Article

Not peer-reviewed version

Comparison of the HBSC Results of the Visegrad Countries with the Health Behavior of Young People with Disabilities Living in Hungary: A Cross-Sectional Study

Agota Barabas *, Attila Csaba Nagy, Viktoria Pazmany, Anita Katalin Grestyak Molnarne, Nemeth Agnes, György Jona, Agnes Santha, Peter Takacs, Emil Toldy, Renata Javorne Erdei

Posted Date: 18 March 2024

doi: 10.20944/preprints202403.0958.v1

Keywords: health; health behavior; disability; Visegrad Group

Article

Comparison of the HBSC Results of the Visegrad Countries with the Health Behavior of Young People with Disabilities Living in Hungary: A Cross-Sectional Study

Agota Barabas [1], Attila Cs. Nagy [2], Viktoria Pazmany [1], Anita K. M. Grestyak [1], Agnes Nemeth [3], György Jona [4], Agnes Santha [5], Peter Takacs [6], Emil Toldy-Schedel [7] and Renata J. Erdei [1]

[1] University of Debrecen Faculty of Health Sciences, Institute of Health Sciences, Department of Maternal Methods and Prevention, Nyíregyháza, Hungary
[2] University of Debrecen, Faculty of Health Sciences, Department of Health Informatics, Debrecen, Hungary
[3] Institute of Psychology, Eötvös Loránd University, Budapest, Hungary
[4] Department of Social Sciences, Faculty of Health, University of Debrecen, Nyíregyháza, Hungary
[5] Department of Applied Social Sciences, Faculty of Technical and Human Sciences, Sapientia Hungarian University of Transylvania, Targu Mures, Romania
[6] University of Debrecen, Faculty of Health Sciences, Department of Health Informatics , Nyíregyháza, Hungary
[7] St. Francis Hospital of Budapest, Budapest, Hungary
* Correspondence: for correspondence: A. Barabas, Department of Health Methodology and Prevention Faculty of Health, University of Debrecen, Sóstói u. 2–4, 4400 Nyíregyháza, Hungary. E-mail: barabas.agota@etk.unideb.hu

Abstract: The health status of Hungary's population is unfavorable, with significant differences in health indicators not only compared to the EU_{15} but also to the Visegrad countries. Unfavorable health indicators can be disproportionate and particularly affect vulnerable groups, such as people with disabilities. The aim of the present study is to compare the health behaviour and indicators of adolescents with disabilities in Hungary with those of the HBSC survey in the Visegrad countries, and to compare the results of the Hungarian special needs adolescent population with those of the Visegrad countries. Eating habits are unfavourable for both the Visegrad countries and the young people we studied. Children with disabilities have significantly higher rates of schoolwork stress compared to other countries. Significantly higher prevalence of somatic complaints and worse mental well-being parameters higher in Hungary than in the other Visegrad countries. The results suggest that further interventions are needed in Hungary and that differentiated, professionalised health promotion is needed for young people with disabilities. The researchers propose to extend the research to adolescents with disabilities living in the Visegrad countries, on the basis of which a methodology for injury-specific health promotion could be developed, including through international interprofessional cooperation.

Keywords: health; health behavior; disability; visegrad group

1. Introduction

The health status of the Hungarian population is among the worst in the European Union (EU). Although there has been an improvement in health indicators over the last two decades, there are significant differences not only in relation to the EU_{15} but also to the Visegrad countries (Czech Republic, Poland, Slovakia, hereafter V_3) [1, 2]. The Visegrad countries include four Central European countries, the Czech Republic, Hungary, Poland and Slovakia [3]. Although life expectancy at birth is on a steadily increasing trend, it is still lower than in the V_3 countries, with 77.8 years of life expected in 2021 in Hungary, compared to 80.5 in the Czech Republic, 79.6 in Poland and 78.2 in Slovakia [4]. The number of preventable deaths that could have been avoided with primary prevention

 doi:10.20944/preprints202403.0958.v1

interventions in Hungary is the highest in the EU. In 2020, 350 deaths per 100,000 people could have been avoided, compared to 275 in Poland, 218 in the Czech Republic and 262 in Slovakia [1, 5, 6, 7]. In Hungary, ischaemic heart disease and brain diseases have been the leading causes of death for many years, followed by cancer deaths, which is no different in the V_3 countries [8]. In terms of early mortality, i.e. under 65 years of age, cancer is the main cause of death in Hungary, which had the highest malignant cancer mortality rate in the EU in 2019 [9]. Hungary also has a poor demographic profile, which is linked to the health status of the population. Hungary's population is steadily declining, reflecting an ageing society. Regarding the early life stage, infant mortality rates have been improving in Hungary recently, reaching 3.4 ‰ in 2020, which is lower than the 3.08 ‰ in the EU_{15}. Compared to the V_3 countries, Hungary ranks second in 2020. The Czech Republic had an infant mortality rate of 2.2 ‰, Poland 3.9 ‰ and Slovakia 4.9 ‰ per 1000 population [2, 10].

In 2019, nutritional risk factors were responsible for around half of all deaths in Hungary, higher than the EU average of 17%. In Hungary Tobacco accounted for 21% of all deaths, in Poland it was responsible for one fifth of deaths. Obesity is a problem in all Visegrad countries. In 2019, among EU member states, 19% of adults in the Czech Republic were obese and 16% of the adult population in Slovakia was obese, the same as the EU average. Poland's adult population is above the EU average at 18.5%. In Hungary, the obesity rate (33%) is also higher than the EU average [1, 5, 6, 7]. Obesity or overweight, poor dietary habits and risky behaviours are already present in childhood. The Health Behaviour in School-aged Children (HBSC) survey is an internationally collaborative youth survey that has been in place for more than 36 years [11]. International results for 2018 show that physical activity levels are poor in most countries, with less than one in five adolescents completing the global physical activity target of at least 60 minutes of physical activity per day (MVPA recommendation). One in five adolescents is overweight or obese, with higher rates in younger age groups and among boys. Children from families with a better socio-economic background reported better health and well-being, higher physical activity levels and more favourable dietary habits [12].

