets (11 years old boys 66.5%, 11 years old girls 71.4%; 13 years old boys 69.5%, 13 years old girls 75.7%) and soft drinks (11 years old boys 77.9%, 11 years old girls 71.2%; 13 years old boys 80.3%, 13 years old girls 80.7%) were one and a half and two times higher among children in the general population. In the Roma sample, more girls than boys reported regular sweets consumption.

Approximately half of the children in both populations (except the girls) reported performing intense physical activity regularly (daily or 4–5 times per week), and in both populations and in both age groups boys were more likely to report this than girls. Regular intense physical activity was more prevalent among the Roma boys aged 13, while among the Roma girls physical inactivity was higher in both age groups compared with non-Roma children.

Taking the BMI categories, the prevalence of obesity was higher among Roma girls in both age groups than in the general population. Approximately 20% of Roma children and children in the general population were overweight at age 11 years. Moreover, at both ages, one in 10 Roma children was obese.

Table 1. *Socioeconomic characteristics of children living in Roma settlements (Roma Children Health Survey 2011) and in general child population (Health Behaviour in School-aged Children – HBSC 2009/2010) in Hungary*

Characteristics	Children living in Roma settlements		General child population	
	11 years	13 years	11 years	13 years
	(n = 463)	(n = 452)	(n = 1,873)	(n = 1,905)
Education				
Only primary education of parents (8 years)	49.4[a] (46.0–52.7)	52.7[a] (49.3–56.1)	11.5[a] (9.2–11.5)	11.6[a] (10.2–12.4)
Vocational school	11.6[a] (9.3–14.2)	12.1[a] (9.9–14.8)	22.4[a] (22.5–26.5)	30.5[a] (28.8–32.3)
Secondary education	2.6[a] (1.6–4.1)	4.0[a] (2.7–5.8)	21.9[a] (20.0–23.8)	25.1[a] (23.5–26.8)
University education	0.6[a] (0.3–1.5)	0.6[a] (0.2–1.4)	25.5[a] (22.3–25.5)	25.7[a] (23.9–26.9)
Employment				
Actively employed fathers	37.6[a] (33.1–42.2)	43.3[a] (38.7–48.6)	84.3[a] (82.6–85.9)	82.1[a] (80.3–83.8)
Actively employed mothers	15.0[a] (11.9–18.7)	18.8[a] (15.4–22.8)	72.0[a] (69.9–74.0)	72.4[a] (70.3–74.4)
Family Affluence Scale (FAS)				
Low FAS	71.7[a] (67.3–75.7)	70.9[a] (66.4–75.0)	31.1[a] (29.0–33.3)	30.3[a] (28.3–32.5)
Middle FAS	24.6[a] (20.8–28.9)	22.4[a] (18.7–26.6)	50.5[a] (48.2–52.8)	51.3[a] (49.0–53.6)
High FAS	3.7[a] (2.2–6.0)	6.7[a] (4.7–9.6)	18.4[a] (16.7–20.3)	18.4[a] (16.7–20.2)
Perceived financial status				
Very bad or bad	17.4[a] (14.1–21.2)	14.9[a] (11.8–18.6)	2.4[a] (1.7–3.14)	3.6[a] (2.78–4.51)
Average	30.4 (26.3–34.8)	47.3 (42.7–52.1)	34.0 (31.9–36.2)	53.4 (51.1–55.7)
Very good or good	52.2[a] (47.6–56.9)	37.7 (33.3–42.5)	63.7[a] (61.4–65.6)	43.0 (40.8–45.3)

Prevalence in % (estimated 95% confidence interval); [a]95% CIs of estimates in the Roma child population and in the general child population do not overlap.

Smoking and Alcohol Consumption

Almost one-quarter of Roma children (29.6% of boys and 19.7% of girls) and about 14% of children in the general population had tried smoking at age 11 (Table 3). The prevalence of trying tobacco was doubled at age 13 among Roma children.

