

Risk Behaviour of Adolescents Aged 10–15 in Slovakia. Relation to Sex, Age, and Body Mass Index

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BACKGROUND: As a theoretical base we used Jessor's concept of the Syndrome of Risk Behaviour in Adolescence, the self-concept, and the concept of body image. **AIM:** The main aim of the contribution was research on the relations between the self-schema, specifically the physical proportions represented by BMI, and risk behaviour. The secondary aims were research on the relations between the self-schema, specifically the physical proportions represented by BMI, and sex and age. **METHOD:** In the research we used the 46-item modified version of the Risk Behaviour Questionnaire (Čerešník, 2016). **SAMPLE:** We acquired data from almost 900 adolescents from all regions of Slovakia. They were aged from 10 to 15 ($M = 12.69$; $SD = 1.48$). They were attending the lower system of secondary schools. **RESULTS:** We found that there are significant sex and age differences in some manifestations of risk behaviour. We also found that adolescents with a higher BMI (above the 85th percentile) behave in a more risky manner.

CONCLUSIONS: We identified the differences in risk behaviour in relation to sex (boys are at greater risk in the areas of abuse and delinquency, girls in the areas of inadequate eating and physical activity) in relation to age in overall risk behaviour and in several monitored areas, with an increasing level of risk up to the age of 14, and in relation to BMI in overall risk behaviour and on the subscales of delinquency and inadequate eating and physical activity (adolescents with higher BMI are at greater risk).

Keywords | Risk Behaviour – Adolescence – Sex – Gender – BMI

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1 BACKGROUND

Some research findings suggest that more than half of adolescents behave in a risky way at least once in their lives (e.g. Smart et al., 2004). We were interested in whether the manifestations of risk behaviour are related to physical self-concept, specifically body proportions. The very strong targeting of social norms to the desired look sets the norm for what the ideal body should look like. This norm operates very strongly during adolescence. The standard of appearance includes how attractive and appreciated the body is. This is also associated with the integration of the adolescent into peer interactions and social attractiveness. The strength of peer bonds intensifies in adolescence. Adolescents emancipate themselves from their parents and their reference points become peers and their acceptance. Adolescents use various social strategies to be included in their peer group, including increasing their own social attractiveness through the production of some form of risk behaviour. The aim of this paper is to look at the production of risk behaviour in relation to the body proportions of adolescents (expressed through the BMI index).

The term “risk behaviour in adolescence” is a relatively recent addition to the literature, although it must be said that the phenomenon which is hidden behind it certainly has a longer history. The main conceptual basis of the article is the studies of Jessor, who has carried out a series of research studies on psychosocial development in adolescence since the 1970s (e.g. Jessor & Jessor, 1977). His longitudinal research on adolescents aged from 14 to 22 years led to the formulation of two basic concepts called *risk behaviour syndrome* and *problem behaviour syndrome*. These are sets of symptomatic units that are assumed to arise on the same basis. Gradually, for these two syndromes, the single name “*syndrome of risk behaviour in adolescence*” (RBS-A) has become used, and in it the last part (“in adolescence”) is significant. This is related to the fact that some of the behavioural manifestations are problematic only in relation to this age, specifically this stage of adolescence.

Jessor (1991) assumed that adolescent risk behaviour has its purpose linked to (1) positive satisfaction in developmental problems, (2) solving a current personal problem, or (3) replacing something the adolescent lacks. In connection with the last purpose, Langmeier and Matějček (2011) talk about compensating for the experience of deprivation. All of these benefits identified by Jessor (1991) appear to have sufficient power for adolescents to ignore the serious consequences of their behaviour, such as premature pregnancy, substance or non-substance addictions, school failure, and the like. But, however riskily adolescents may behave in some areas, they can behave appropriately in others.