The aim of the research, launched by the research team in 2021, was to explore the health behaviour of young people aged 12-18 with disabilities in the Northern Great Plain Region of Hungary and the factors influencing it. Many diseases are established during childhood and foetal life, and it is therefore necessary to examine the situation of mothers and their access to health care from conception onwards, as a good start in life is a prerequisite for good health in childhood [13].

Poor health indicators can have a disproportionate impact and particularly affect vulnerable groups. Such vulnerable groups include people with disabilities, who have health indicators below the average population.

More than 1 billion people live with a disability, affecting 15% of the world's population. People with disabilities have greater health care needs, health problems and more difficulties in accessing health care. People with disabilities are more likely to have inadequate nutritional status, three times more likely to suffer from diabetes mellitus and three times more likely to be denied health care [14]. The proportion of women with disabilities in EU Member States was higher than that of men in 2022. In Hungary, 23.0% of the population, in Poland 24.2%, in the Czech Republic 26.6% and in Slovakia 30.6% of the population were affected by some type of disability [15]. According to the Hungarian Central Statistical Office (KSH), 408.021 people in Hungary had some type of disability in 2016, representing 4.3% of the population. In Hungary, in the North Great Plain Region, 2042 persons aged 12-18 years have a disability, 984 persons in Szabolcs-Szatmár-Bereg county, 444 persons in Jász-Nagykun-Szolnok county and 614 persons in Hajdú-Bihar county [16].

Children with disabilities often have poorer health outcomes than their typically developing peers, and children with intellectual disabilities (ID) have a shorter life expectancy [17]. They are more likely to be affected by obesity and diabetes, have a higher incidence of developmental disorders, heart and respiratory diseases, mental health problems and premature mortality [18]. Adults with ID are less physically active than the general population [19].

Differences in health status are known to be associated with the disability itself, e.g. congenital heart defects, premature dementia in children with Down's syndrome (DS). Children and adolescents with DS have higher rates of overweight/obesity than their typically developing peers. Likely causes

 doi:10.20944/preprints202403.0958.v1

of obesity in overweight young people with DS may include increased leptin levels, lower prealbumin levels, resting energy expenditure, poor dietary preferences and comorbidities. However, in young people with DS, the presence of obesity increases the risk of dyslipidemia, obstructive sleep apnea, hyperinsulinemia, and gait disturbances. There are, however, differences that are not explained by the biological basis of health status, but are associated with a risk of poorer health. Such social determinants of health include poverty, wealth and social exclusion. Access to health promotion, education and some health services is difficult for young people with disabilities, and frequent stigma associated with different developmental trajectories is common. Children with disabilities are often characterised by multiple disadvantages. In addition to existing disability, health status is also affected by the income status of the country or family and ethnicity, which can reduce or even exacerbate disadvantage and social exclusion [17]. Financial status also affects a child's physical activity, with children from more affluent families having a higher rate of regular sport participation. Parents' educational attainment has an impact on children's diet [20]. Health literacy, health awareness and financial status vary among children's families, which places a strong emphasis on school health and school-parent partnerships to promote healthy lifestyles [21].

According to the Hungarian Central Statistical Office, 408 021 people in Hungary had some type of disability in 2016, representing 4.3% of the population [22].

2. Materials and Methods

2.1. Aim of the Research

To investigate the health behaviour of young people aged 12-18 with disabilities in the Northern Great Plain Region of Hungary and the background factors influencing it. The aim of the present study is to compare the health behaviour and health indicators of adolescents with disabilities in Hungary with those of the HBSC survey in the Visegrad countries, and to compare the results of the Hungarian special needs adolescent population with those of the Visegrad countries. The survey was conducted in preparation for a needs-driven intervention.

In our study, special schools in the counties covered by the research were randomly selected through a cluster sampling procedure. Everyone from a given school who met the selection criteria (age 12-18, disability, living in the Northern Great Plain Region) and the parent and child gave prior consent to the study was included in the sample. The gross sample consisted of pupils from 12 special schools and members of NGOs working with people with disabilities. Of the schools selected, 366 agreed to participate in the survey, giving a response rate of 93.81%. Finally, 356 paper questionnaires were collected. During the computer data entry and cleaning process, a further 15 questionnaires were deleted from the sample (e.g. 50% of the questions were not answered, due to apparently frivolous responses). The final, implemented sample size consists of 341 questionnaires. In the vast majority of cases, the presence of an interviewer was required during the collection of the questionnaires. The age group included in our research was 12-18 years. From the HBSC research sample, we took the results of young people in the 13, 15 and 17 age groups, so that our own sample of 109 respondents matched to these age groups forms the basis of this study. We have compared our data with international data from the HBSC survey 2018 with.