Further analysis of children's smoking habits showed that most of the children in both populations had never smoked either at age 11 or age 13. In both populations there are more boys who had tried smoking at age 11. Substantially more Roma boys smoked occasionally at age 11 than non-Roma children.

Trying alcohol was more prevalent among the Roma boys at age 11 while in drunkenness was no difference between the two groups. However, in both population groups and in both age groups, more boys than girls reported trying both alcohol and experiencing drunkenness.

Self-rated Health

The self-rated health status of the Roma children was worse than the self-rated health status of children in the general population. More children in the general population reported excellent or good health, and in both age groups, more than twice as many Roma children reported fair and poor health.

DISCUSSION

Poor health condition among the Roma population is a well-documented fact in central European countries, although studying the Roma minority entails some difficulties, e.g. determining the population, accessing the population, and dealing with their high illiteracy rate (10–13, 30). In Hungary, a comprehensive survey was performed regarding the health status of the adult Roma population (13).

Roma families, particularly families living in settlements, are more strongly affected by poverty and social deprivation than the average population because of their low education level and high unemployment rate (31). Recently, an increasing number of papers have focused on health status and health behaviours of this socially and economically disadvantaged group (19, 32–34). These studies have mainly focused on isolating behavioural characteristics, while only a few studies carried out comprehensive surveys. One study showed a higher prevalence of daily alcohol consumption, drug use and smoking among Roma children (32), while another one found lower prevalence of smoking, drunkenness, drug use and higher rate of physical activity among Roma adolescent girls and lower rate of drug use among Roma adolescent boys, but there was no significant difference in other risk factors (19).

Our comparative study demonstrated that children living in Roma settlements have many unfavourable health behaviour indicators compared with the general youth population mainly at the age 11. Similar findings were reported in other reports (32–34). The self-rated health status of Roma children was worse than that of the children in the general population. The unhealthy eating habits of Roma children were characterized by high consumption of sweets and soft drinks and lower everyday consumption of fruit among girls aged 11 years. The high prevalence of those Roma girls who do not pursue intense physical activity may have resulted in the higher proportion of obesity in both age groups. Our findings seem to contradict some previous results that showed a higher proportion of underweight among Roma children compared to the non-Roma population (34, 35). However, the age groups

Table 2. *Eating habits, physical activity and BMI of children living in Roma settlements (Roma Children Health Survey 2011) and in general child population (Health Behaviour in School-aged Children – HBSC 2009/2010) in Hungary*