The latest reports on risk behaviour in adolescence (WHO Reports (2014a, 2014b); HBSC study (Madarasová Gecková et al., 2019; ESPAD study (ESPAD, 2020) showed alarming numbers that point to the validity of the definition of risk behaviour according to Jessor (1991) and the need to identify risk behaviour in early adolescence. Here are some of the manifestations of adolescent risk behaviour: the proportion of bullying behaviour is increasing (the differences among countries can be as

high as 50%), in the age group aged 12 to 18 years about 40% of adolescents eat breakfast regularly, about a third of them consume fruits and vegetables, about 55% eat regularly with their parents, 15% are overweight or obese, about 20% have already been on a diet (with a predominance of girls), 18% engage in physical activity for at least an hour a day (with a predominance of boys), 20% have a risky amount of body fat (boys predominate), 26% use social media for four hours or more on normal school days and 54% at weekends and during holidays, and 9% play computer games for four hours or more on normal school days and 24% at weekends and during the holidays.

However, the definition of risk behaviour is not clear and there is currently no general consensus on what the mandatory categories are. Several authors (e.g. Miovský & Zapletalová, 2006; Dolejš, 2010; Nielsen Sobotková et al., 2014) approach this problem in very different ways. But many definitions agree on certain elements of content. Risk behaviour is an inclusive term that includes various forms of behaviour, from the least serious (in terms of harmfulness to the organism and its surroundings, e.g. truancy, defiant behaviour) to the most serious (e.g. suicidal tendencies, use of psychoactive substances).

Whether there are any factors that can contribute to the development of RBS-A and, conversely, whether there are factors that can protect adolescents is a legitimate question. We can say that they exist. We name them as *risk factors* (triggers) and *protective factors*. They are divided into three groups: (1) individual, (2) family, and (3) social. In relation to the topic of the paper, we will focus on the group of factors identified by Jessor (1998) in the group of individual factors. Risk factors include neglect and abuse, behavioural disorders, genetic burden, low self-esteem and self-confidence, chronic illness, poor school performance, low aspirations, uncertain prospects for the future, hopelessness, unemployment, friends with inappropriate behaviour, belonging to socially excluded minorities, pregnancy, and one's own parenthood. On the contrary, protective factors include high intelligence, high self-esteem and self-confidence, a positive perspective on the future, social skills, the ability of self-control, positive peers, a positive attitude to school, a positive attitude to health, religiosity, and volunteering. On the individual level, high self-esteem and self-confidence are important protective factors which also relate to the self-schema and self-concept. A person who is dissatisfied with his/her own body and his/her ego usually has lower self-esteem and self-confidence, which can be one of the causes of risk behaviour.

Self-concepts include ideas and evaluative judgments that a human being has about himself or herself, as well as a complex relationship with oneself (Blatný & Plhánková, 2003; Smékal, 2009). An integral part of these is self-evaluation as a mental representation of the emotional relationship to oneself, which is formed on the basis of self-knowledge and social comparison (Macek, 2008; Smékal, 2009; Tomšík, 2014). Fialová (2001) states that high self-esteem is related to good health, positive social behaviour, success, and satisfaction and is a prerequisite for a subjective feeling of well-being. On the other hand, low self-esteem is associated with risk health behaviours and social problems. All self-concepts, in accordance with Blatný

(2003), can be classified as a hypothetical construct termed *the general self-concept*. This has several components that relate to the person and the social environment in which he or she lives. On the basis of this, we can talk about e.g. school self-concept, work self-concept, and also physical self-concept. The components of the self-concept are relatively autonomous. However, a mutually influential relationship applies; it means the general self-concept affects the quality of the individual components and the quality of the individual components of the self-concept affects the general self-concept. If we focus on the relationship between body image and general self-concept, we can assume that how we perceive our own body significantly affects our perception of ourselves as a personality, including emotional relationships, attitudes, goals, and specific behaviour. Strauss (2000) pointed out the relationship between physical self-concept and self-esteem in school-age children. He identified significantly lower self-esteem in obese children (especially girls) compared to adolescents with normal weight. At the same time, he observed a tendency to loneliness, nervousness, and sadness. Subsequently, over the next four years, these adolescents experienced a higher level of risk behaviour, especially in relation to alcohol and cigarette use.