2.2. Method of Data Collection

During the investigation, we combined theoretical research with empirical questionnaire research in an interdisciplinary approach. In our self-developed questionnaire, we adapted certain blocks of questions from the validated questionnaire of the HBSC research to assess eating habits, dental care, and physical activity. Data collection covered the following topics: Demographic data: age, gender, parents' education, place of residence, self-assessed financial situation. Questions about health behaviour: physical activity, eating habits and dental care, smoking habits, alcohol consumption, leisure time, age, gender, education, place of residence.

 doi:10.20944/preprints202403.0958.v1

2.3. The Ethical Background of the Research

The questionnaire was completed anonymously, the persons participating in the research cannot be identified. The research was carried out in compliance with the applicable law, professional guidelines and recommended ethical codes. The rules for querying and collecting the questionnaire, processing, storage, and database management complied with the relevant legislation. The research was approved by the Scientific and Research Ethics Committee, license number: IV/5706-1/2021/EKU.

2.4. Statistical Analysis

Frequencies and proportions were calculated as descriptive statistics. Pearson's chi-squared tests were used to check associations between categorical variables, a p value of < 0.05 was considered significant. Two proportion Z-tests were used to compare proportions. The data was analyzed using Intercooled Microsoft Excel v2007 and Stata v17. [23].

2.5. Presentation of the Sample

The sample sizes for the Visegrad countries from the HBSC 2018 database were as follows: Czech 11.470, Hungary 3.739, Poland 5.181, Slovakia 4.621 people. The Hungarian disabled children (hereafter HUDC) sample was 109 people. The total sample was 25.120. In our survey in the sample, of young people with disabilities, boys were over-represented (57.8% vs. 42.2%). The highest proportion of young people in the sample was aged 15 years. In terms of disability type, participants were most affected by mild intellectual disability, followed by those with mild autism spectrum disorder and those with mild learning disability. The lowest proportion were young people with hearing impairment. 66.1% of pupils live in a city, 80.7% with their families. 9.2% of respondents live in dormitories, 2.8% in children's homes and 7.3% in foster care (Table 1).

Table 1. The main characteristics of sample of young Hungarians with disabilities N=109.

Characteristics	**%**	
Gender	boy	57.8
	girl	42.2
Age	13 years	22.0
	15 years	41.3
	17 years	36.7
Intellectual disability (66 people)	mild	66.7
	intermediate	24,2
	serious	9.1
Mobility impairment (14 people)	mild	71.4
	intermediate	21.5
	serious	7.1
Visual impairment (15 people)	mild	73.3
	intermediate	20.0
	serious	6.7
Hearing impairment (7 people)	mild	71.4
	intermediate	28.6
	serious	0.0
Speech impairment (14 people)	mild	50.0
	intermediate	21.4

 doi:10.20944/preprints202403.0958.v1

	serious	28.6
Autism spectrum disorder (23 people)	mild	74.0
	intermediate	8.6
	serious	17.4
Learning disorder (22 people)	mild	77.3
	intermediate	18.2
	serious	4.5
Type of settlement	city	66.1
	village	33.9
Child's residence	at home with her family	80.7
	in college	9.2
	in a children's home	2.8
	with a foster parent	7.3

own editing.

3. Results

3.1. Eating Behaviours and Oral Health

The proportion of young people who regularly eat breakfast on weekdays is highest in Poland (61.24%), which is significantly ($p<0.001$) higher than in Hungary (45.39%), the Czech Republic (52.88%) and Slovakia (45.99%). In Hungary, 54.13% of young people with disabilities eat breakfast every weekday. The proportion of fruit consumption several times a day is low for all countries, with the lowest proportion among HUDC (6.42%). The proportion of vegetables consumed several times a day is also lowest among HUDC, but is not much better in Hungary than in the other countries. In Slovakia, a significantly higher proportion ($p<0.001$) of young people consume vegetables more than once a day than in Hungary (18.72% vs. 13.55%). The proportion of young people who consume sweets is significantly higher ($p<0.001$) in Slovakia (17.48%) than in the Czech Republic (8.45%), Hungary (11.08%) and Poland (12.69%). 7.34% of HUDC consume sweets at least once a day. Consumption of cola and sugary drinks is significantly higher ($p<0.001$) in Hungary (24.44%) than in the V_3 countries (13.76% of young people in the Czech Republic, 16.27% in Poland and 21.25% in Slovakia consume such drinks at least once a day). The proportion is also significantly higher (p: 0.001) compared to HUDC (22.94%). rushing more than once a day was significantly higher in the Czech Republic ($p<0.001$) compared to the other Visegrad countries and HUDC. The lowest proportion of HUDC brushing their teeth several times a day (73.54% vs. 28.44%) (Table 2.)

Table 2. Eating behaviours and oral health (%). Rows sig.: χ 2 test for all countries.; proportion Z-tests for pair of countries.

Characteristics	Czech Republic		Hungary		Poland		Slovakia		Hungarian disabled children	
	N, Proportion	MT	N, Proportion	MT	N, Proportion	MT	N, Proportion	MT	N, Proportion	MT
Weekday	6065, 11470,	[51.96-53.79]	1697, 3739,	[43.79-46.98]	3173, 5181,	[59.9-62.57]	2125, 4621,	[44.55-47.42]	59, 109,	[44.7-63.48]