| | | Children living in Roma settlements | | | | General child population | | | |
| | | 11 years (n = 463) | | 13 years (n = 452) | | 11 years (n = 1,873) | | 13 years (n = 1,905) | |
		Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Fruit consumption	Never or less than once a week	20.6 (15.7–26.5)	23.1[a] (18.0–29.3)	17.9 (13.2–23.7)	16.9[a] (12.4–22.6)	15.5 (13.3–18.1)	9.7[a] (7.9–11.9)	11.1 (9.2–13.3)	8.0[a] (6.4–10.0)
	Irregular	45.1 (38.6–51.7)	37.6 (31.3–44.2)	49.1[a] (42.4–55.8)	40.4 (34.0–47.2)	47.4 (44.2–50.6)	40.7 (37.5–44.1)	57.0[a] (53.8–60.2)	50.0 (46.8–53.2)
	Every day	34.3 (28.3–40.9)	39.3[a] (33.0–46.0)	33.0 (27.0–39.7)	42.7 (36.2–49.4)	37.1 (34.0–40.3)	49.6[a] (46.2–52.9)	31.9 (28.9–35.0)	42.0 (38.8–45.2)
Vegetable consumption	Never or less than once a week	31.6 (25.8–38.1)	35.6 (29.4–42.2)	28.2 (22.4–34.7)	20.7 (15.7–26.8)	25.3 (22.5–28.2)	18.8 (16.3–21.6)	18.1 (15.7–20.8)	13.6 (11.6–16.0)
	Irregular	38.1[a] (31.9–44.7)	34.7[a] (28.6–41.3)	41.4[a] (34.8–48.2)	45.5[a] (38.9–52.3)	48.3[a] (45.1–51.6)	48.3 (45.0–51.6)	59.2[a] (55.9–62.4)	57.5[a] (54.3–60.6)
	Every day	30.3 (24.5–36.7)	29.8 (24.0–36.3)	30.5 (24.5–37.1)	33.8 (27.7–40.5)	26.4 (23.7–29.4)	32.9 (29.9–36.1)	22.7 (20.1–25.5)	28.9 (26.1–31.9)
Sweets consumption	Never or less than once a week	12.0[a] (8.3–17.1)	12.5[a] (8.6–17.7)	10.5 (6.9–15.5)	7.7[a] (4.7–12.2)	20.8[a] (18.3–23.5)	27.4[a] (24.5–30.5)	15.5 (13.3–18.0)	15.4[a] (13.3–17.9)
	Irregular	21.5[a] (16.5–27.4)	16.1[a] (11.7–21.7)	20.0[a] (15.0–26.0)	16.7[a] (12.2–22.4)	36.3[a] (33.2–39.5)	31.3[a] (28.3–34.5)	36.3[a] (33.2–39.5)	34.9[a] (31.9–38.0)
	At least 5 times a week	66.5[a] (60.0–72.5)	71.4[a] (65.0–77.2)	69.5[a] (62.9–75.5)	75.7[a] (69.4–81.1)	42.9[a] (39.8–46.2)	41.3[a] (38.0–44.6)	48.2[a] (45.0–51.5)	49.7[a] (46.5–52.9)
Soft drink consumption	Never or less than once a week	9.5[a] (6.2–14.2)	10.5[a] (7.0–15.4)	6.0[a] (3.3–10.2)	9.0[a] (5.7–13.7)	37.0[a] (34.0–40.2)	44.1[a] (40.8–47.2)	24.6[a] (21.9–27.5)	35.7[a] (32.7–38.8)
	Irregular	12.6[a] (8.7–17.7)	18.3 (13.7–24.1)	13.8[a] (9.6–19.2)	10.3[a] (6.8–15.3)	27.0[a] (24.2–30.0)	22.5 (19.8–25.4)	31.3[a] (28.3–34.4)	28.1[a] (25.3–31.1)
	At least 5 times a week	77.9[a] (71.9–83.0)	71.2[a] (64.8–76.9)	80.3[a] (74.3–85.2)	80.7[a] (74.8–85.6)	36.0[a] (32.9–39.1)	33.4[a] (30.4–36.6)	44.1[a] (40.9–47.4)	36.2[a] (33.2–39.4)
Physical activity (intensive)	Daily or 4–5 times a week	64.4 (57.8–70.5)	38.0 (31.7–44.7)	60.5[a] (53.8–67.9)	31.7 (25.8–38.3)	59.6 (56.4–62.7)	45.6 (42.4–49.0)	47.9[a] (44.7–51.2)	26.7 (23.9–29.6)
	1–3 times a week	24.9[a] (19.6–31.1)	34.5 (28.4–41.1)	26.0 (20.5–32.4)	37.5[a] (31.2–44.2)	30.4[a] (27.5–33.4)	41.2 (38.0–44.5)	40.8[a] (37.6–44.0)	53.6[a] (50.4–56.8)
	Monthly or fewer than monthly	10.7 (7.2–15.6)	27.5[a] (21.9–33.9)	13.5 (9.4–18.8)	30.8[a] (24.9–37.4)	10.1 (8.3–12.2)	13.2[a] (11.1–15.6)	11.3 (9.4–13.6)	19.7[a] (17.3–22.4)
Body mass index	Thin	3.9 (1.8–7.8)	3.0 (1.3–6.8)	4.8 (2.5–8.9)	3.0 (1.2–6.6)	5.5 (4.1–7.4)	5.7 (4.2–7.7)	1.9 (1.1–3.1)	3.4 (2.4–5.0)
	Normal	58.0 (51.0–64.8)	68.5 (61.5–74.8)	59.1 (52.1–65.8)	69.0[a] (62.1–75.2)	60.5 (57.1–63.9)	71.5 (68.1–74.6)	66.7 (63.4–69.8)	80.0[a] (77.2–82.6)
	Over weight	26.3 (20.6–33.0)	18.8 (13.7–25.1)	25.0 (19.4–31.6)	17.7 (12.9–23.8)	22.5 (19.7–25.6)	18.6 (16.0–21.6)	22.1 (19.4–25.1)	13.5 (11.4–16.0)
	Obese	11.7 (7.8–17.1)	9.6[a] (6.1–14.9)	11.1 (7.3–16.3)	10.3[a] (6.7–15.6)	11.4 (9.4–13.9)	4.2[a] (2.9–5.9)	9.3 (7.5–11.6)	3.0[a] (2.0–4.4)