Grogan (2000) perceives the body image as a way of thinking about one's body, how one perceives and feels it (it includes emotions associated with perceiving the shape and size of one's own body, estimating body size, and opinion about its size). Sejščová (2008) states that the body self-concept (body-image) is made up of a perceptual component connected to the degree of accuracy in estimating the size and shape of one's own body, an emotional component, connected to the degree of satisfaction or dissatisfaction with one's own body, and a behavioural component, which involves avoiding situations that cause discomfort associated with one's physical appearance. Farhat et al. (2010) provided information about the relationship between the risk behaviour of overweight and obese adolescents. In a study of 11- to-17-year-old adolescents in the United States, they showed that overweight and obese adolescents are at risk of developing health-threatening behaviours. They also identified significant differences with regard to age and sex in obese adolescents. While overweight and obese girls are more likely to display abusive risk behaviour, boys are more likely to be bullied (younger boys) or be more interested in weapons and violence (older boys).

1.1 Aims

The aim of the study is to find out if there are differences in the production of risk behaviour by adolescents in relation to sex, age, and body proportions (expressed by BMI). Jessor (1998) mentioned high self-confidence and self-esteem among the individual protective factors that prevent the production of risk behaviour. Fialová (2001) states that low self-esteem is associated with risk health behaviour. We consider obesity to be a form of risk health behaviour. In adolescence, physical self-concept is an essential component of self-concept and is related to self-constructs. Adolescents react very sensitively to changes in their physical constitution, especially in relation to social comparisons and social norms. Our goal is to focus on

the relationship between adolescent body proportions (through the calculation of BMI) and the prevalence of risk behaviour production. We assume that adolescents with a higher BMI will be at greater risk because of an effort to integrate themselves into peer groups and gain social attractiveness.

We have formulated statistical hypotheses in relation to the research method (below) as follows:

- H1:** We assume that there will be intersexual differences in the score on the subscale “family and daily rituals”.
- H2:** We assume that there will be intersexual differences in the score on the subscale “school and friendships”.
- H3:** We assume that there will be intersexual differences in the score on the subscale “addictive behaviour”.
- H4:** We assume that there will be intersexual differences in the score on the subscale “delinquent behaviour”.
- H5:** We assume that there will be intersexual differences in the score on the subscale “bullying”.
- H6:** We assume that there will be intersexual differences in the score on the subscale “inappropriate eating habits and physical activity”.
- H7:** We assume that there will be intersexual differences in the score on the scale “risk behaviour”.
- H8:** We assume that there will be age differences in the score on the subscale “family and daily rituals”.
- H9:** We assume that there will be age differences in the score on the subscale “school and friendships”.
- H10:** We assume that there will be age differences in the score on the subscale “addictive behaviour”.
- H11:** We assume that there will be age differences in the score on the subscale “delinquent behaviour”.
- H12:** We assume that there will be age differences in the score on the subscale “bullying”.
- H13:** We assume that there will be age differences in the score on the subscale “inappropriate eating habits and physical activity”.
- H14:** We assume that there will be age differences in the score on the scale “risk behaviour”.
- H15:** We assume that there will be differences in the score on the subscale “family and daily rituals” in relation to BMI.
- H16:** We assume that there will be differences in the score on the subscale “school and friendships” in relation to BMI.
- H17:** We assume that there will be differences in the score on the subscale “addictive behaviour” in relation to BMI.

H18: We assume that there will be differences in the score on the subscale “delinquent behaviour” in relation to BMI.

H19: We assume that there will be differences in the score on the subscale “bullying” in relation to BMI.

H20: We assume that there will be differences in the score on the subscale “inappropriate eating habits and physical activity” in relation to BMI.

H21: We assume that there will be differences in the score on the scale “risk behaviour” in relation to BMI.

2 METHODS

We used the Risk Behaviour Questionnaire (RBQ) in the research. The Risk Behaviour Questionnaire is an original, non-standardised questionnaire developed by Čerešník in 2016. The method was developed on the basis of clinically significant risk behaviour indicators according to the HBSC and ESPAD studies. A modified 46-item version was used in this research. Participants chose from three to eight response options – always in relation to the content of the item. The questionnaire is internally structured into six subscales:

- *Family and Daily Rituals* (FDR) includes items related to the daily activities of the family and the general assessment of the relationship with the parents. Example item: How would you rate the family rules in your family? The possible point range for this subscale is 0 to 15 points.
- *School and Friendship* (SF) includes items aimed at assessing the relationship with the school and classmates. Example item: How do you rate the claims that your teachers make against you? The possible point range for this subscale is 0 to 9 points.
- *Addictive Behaviour* (AB) includes items about the use of the most common psychoactive substances. Example item: How many times have you drunk alcohol? The possible point range for this subscale is 0 to 38 points.
- *Delinquent Behaviour* (DB) includes items about problematic behaviour related to the destruction of the property of others and respect for authority. Example item: How many times have you forged your parents' signatures? The possible point range for this subscale is 0 to 32 points.
- *Bullying* (BUL) includes items that focus on perceiving themselves as victims of bullying. Example item: How many times has someone hurt you on the internet? The possible point range for this subscale is 0 to 32 points.
- *Inappropriate Eating Habits and Physical Activity* (IEHP) includes items about passive leisure and inappropriate eating patterns. Example item: How many times a week do you eat raw vegetables? The possible point range for this subscale is 0 to 24 points.

The sum of the points for all items represents the total *Risk Behaviour* score (RB). The Cronbach's α for the whole questionnaire is 0.828.

2.1 Sample

The parent population of our research consisted of pupils from the fifth to ninth grades of basic schools¹. The representation in the individual regions of Slovakia was as follows: Bratislava N = 19,992, Trnava N = 21,267, Trenčín N = 20,876, Nitra N = 24,741, Žilina N = 28,340, Banská Bystrica N = 23,960, Prešov N = 34,083, Košice N = 23,913 (ÚIPŠ, 2018). The total number of pupils attending the fifth to ninth grades of basic schools in the 2017/2018 school year was 203,172.

The research sample consisted of 897 adolescents in the age range from 10 to 15, with a mean age of 12.69 years (standard deviation 1.48). The proportion of boys and girls was 432:465. The representation of grades was as follows: fifth grade N = 201, sixth grade N = 193, seventh grade N = 172, eighth grade N = 163, ninth grade N = 168. The research was implemented in all the regions of Slovakia.

We collected data at basic schools from adolescents attending the fifth to ninth grades. We chose the schools randomly. We contacted them with a request for cooperation by email and by phone. If the school refused to cooperate, we repeated the process. The data collection was preceded by obtaining informed consent from the adolescents' parents. The data collection was anonymised and was conducted in concordance with Law 245/2008 (about the education), 18/2018 (about the protection of personal data) and 199/1994 (about psychological activity). The identities of the participants cannot be identified.

3 RESULTS

We present the results in Tables 1 to 4. We used the Mann-Whitney test and the Kruskal-Wallis test in the statistical analysis. We accepted a standard significance level of $\alpha \leq .05$. To test the effect size we used Cohen's *d*.

In *Table 1* we present the descriptive characteristics of the whole research sample. *Tables 2, 3, and 4* show the results of the comparisons. We compared risk behaviour

- in relation to sex: boys and girls (*Table 2*),
- in relation to age: 10, 11, 12, 13, 14, and 15 years old (*Table 3*)
- in relation to BMI:
 - (1) group with low BMI (lower than the fifth percentile),
 - (2) with normal BMI (sixth to 84th percentiles) and

1 | In Slovakia there are „the basic schools“. They are divided into lower and higher degree. The 1st, 2nd, 3rd, 4th grades belong to primary education (age 6/7 – 10/11; lower degree; ISCED 1) and 5th, 6th, 7th, 8th, 9th grades belong to lower secondary education (age 10/11 – 15/16; higher degree; ISCED 2).

Table 1 | Descriptive statistics of whole research sample

	FDR	SF	AB	DB	BUL	IEPA	RB
N	846	879	839	873	868	869	730
M	4.61	3.74	7.40	3.41	12.22	8.96	40.05
SD	2.86	1.59	4.96	3.77	4.74	3.70	13.89
SEM	0.10	0.05	0.17	0.13	0.16	0.13	0.51

Note: FDR = family and daily rituals; SF = school and friendships; AB = addictive behaviour; DB = delinquent behaviour; BUL = bullying; IEPA = inappropriate eating habits and physical activity; RB = risk behaviour; N = count; M = mean; SD = standard deviation; SEM = standard error of mean