 doi:10.20944/preprints202403.0958.v1

breakfast on all five days	52.88		45.39		61.24		45.99		54.13	
Sig.	p<0.001; PO-CZ p<0.001; PO-HU p<0.001; PO-SL p<0.001									
Eat fruits more than once daily	2848, 11482, 24.80	[24.01-25.59]	670, 3758, 17.83	[16.60-19.05]	1139, 5199, 21.91	[20.78-23.03]	1087, 4659, 23.33	[22.12-24.55]	7, 109, 6.42	[1.82-11.02]
Sig.	p<0.0001; CZ-HU p<0.001; CZ-PO p<0.001, CZ-HUDC p<0.001									
Eat vegetables more than once daily	2008, 11371, 17.66	[16.96-18.36]	509, 3757, 13.55	[12.45-14.64]	859, 5193, 16.54	[15.53-17.55]	867, 4632, 18.72	[17.59-19.84]	8, 109, 7.34	[2.44-12.24]
Sig.	p<0.0001; SL-HU p<0.001									
Eat sweets more at least once a day	961, 11376, 8.45	[7.94-8.96]	416, 3756, 11.08	[10.07-12.08]	659, 5195, 12.69	[11.78-13.59]	810, 4634, 17.48	[16.39-18.57]	8, 109, 7.34	[2.44-12.24]
Sig.	p= 0.0007; SL-CZ p<0.001; SL-HU p<0.001; SL-PO p<0.001									
Drinks cola/soft drinks at least once a day	1505/ 11374 13.76	[13.76-13.13]	919/ 3760 24.44	[24,44-23,07]	845/ 5195 16.27	[15.26-17.27]	984/ 4631 21.25	[20.07-22.43]	25/ 109 22.94	[15.04-30.83]
Sig.	p<0.0001; HU-CZ p<0.001; HU-PO p<0.001; HU-SL p=0.001									
Tooth brusing more than once a day	8476/ 11526 73.54	[72.73-74.34]	2292/ 3750 61.12	[59.56-62.68]	3594/ 5204 69.06	[67.81-70.32]	2920/ 4638 62.96	[61.57-64.35]	31/ 109 28.44	[19.97-36.91]
Sig.	p<0.001; CZ-H p<0.001; CZ-PO p<0.001; CZ-SL p<0.001; CZ-HUDC p<0.001									

own editing.

 doi:10.20944/preprints202403.0958.v1

3.2. Physical Activity, Body Image, Health Status

On seven of the seven days prior to taking the questionnaire, the highest proportion of adolescents living in Slovakia performed physical activity (23.05%).A significantly higher proportion of adolescents living in Slovakia than in Hungary were physically active on all seven days before the questionnaire was taken (p:0. 016), (19.68%) and among our HUDC (p:0.003) (10.09%). Young people living in Slovakia also had the highest proportion of vigorous physical activity at least 4-6 times per week (51.27%), which is significantly higher (p<0.001) than in the Visegrad countries and HUDC. The lowest rate is also found among HUDC (21.10%). Overweight/obesity is significantly higher (p<0.001) among the Hungarian general population compared to the other Visegrad countries. Among minority Hungarians residing in Romania (Transylvania), Slovakia (Southern Slovakia), Serbia (Vojvodina) and Ukraine (Transcarpathia), the proportion of those who have never engaged in exercise varies between 34% (in Serbia) and 53% (in Romania), with an additional one-fifth of the population doing exercise less than once in a week. In each region, regular physical activity tends to be more prevalent among those with higher education and decreases with age [24]. No significant difference is found for thinness. The proportion of HUDC that are too thin is 6.42%, compared to slightly more than 12% in the V4 countries. The highest proportion of young people in Poland consider themselves fat (39.09%), which is significantly higher (p<0.001) compared to Hungary (32.63%), the Czech Republic (25.36%), Slovakia (24.43%) and HUDC (p:0.001 22.94%). HUDC has the lowest proportion of young people who consider themselves obese. The proportion of students who consider their health to be excellent is highest in Slovakia and lowest in HUDC (27.69% vs. 12.84%) (Table 3.)

Table 3. Physical activity, body image, health status (%). Rows sig.: χ 2 test for all countries.; proportion Z-tests for pair of countries.

Characte-ristics	Czech Republic		Hungary		Poland		Slovakia		Hungarian disabled children	
	N, Pro-por-tion	MT	N, Pro-por-tion	MT	N, Pro-por-tion	MT	N, Pro-por-tion	MT	N, Pro-por-tion	MT
Physical activity every day for the last 7 days	2109, 11534, 18.29	[17.58-18.99]	727, 3694, 19.68	[18.40-20.96]	891, 5193, 17.16	[16.13-18.18]	1074, 4660, 23.05	[21.84-24.26]	11, 109, 10.09	[4.44-15.75]
Sig.	NS.									
Frequenc y of vigorous physical activity at least 4-6 times a week	4572, 11502, 39.75	[38.86-40.64]	1628, 3755, 43.36	[41.77-44.94]	1721, 5194, 33.13	[31.85-34.41]	2362, 4607, 51.27	[49.83-52.71]	23, 109, 21.10	[13.44-28.76]

 doi:10.20944/preprints202403.0958.v1

Sig.	p<0.0001; SL-CZ p<0.001; SL-HU p<0.001; SL-PO p<0.001; SL-HUDC p<0.001									
Overweight or obese	2369, 10743, 22.05	[21.27-22.84]	880, 3419, 25.74	[24.27-27.20]	1010, 4744, 21.29	[20.13-22.45]	845, 3943, 21.43	[20.15-22.71]	23, 109, 21.10	[13.44-28.76]
Sig.	p=0.0004; HU-CZ p<0.001; HU-PO p<0.001; HU-SL p<0.001									
Thinness	1358, 10747, 12.64	[12.01-13.26]	420, 3417, 12.29	[11.19-13.39]	594, 4744, 12.52	[11.58-13.46]	516, 3943, 13.09	[12.03-14.14]	7, 109, 6.42	[1.82-11.02]
Sign.	NS.									
self-rated body image a bit too fat, much too fat	2889, 11394, 25.36	[24.56-26.15]	1199, 3674, 32.63	[31.12-34.15]	2036, 5208, 39.09	[37.77-40.42]	1159, 4744, 24.43	[23.21-25.65]	25, 109, 22.94	[15.04-30.83]
Sig.	p<000.1; PO-CZ p<0.001; PO-HU p<0.001; PO-SL p<0.001; PO-HUDC p:0.001									
self-rated health status excellent	278, 11543, 24.08	[23.30-24.86]	995, 3716, 26.78	[25.35-28.20]	1145, 5204, 22.00	[20.88-23.13]	1320, 4767, 27.69	[26.42-28.96]	14, 109, 12.84	[6.56-19.13]
Sign.	NS.									

own editing.