Prevalence in % (estimated 95% confidence interval); [a]95% CIs of estimates in the Roma child population and in the general child population do not overlap.

Table 3. Tobacco smoking, alcohol consumption and self-rated health of children living in Roma settlements (Roma Children Health Survey 2011) and in general child population (Health Behaviour in School-aged Children – HBSC 2009/2010) in Hungary

Health determinants		Children living in Roma settlements				General child population			
		11 years (n = 463)		13 years (n = 452)		11 years (n = 1,873)		13 years (n = 1,905)	
		Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Tobacco trying (%)	Yes	29.6a (23.9–36.0)	19.7a (14.9–25.6)	47.9 (41.1–54.8)	42.0 (35.5–48.7)	17.7a (15.3–20.3)	10.6a (8.7–12.8)	41.5 (38.4–44.8)	36.1 (33.0–39.2)
Smoking (%)	At least once a week or every day	6.6 (3.9–10.8)	2.2 (0.8–5.4)	14.7 (10.4–20.2)	11.2 (7.5–16.2)	3.9 (2.8–5.4)	0.9 (0.4–1.8)	9.2 (7.5–11.3)	6.6 (5.1–8.4)
	Occasionally	6.6 (3.9–10.8)	2.2 (0.8–5.4)	4.6 (2.4–8.5)	6.3 (3.6–10.5)	2.3a (1.5–3.6)	0.7 (0.2–1.5)	4.4 (3.2–6.0)	5.4 (4.1–7.1)
	Never	86.8 (81.6–90.8)	95.6 (91.8–97.7)	80.7 (74.7–85.6)	82.6 (76.8–87.2)	93.8 (92.0–95.2)	98.4 (97.3–99.1)	86.3 (83.9–88.5)	88.0 (85.8–89.0)
Alcohol trying (%)	Yes	53.2a (46.4–60.0)	29.1 (23.2–35.8)	63.3 (56.3–69.8)	53.7 (46.8–60.5)	42.7a (39.4–46.0)	29.0 (26.1–32.2)	67.4 (64.2–70.4)	60.7 (57.5–63.8)
Drunkenness (%)	Drunk at least once	21.0 (16.0–27.0)	9.3 (6.0–14.0)	39.6 (33.2–46.4)	25.2 (19.8–31.6)	14.1 (12.0–16.5)	7.2 (5.7–9.2)	32.2 (29.2–35.4)	22.6 (20.0–25.4)
Self-rated health (%)	Excellent or good	70.7a (64.3–76.5)	68.9a (62.4–74.7)	65.5a (58.8–71.6)	58.1a (51.3–64.6)	86.0a (83.5–88.1)	86.3a (83.9–88.5)	81.9a (79.2–84.3)	79.0a (76.3–81.5)
	Fair	26.6 (21.1–33.0)	28.1 (22.4–34.5)	30.5 (24.6–37.1)	36.9 (30.7–43.7)	12.0 (10.1–14.3)	11.3 (9.4–13.6)	15.7 (13.5–18.3)	17.8 (15.5–20.5)
	Poor	2.6 (1.1–5.9)	3.1 (1.4–6.5)	4.0 (2.0–7.8)	5.0 (2.6–8.9)	2.0 (1.3–3.2)	2.3 (1.5–3.6)	2.4 (1.5–3.6)	3.1 (2.2–4.5)