Table 2 | Comparison of risk behaviour of adolescents in relation to sex

Gender		FDR	SF	AB	DB	BUL	IEPA	RB
Males	N	406	424	402	421	420	418	352
	M	4.36	3.77	7.89	4.07	12.12	9.28	41.05
	SD	2.82	1.59	5.36	4.09	4.91	3.81	13.99
	SEM	0.14	0.08	0.27	0.20	0.24	0.19	0.75
Females	N	440	455	437	452	448	451	378
	M	4.83	3.72	6.95	2.79	12.31	8.67	39.12
	SD	2.87	1.59	4.52	3.32	4.57	3.58	13.76
	SEM	0.14	0.07	0.22	0.16	0.22	0.17	0.71
U		80523.5	94334.0	80434.0	73673.5	89894.5	84741.5	61421.0
p		0.013	0.562	0.034	0.000	0.252	0.010	0.073
d Cohen		0.165	-0.031	-0.19	-0.345	0.04	-0.165	-0.139

Legend: FDR = family and daily rituals; SF = school and friendships; AB = addictive behaviour; DB = delinquent behaviour; BUL = bullying; IEPA = inappropriate eating habits and physical activity; RB = risk behaviour; N = count; M = mean; SD = standard deviation; SEM = standard error of mean; U = result of Mann-Whitney test; p = significance; d_{Cohen} = Cohen's d

(3) higher BMI (85th percentile and higher) (Table 4). We calculated BMI on the basis of data on the height and weight of the adolescents, which they reported in the Risk Behaviour Questionnaire (Čerešník, 2016). We took age into consideration and the percentiles for each adolescent were calculated according to growth tables (National Center for Health Statistics, 2022).

We are aware that BMI is not accurate in determining overweight and obesity in children, in the population with a high proportion of active body mass, and in tall individuals. The BMI value can overestimate body fat in these cases. In the elderly population, the BMI tends to underestimate the body fat (Romero-Corral et al., 2008; Maynard et al., 2001).

We found that girls are at greater risk in the family and daily rituals subscale ($U = 80523.5$; $p = .013$) and boys are at greater risk in the subscales concerned with addictive behaviour ($U = 80434.0$; $p = .034$), delinquent behaviour ($U = 73673.5$; $p < .001$), and inappropriate eating habits and physical activity ($U = 84741.5$; $p = .010$). The differences are insignificant in relation to effect size. The differences in delinquent behaviour can be interpreted as small ($d = -0.345$).

In relation to age, we found significant differences in risk behaviour in the subscales dealing with family and daily rituals ($H = 28.674$; $p < .001$), school and friendship ($H = 13.509$; $p = .019$), addictive behaviour ($H = 85.079$; $p < .001$), delinquent behaviour ($H = 58.581$; $p < .001$), and the overall risk behaviour score ($H = 43.903$; $p < .001$). We always identified the same trend. There is a gradual increase in risk behaviour together with increasing age and peaking in the 14th year of life. The subscales for addictive behaviour and inappropriate eating and physical activity were exceptions, peaking in the 15th year. The effect size testing pointed to negligible differences in the variables for school and friendship, bullying, and inappropriate eating and physical activity. We found small differences in the variable for family and daily rituals ($d = 0.341$) and overall risk behaviour scores ($d = 0.477$). We found medium differences in the variables for addictive behaviour ($d = 0.652$) and delinquent behaviour ($d = 0.513$).

In relation to BMI, we found significant differences in the subscales for family and daily rituals ($H = 6.271$; $p = .043$), delinquent behaviour ($H = 10.655$; $p = .005$), inappropriate eating habits and physical activity ($H = 31.493$; $p < .001$), and overall