3.3. Life Statisfaction, School Experience, Mental Well-Being

Overall in the sample, more than 14% of young people are satisfied with their lives and consider them to be the best they can be. This proportion is the highest in the HUDC (21.10%). 71.76% of Hungarian children in the HBSC survey feel depressed at least once a month, which is higher (p<0.001) compared to the other Visegrad countries and significantly higher (p:0.011) than in the HUDC. A significantly higher (p<0.001) proportion of HUDC feel depressed compared to Slovakia. Also, Hungarian children had significantly the highest rate of having a tummy ache at least once a month (61.80%), which is significantly higher (p<0.001) compared to Czech Republic, Poland and Slovakia and (p.0.001) compared to HUDC. The prevalence of back pain is also highest in Hungary (45.49%), but the prevalence of this complaint is also above 35% in the other Visegrad countries. Among children with disabilities, the prevalence of back pain was 30.28%. Among the complaints, the rate of monthly headache was significantly (p<0.001) higher in Hungary compared to the other countries studied and HUDC. The prevalence of dizziness is lowest among Czech youth (16.91%), with no significant differences, but highest among Hungarian youth (33.30%). Difficulty falling asleep at least once a month was reported by 56.91% of Hungarian adolescents, significantly higher (p<0.001) than the results for young people in Poland and Slovakia, with 49.54% of HUDC reporting this. A significantly higher proportion (p<0.001) of HUDC (56.88%) are very stressed by schoolwork, which is significantly higher (p<0.001) than in the Visegrad countries (Table 4.)

 doi:10.20944/preprints202403.0958.v1

Table 4. Life statifaction, School experience, Mental Well-Being (%). Rows sig.: χ 2 test for all countries.; proportion Z-tests for pair of countries.

Character-istics	Czech Republic		Hungary		Poland		Slovakia		Hungarian disabled children	
	N, Propor-tion	MT	N, Propor-tion	MT	N, Pro-por-tion	MT	N, Pro-por-tion	MT	N, Pro-por-tion	MT
Life satisfaction best possible life	1819, 11479, 15.85	[15.18-16.51]	659, 3670, 17.96	[16.71-19.20]	755, 5165, 14.62	[13.65-15.58]	786, 4781, 16.44	[15.39-17.49]	23, 109, 21.10	[13.44-28.76]
Sign.	NS.									
Feeling low at least once a month	5812, 11034, 52.67	[51.74-53.61]	2653, 3697, 71.76	[70.31-73.21]	2743, 5153, 53.23	[51.87-54.59]	1710, 4501, 37.99	[36.57-39.41]	66, 109, 60.55	[51.38-69.73]
Sign.	p<0.001; HU-CZ p<0.001; HU-PO p<0.001; HU-SL p<0.001; HU-HUDC p:0.011; HUDC-SL p: 0.001									
Stomach ache at least once a month	3989, 11124, 35.86	[34.97-36.75]	2289, 3704, 61.80	[60.23-63.36]	2681, 5176, 51.80	[50.44-53.16]	2260, 4569, 49.46	[48.01-50.91]	49, 109, 44.95	[35.62-54.29]
Sign.	p<0.0001; HU-CZ p<0.001; HU-PO p<0.001; HU-SL p<0.001; HU-HUDC p:0.001									
Backache at least once a month	5021, 11112, 45.19	[44.26-46.11]	1684, 3702, 45.49	[43.88-47.09]	1801, 5118, 35.19	[33.88-36.50]	1856, 4560, 40.70	[39.28-42.13]	33, 109, 30.28	[21.65-38.90]
Sign.	NS.									
Headache at least once a month	5894, 360, 52.47	[51.55-53.39]	2437, 3708, 65.72	[64.20-67.25]	2594, 5181, 50.07	[48.71-51.43]	2237, 4645, 48.16	[46.72-49.60]	47, 109, 43.12	[33.82-52.42]
Sign.	p<0.0001; HU-CZ p<0.001; HU-PO p<0.001; HU-SL p<0.001; HU-HUDC p<0.001									
Feeling dizzy at least once a month	1870, 11058, 16.91	[16.21-17.61]	1323, 3690, 35.85	[34.31-37.40]	1444, 5163, 27.97	[26.74-29.19]	1509, 4532, 33.30	[31.92-34.67]	29, 109, 26.61	[18.31-34.90]
Sign.	NS.									

 doi:10.20944/preprints202403.0958.v1

Difficulties in sleeping at least once a month	5563, 11071, 50.25	[49.32-51.18]	2103, 3695, 56.91	[55.32-58.51]	2433, 5165, 47.11	[45.74-48.47]	2103, 4523, 46.50	[45.04-47.95]	54, 109, 49.54	[40.15-58.93]
Sign.	p<0.0001; HU-CZ p<0.001; HU-PO p<0.001; HU-SL p<0.001									
Pressured by schoolwork a lot	1249, 11508, 10.85	[10.29-11.42]	267, 3710, 7.20	[6.37-8.03]	753, 5213, 14.44	[13.49-15.40]	278, 4432, 6.27	[5.56-6.99]	62, 109, 56.88	[47.58-66.18]
Sign.	p<0.0001; HUDC-CZ p<0.001; HUDC-HU p<0.001; HUDC-PO p<0.001; HUDC-SL p<0.001									

own editing

3.4. Drunkenness

Regarding alcohol consumption young people in Hungary have been drunk at least 2-3 times more than young people in Poland, the Czech Republic and Slovakia. 13.76% of HUDC reported having been drunk at least 2-3 times (Table 5).