Prevalence in % (estimated 95% confidence interval); a95% CIs of estimates in the Roma child population and in the general child population do not overlap.

in these surveys were predominantly younger than in our study and our results can be explained by a high intake of carbohydrate foods in this group. Another survey from Canada also showed a high prevalence of overweight and obesity among multi-ethnic schoolchildren in a low-income inner-city neighbourhood (36).

Risk behaviours of Roma children were worse in case of trying tobacco and alcohol than those of the general population. In line with the previous study from Lithuania (32) we revealed a substantially higher prevalence of smoking initiation in both sexes and a higher proportion of trying alcohol among Roma boys. The prevalence of regular smokers was low in both populations, substantially more Roma boys smoked occasionally at age 11 compared to boys in the general population. The prevalence of trying alcohol was also higher among Roma children at age 11, while we have not found a difference in case of drunkenness between the two groups. These findings clearly show that Roma children try alcohol and smoking earlier than the general child population and in the latter age groups this difference can level off for these risk factors. This may serve to explain why Kolarčik observed a lower smoking and drunkenness prevalence among Roma adolescents (mean age was 14.50 years) (21).

A great number of studies proved that there is a strong association between socioeconomic position and health outcomes and that health behaviours contribute to socioeconomic gradient (37). The differences in the health behaviours between the Roma and the general child population can be explained mainly by the socioeconomic status of their parents, e.g. educational level, income, health literacy and unemployment rate which lead to higher unfavourable risk behaviour not only in the adult but also in the child Roma population (13, 14).

This study has some limitations. The survey was conducted in three counties of Hungary, which means that the results are not representative for the overall population of Roma children living in Hungary. The national sample involves the same proportion of Roma children as it is found in the Hungarian population. This may lead to a dilution of the true difference when comparing these two groups. The weight and height of students were self-reported which could cause measurement errors. Moreover, the socioeconomic characteristics of the North-East part of Hungary is worse compared to other regions and therefore we may have received different findings if we compared our Roma children to the children living in this region.

The important strength of our study was the use of identical questionnaires in both surveys, which ensures comparability of data. This means that our study was an extension of the HBSC international survey to a special group.

Our study provided evidence for unfavourable health behaviours mainly in consumption of sweets, soft drinks and early trying of tobacco and alcohol by Roma children. This may lead to a high prevalence of harmful lifestyle and poor health among the adult Roma population. For European Union countries it is vital to initiate, enhance and continue special health education and health promotion programmes for this highly disadvantaged group, especially for children. Recently, the issue of public education of Roma children was highlighted in the Decade of Roma Inclusion, which was followed by a document entitled "Roma in the European Union" (38). Studies show that achievement of Roma children who attend pre-school is higher than children who do not attend. In Hungary, a new pilot programme, called

Sure Start, was launched in 2003 and it was enhanced in 2006 for the early development of pre-school children living in poor environments in which different professionals are involved (39). On the other hand, it is important to increase job opportunities, social support, to provide access to the health care system and to strengthen the inclusion of the Roma people (38).

In conclusion, children living in Roma settlements reported poorer socioeconomic conditions, higher consumption of sweets and soft drinks, earlier smoking and alcohol initiation and worse self-rated health. Basically, there were no differences in fruit or vegetable consumption and BMI between the two populations. Interdisciplinary and multi-sector approaches, special health education and long-term maintenance of health promotional programmes plus social and health promotion programmes are needed to improve the health behaviours of this disadvantaged group.

Conflicts of Interests

None declared

Adherence to Ethical Standards

The research was approved by the Regional and Institutional Ethics Committee of the University of Debrecen and by the Scientific and Research Ethics Committee of the Medical Research Council.

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