Table 3 | Comparison of risk behaviour of adolescents in relation to age

Age		FDR	SF	AB	DB	BUL	IEPA	RB
10	N	46	49	42	48	47	46	37
	M	3.63	3.33	5.52	2.19	11.83	8.72	33.68
	SD	2.53	1.51	4.24	3.29	4.20	4.17	14.01
	SEM	0.37	0.22	0.65	0.47	0.61	0.62	2.30
11	N	163	180	165	171	173	172	133
	M	3.86	3.46	5.48	2.51	12.29	8.34	35.45
	SD	2.68	1.58	3.94	3.32	4.71	3.88	12.80
	SEM	0.21	0.12	0.31	0.25	0.36	0.30	1.11
12	N	182	189	182	189	190	190	165
	M	4.62	3.74	6.75	3.06	12.45	8.90	39.91
	SD	2.77	1.46	4.21	3.32	4.96	3.45	12.43
	SEM	0.21	0.11	0.31	0.24	0.36	0.25	0.97
13	N	186	190	187	192	191	189	165
	M	4.61	3.97	7.43	3.17	12.63	9.23	40.30
	SD	2.91	1.55	4.99	3.51	5.31	3.60	14.39
	SEM	0.21	0.11	0.37	0.25	0.38	0.26	1.12
14	N	134	135	134	135	133	137	115
	M	5.50	3.96	8.79	4.88	12.50	9.31	44.57
	SD	2.89	1.59	4.80	4.46	4.63	3.39	14.46
	SEM	0.25	0.14	0.42	0.38	0.40	0.29	1.35
15	N	135	136	129	138	134	135	115
	M	4.93	3.74	9.88	4.30	11.06	9.19	42.76
	SD	2.90	1.81	5.96	4.06	3.62	4.05	13.69
	SEM	0.25	0.16	0.52	0.35	0.31	0.35	1.28
H		28.674	13.509	85.079	58.581	8.951	8.271	43.903
p		0.000	0.019	0.000	0.000	0.111	0.142	0.000
d Cohen		0.341	0.198	0.652	0.513	0.136	0.123	0.477

Legend: FDR = family and daily rituals; SF = school and friendships; AB = addictive behaviour; DB = delinquent behaviour; BUL = bullying; IEPA = inappropriate eating habits and physical activity; RB = risk behaviour; N = count; M = mean; SD = standard deviation; SEM = standard error of mean; H = result of Kruskal-Wallis test; p = significance; d_{Cohen} = Cohen's d

risk behaviour ($H = 16.860$; $p < .001$). The group at greatest risk was adolescents with a BMI higher than the 85th percentile. The effect size testing pointed to negligible differences in the variables for family and daily rituals, school and friendships, addictive behaviour, and bullying. We found small differences in the variables for delinquent behaviour ($d = 0.200$), inappropriate eating and physical activity ($d = 0.376$), and overall risk behaviour ($d = 0.289$).

4 DISCUSSION

The aim of the study was to find out if there are differences in the production of risk behaviour by adolescents in relation to sex, age, and body proportions (expressed by BMI). We were interested in whether there was a relationship between physical

schema and the production of some kind of risk behaviour by adolescents. We also tested the sex and age differences. We did not deal directly with the perception of one's own body in the original research in all its components, as described by Sejščová (2008); we worked with the BMI index as a normative indicator and we divided the research group into three groups – low BMI, normal BMI, and higher BMI. This distribution corresponds to adolescent growth tables according to age. Low BMI was below the fifth percentile, normal BMI from the sixth to the 84th, and high BMI above the 85th percentile. We are aware of the methodological limitations of such processing. The intervals defining the groups are not equal and the normal BMI defined by the sixth to 84th percentiles is wide. However, the fifth and 85th percentiles are clinically significant values in paediatrics in relation to the normal weight of adolescents. It is clear that the interval above the 85th percentile can be divided more pre-

Table 4 | Comparison of risk behaviour of adolescents in relation to BMI

BMI		FDR	SF	AB	DB	BUL	IEPA	RB
Low	N	54	55	54	56	52	57	45
	M	3.91	3.53	7.13	2.95	11.37	8.11	35.73
	SD	2.557	1.438	4.872	3.792	3.941	4.083	12.727
	SEM	0.348	0.194	0.663	0.507	0.547	0.541	1.897
Average	N	637	657	628	654	654	649	551
	M	4.55	3.69	7.24	3.26	12.01	8.66	39.37
	SD	2.816	1.550	4.836	3.642	4.507	3.583	13.467
	SEM	0.112	0.060	0.193	0.142	0.176	0.141	0.574
High	N	155	167	157	163	162	163	134
	M	5.07	4.04	8.14	4.16	13.31	10.45	44.30
	SD	3.060	1.766	5.425	4.159	5.646	3.677	15.107
	SEM	0.246	0.137	0.433	0.326	0.444	0.288	1.305
H		6.271	5.595	4.232	10.655	5.339	31.493	16.860
p		0.043	0.061	0.121	0.005	0.069	0.000	0.000
d Cohen		0.143	0.128	0.103	0.2	0.125	0.376	0.289