Table 5. Drunkness (%). Rows sig.: χ 2 test for all countries.; Proportion Z-tests for pair of countries.

Characteristics	**Czech Republic**		**Hungary**		**Poland**		**Slovakia**		**Hungarian disabled children**	
	N, Proportion	**MT**	**N, Proportion**	**MT**	**N, Proportion**	**MT**	**N, Proportion**	**MT**	**N, Proportion**	**MT**
Drunkeness lifetime 2-3 times	1111, 11464, 9.69	[9.15-10.23]	418, 3702, 11.29	[10.27-12.31]	424, 5195, 8.16	[7.42-8.91]	375, 4515, 8.31	[7.50-9.11]	15, 109, 13.76	[7.29-20.23]
Sig.	NS.									

own editing.

3.5. Family Context

The share of pupils living with their mother is highest among Polish young people (96.28%). 91.74% of HUDC live with their mother. The rate of living with the father is lower than living with the mother in all countries, but higher in Poland. It is lowest among HUDC. The proportion of

 doi:10.20944/preprints202403.0958.v1

mothers with a job is significantly highest in Poland (79.63%). Lowest among HUDC. The proportion of fathers with a job is highest in Slovakia (93.51%) and lowest among HUDC (73.39%) (Table 6.)

Table 6. Family Context. Rows sig.: χ 2 test for all countries.; Proportion Z-tests for pair of countries.

Characte-ristics	Czech Republic		Hungary		Poland		Slovakia		Hungarian disabled children	
	N, Pro-por-tion	MT	N, Pro-por--tion	MT	N, Pro-por-tion	MT	N, Pro-por-tion	MT	N, Pro-por-tion	MT
Mother in main home	10464, 11070, 94.53	[94.10-94.95]	3526, 11070, 94.08	[93.32-94.83]	4972, 5164, 96.28	[95.77-96.80]	3498, 3911, 89.44	[88.48-90.40]	100, 109, 91.74	[86.58-96.91]
Sign.	NS.									
Father main home	8173, 11070, 73.83	[73.01-74.65]	2781, 3748, 74.20	[72.80-75.60]	4129, 5164, 79.96	[78.87-81.05]	2888, 3911, 73.84	[72.47-75.22]	76, 109, 69.72	[61.10-78.35]
Sign.	NS.									
Mother job	10164, 11082, 91.72	[91.20-92.23]	3233, 3747, 86.28	[85.18-87.38]	4132, 5189, 79.63	[78.53-80.73]	3272, 3757, 87.09	[86.02-88.16]	63, 109, 57.80	[48.53-67.07]
Sign.	p<0.001; CZ-H p<0.001; CZ-PO p<0.001; CZ-SL p<0.001; CZ-HUDC p<0.001									
Father job	10193, 11067, 92.10	[91.60-92.61]	3452, 3740, 92.30	[91.45-93.15]	4732, 5186, 91.25	[90.48-92.01]	3514, 3758, 93.51	[92.72-94.29]	80, 109, 73.39	[65.10-81.69]
Sig.	NS.; HU-HUDC p<0.001									

own editing.

4. Discussion

Dietary habits are poor both among the Visegrad countries and among the young people with disabilities we surveyed. Consumption of fruit and vegetables several times a day is lowest in Hungary and HUDC, but is also unfavourable in the other Visegrad countries. Consumption of vegetables several times a day is also lowest in Hungary and HUDC. The consumption of Cola and soft drinks is significantly higher in Hungary and the second highest in HUDC. And brushing teeth several times a day is the lowest among Hungary and HUDC. HUDC had the lowest rate of physical activity on 7 of the 7 days prior to the survey, followed by adolescents in Hungary. The highest proportion of adolescents living in Slovakia performed physical activity during the survey period. Hungary had the highest proportion of obese young people. In contrast, when looking at self-perceived body image, young people in Poland had significantly the highest rates of perceived obesity compared to the other countries. In Hungary, initiatives are being taken by health policy to

 doi:10.20944/preprints202403.0958.v1

reduce the prevalence of obesity and promote healthy lifestyles, but unfortunately these are not yet reflected in health indicators as expected.

In Hungary, Act CXC of 2011 on National Public Education states that pupils must participate in at least one physical education lesson every school day [25]. To promote healthy eating, there is a school fruit and vegetable programme and a school milk programme, the implementation of which is regulated by the Ministry of Agriculture Decree 15/2021 (31.III.) and Decree 19/2021 (5.V.). The consumption of fruit, vegetables, milk and milk products takes place several times a week in the institutions participating in the programme [26, 27]. In order to protect children's health, school canteens have reduced the availability of soft drinks with added sugar or sweeteners, energy drinks, pre-packaged products with added sugar or sweeteners, snacks with high salt content and snacks with high saturated fat content [28].

HUDC rated their health as the best, although the difference is not significant. Symptoms related to physical and mental well-being, such as dizziness, depression, stomach pain, backache, headache and sleep problems were the most common for Hungary in all cases. The prevalence rates for depression, stomach pain, headache and sleep problems at least monthly were all significantly higher in Hungary than in the other Visegrad countries. HUDC rates of depression and sleep problems occurring at least monthly were the second highest after Hungary.

The Hungarian Comprehensive School Health Promotion Programme has been a requirement for all public education institutions in Hungary since 2012, focusing on healthy eating, daily physical education, health literacy and mental health promotion, with the aim of ensuring that all children benefit from programmes that effectively improve their health and promote their overall physical, mental and emotional well-being. In schools, special attention needs to be paid to various chemical and behavioural addictions [29].

Among the risk behaviours, we examined the prevalence of drunkenness and found that Hungarian young people had the highest prevalence of at least 2-3 binge drinking episodes.

More than 90% of young people live with their mother, with the highest rate in Poland. The rate of father living with the family is lower, but the highest in Poland. Most mothers of the children surveyed have a job in the Czech Republic, and the least for the mother of the HUDC. Slovakia has the highest proportion of fathers with a job and the lowest proportion of HUDC living with their father.

5. Conclusions

Hungary lags behind the other Visegrad countries in most of the health behaviour parameters examined. Hungarian children have a significantly higher prevalence of somatic complaints and worse mental well-being parameters. Children with disabilities have significantly higher rates of schoolwork stress compared to other countries. Their health status is rated by HUDC with the lowest rate of excellent. The results suggest that further interventions are needed in Hungary and that differentiated, professionalised health promotion is needed for young people with disabilities. Interventions based on inter-professional cooperation to protect mental health need to be developed and implemented, taking into account the specific needs of young people with disabilities. It is clear that the congruence of health and youth policy goals can make a significant contribution to the further development of health behaviour among young Hungarians. Community interventions based on interdisciplinary scientific evidence can achieve their social goals if time-tested central regulation takes into account the principle of subsidiarity. Accordingly, in the definition of cross-border health policy strategies in the Visegrad countries, indicators of health behaviour of Hungarian young people should be taken into account to improve somatic and mental conditions. More specifically, a healthy diet, regular exercise and complex planning and organisation of oral health care can reduce the risk of developing early obesity, depression, depression, excessive alcohol consumption, cigarette smoking, drug use and frequent headaches. At population level, steps to improve health behaviour should be monitored through follow-up; longitudinal scientific research in this area should be continued. The researchers propose to extend the research to young adolescents with disabilities in

 doi:10.20944/preprints202403.0958.v1

the Visegrad countries, on the basis of which a methodology for injury-specific health promotion could be developed, including through international interdisciplinary cooperation.

Author Contributions: : A.B., R.J.E., P.T., A.Cs.N., – conceptualization; A.B. Gy.J., A.S., R.J.E. A.K.M.G., A.N., E. T-S.- formal analyisis A.B., R.J.E., A.N., A.K.M.G.– methodology; B.Á., – writing, original draft preparation; R.J.E, A.S., Gy.J., A.N., V.P.,E.T-S.,– writing, review and editing; A.Cs.N., A.B., P.T. – statistical analysis. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board The research was approved by the Scientific and Research Ethics Committee, license number: IV/5706- 1/2021/EKU.

Informed Consent Statement: Written informed consent has been obtained from the parents and the children to publish this paper.

Acknowledgments: This work was supported by University of Debrecen. The authors of this study thanks all the schools and students who participated in the survey, and also many thanks to the HBSC research team.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. OECD/European Observatory on Health Systems and Policies (2024), Magyarország: Egészségügyi országprofil 2023, OECD Publishing, Paris, https://doi.org/10.1787/5adc0e05-hu. Available from: https://read.oecd-ilibrary.org/social-issues-migration-health/magyarorszag-egeszsegugyi-orszagprofil-2023_5adc0e05-hu#page3 (accessed on: 10. February 2024).
2. Központi Statisztikai Hivatal (2018), Statisztikai Tükör, Egészségi állapot és egészségmagatartás, 2016–2017. Available from: https://www.ksh.hu/docs/hun/xftp/stattukor/egeszsegallapot1617.pdf (accessed on: 02. Marc 2024.)
3. Visegrad Group. Available from: https://www.visegradgroup.eu/hu (10. February 2024).
4. Központi Statsiztikai Hivatal. Available from: https://www.ksh.hu/stadat_files/nep/hu/nep0060.html (10. February 2024).
5. OECD/European Observatory on Health Systems and Policies (2023), Szlovákia: Országos Egészségügyi Profil 2023, Egészségügyi állapot az EU-ban, OECD Publishing, Párizs, https://doi.org/10.1787/98f25a9b-en. Available from: https://read.oecd-ilibrary.org/social-issues-migration-health/slovakia-country-health-profile-2023_98f25a9b-en#page3 (accessed on: 15. February 2024).
6. OECD/European Observatory on Health Systems and Policies (2023), Poland: Country Health Profile 2023, State of Health in the EU, OECD Publishing, Paris, https://doi.org/10.1787/f597c810-en. Available from: https://read.oecd-ilibrary.org/social-issues-migration-health/poland-country-health-profile-2023_f597c810-en#page1 (accessed on: 15. February 2024).
7. OECD/European Observatory on Health Systems and Policies (2021), Czech Republic: Country Health Profile 2021, State of Health in the EU, OECD Publishing, Paris, https://doi.org/10.1787/8b341a5e-en. Available from: https://read.oecd-ilibrary.org/social-issues-migration-health/czechia-country-health-profile-2023_24a9401e-en#page1 (accessed on: 15. February 2024).
8. Eurostat Statistics Explained. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Causes_of_death_statistics (accessed on: 16. February 2024).
9. OECD iLibrary. Available form: https://read.oecd-ilibrary.org/social-issues-migration-health/rakugyi-orszagprofil-magyarorszag-2023_39a8899f-hu#page5 (accessed on: 05. Marc 2024).
10. World Health Organization, European Health Information Gateway. Available from: https://gateway.euro.who.int/en/indicators/hfa_74-1110-infant-deaths-per-1000-live-births/#id=18879 (accessed on: 15. February 2024).
11. Németh Á., Várnai D. (2019): Kamaszéletmód Magyarországon: Az Iskoláskorú gyermekek egészségmagatartása elnevezésű, az Egészségügyi Világszervezettel együttműködésben megvalósuló nemzetközi kutatás 2018. évi felméréséről készült nemzeti jelentés. ELTE PPK – L'Harmattan Kiadó Budapest, Magyarország, 265 p.
12. Health Behaviour in school-aged children: Spotlight on adolescent health and well-being Findings from the 2017/18 Health Behaviour in School-aged Children (HBSC) survey in Europe and Canada. Available from: https://hbsc.org/publications/reports/spotlight-on-adolescent-health-and-well-being/ (accessed on: 08. February 2024).
13. Országgyűlés Hivatala Közgyűjteményi és Közművelődési Igazgatóság (2021), https://www.parlament.hu/documents/10181/39233854/Infojegyzet_2021_47_Gyermekgarancia_gyermekegeszseg.pdf/3a9c202a-3dfb-77e1-7e30-1af626f680e6?t=1623134135105 (accessed on: 11. February 2024).

14. Kuper H., Heydt P. (2019), The missing billion: acces to health services for 1billion people with disabilities. London: International Centre for Evidence in Disability; 2019 Available from: https://www.lshtm.ac.uk/media/38726. (accessed on: 15. February 2024).
15. https://www.consilium.europa.eu/hu/infographics/disability-eu-facts-figures/ (accessed on: 15. February 2024).
16. https://www.ksh.hu/docs/hun/xftp/idoszaki/mikrocenzus2016/mikrocenzus_2016_8.pdf (accessed on: 15. February 2024).
17. Bertapelli F., Pitetti K., Agiovlasitis S., Guerra-Junior G. (2016): Overweight and obesity in children and adolescents with Down syndrome-prevalence, determinants, consequences, and interventions: A literature review. Res Dev Disabil. 2016 Oct;57:181-92. doi: 10.1016/j.ridd.2016.06.018. Epub 2016 Jul 19. PMID: 27448331.
18. https://iris.who.int/bitstream/handle/10665/372865/9789240080539eng.pdf?sequence=1 (accessed on: 18. February 2024).
19. Dixon-Ibarra A., Lee M., Dugala A. Physical activity and sedentary behavior in older adults with intellectual disabilities: a comparative study. Adapt Phys Activ Q. 2013 Jan;30(1):1-19. doi: 10.1123/apaq.30.1.1. PMID: 23283028.
20. Barabás Á., Nagy M., Grestyák M. AK., Nagy AC., Pazmany V, Zahatňanská M., Konečná M. et al (2023), Nutrition habits and physical activity of disabled adolescents in Hungary. Cent Eur J Public Health. (Suppl 1):S55-S61. doi: 10.21101/cejph.a8058. PMID: 38272479.
21. Tahan L., Habchy P., Moussi C., Khadra T., Jawich M, Njeim A., Kattan O., Abou Habib L., El Bitar W., El Asmar B., et al. A National School Health Campaign in Lebanon on Children Aged between 3 and 12 Years Old: Concordance Level between Parents' Reports and Medical Visit Findings about Physical and Mental Health. Children. 2024; 11(2):214. https://doi.org/10.3390/children11020214
22. Központi Statisztikai Hivatal Mikrocenzus 2016. A fogyatékos és az egészségi ok miatt korlátozott népesség jellemzői. Available from: https://www.ksh.hu/docs/hun/xftp/idoszaki/mikrocenzus2016/mikrocenzus_2016_8.pdf (accessed on: 11. February 2024).
23. StataCorp. Stata Statistical Software: Release 17. College Station: Stata-Corp LLC; 2021.
24. Csata Zsombor, Tóth-Batizán Emese Emőke, Lelkes Gábor. Report on the health condition of minority Hungarians inCentral and Eastern Europe. In Erdélyi Társadalom (Transylvanian Society). 2022; 20(2):9@49. DOI: 10.17177/77171.275
25. 2011. évi CXC. törvény a nemzeti köznevelésről. Available from: https://net.jogtar.hu/jogszabaly?docid=a1100190.tv (accessed on 05. Marc 2024).
26. 15/2021. (III. 31.) AM rendelet az iskolagyümölcs- és iskolazöldség-program végrehajtásáról. Available from https://net.jogtar.hu/jogszabaly?docid=a2100015.am (accessed on 05. Marc 2024).
27. 19/2021. (V. 5.) AM rendelet az óvoda- és iskolatej program szabályozásáról. Available from: https://net.jogtar.hu/jogszabaly?docid=a2100019.am (accessed on 05. Marc 2024).
28. 2011. évi CIII. törvény a népegészségügyi termékadóról. Available from: https://net.jogtar.hu/jogszabaly?docid=a1100103.tv (accessed on 06. Marc 2024).
29. 20/2012. (VIII. 31.) EMMI rendelet a nevelési-oktatási intézmények működéséről és a köznevelési intézmények névhasználatáról. Available from: https://net.jogtar.hu/jogszabaly?docid=a1200020.emm (accessed on 06. Marc 2024).