Legend: FDR = family and daily rituals; SF = school and friendships; AB = addictive behaviour; DB = delinquent behaviour; BUL = bullying; IEPA = inappropriate eating habits and physical activity; RB = risk behaviour; N = count; M = mean; SD = standard deviation; SEM = standard error of mean; H = result of Kruskal-Wallis test; p = significance; d_{Cohen} = Cohen's d

cisely according to the level of the overweight. The distribution is consistent with our aim of determining whether adolescents with a higher BMI tend to engage in more risk behaviour. The results suggest a relationship between an adolescent's risk behaviour and his or her weight which is outside the norm. This result is more common in the group of heavier adolescents.

Reduced self-esteem and awareness of self-inferiority in obese adolescents have been confirmed in research by e.g. Sejčová (2008). Feelings of inferiority and low self-esteem can lead to the production of risk activities (e.g., smoking, alcohol use, theft), which are intended by the adolescents to impress their peers and to help them become a part of their peer group or to cope with sadness and loneliness (e.g. Suchá et al., 2018; Strauss, 2000). In our research sample, the trend of growth in the production of risk behaviour in relation to increasing BMI appeared in all six areas that were monitored. We captured statistically significant differences in family and daily rituals and a difference close to statistical significance in school and friendship. These two subscales capture the protective factors of risk behaviour (Jessor, 1998). In the results, we see that the adolescents with a BMI higher than 28 assess their relationships with parents as not good more often, stating that their daily rituals lack shared time and perceived control and parental interest is lower than in the groups with low or average BMI. We observe the same trend between the groups in the area of school and friendship. This result supports our assumption that adolescents with a higher BMI perceive the school environment and their influence in it as more negative. Sejčová (2008) connects a problematic physical self-concept with an effort to avoid environments and

situations that are a source of negative experience. Obesity reduces the quality of one's physical self-perception and thus affects the overall self-perception (Macek, 2008; Strauss, 2000). The adolescents with high BMI in our research sample stated more often that they were not satisfied with their school performance and perceived the school's requirements as inappropriate.

In the subscales of risk behaviour, we noted significant differences in the areas of inappropriate eating habits and physical activity and delinquent behaviour and overall risk behaviour. The growth trend of risk behaviour in all the categories that were monitored (addictive behaviour, delinquent behaviour, bullying, inappropriate eating habits, and physical activity) was reflected in the significant difference identified in the overall risk behaviour. Our findings suggest that a high BMI in adolescents may indicate increased production of risk behaviour or that they will be more often exposed to bullying behaviours. Ratcliff et al. (2011), in a study of adolescents with extreme obesity (above the 99th percentile), pointed out that extremely obese adolescents start to smoke more often (compared to adolescents with a normal BMI) before the age of 13. Obese girls drink alcohol more often and use drugs before sexual activity. The relation between high BMI and risk sexual behaviour was studied in sexually active older high school students (16–17 years old) by Lowry et al. (2014). They found that adolescents with a high BMI were more likely to have multiple sexual partners or engage in unprotected sex. Adolescent boys and girls who are overweight or obese are also more likely to use drugs than adolescents who are of normal weight. Both studies point

out that high BMI is associated with risk sexual behaviour and drug use.

In our research, we analysed the data from adolescents with an average age of 12.69 years, and therefore we did not deal directly with risk sexual behaviour. Ratcliff et al. (2011) report that high BMI is a protective factor in risk sexual behaviour in younger adolescents because they begin to have sex later. On the other hand, we have identified a growing trend in the prevalence of psychoactive substance use with increasing BMI, and this may also lead to adolescents producing risk sexual behaviour as a consequence of this behaviour. Farhat et al. (2010) identified differences in the tendency to risk behaviour with respect to age. They found that compared to boys of normal weight, younger obese boys became more likely to be bullied. We also found in our research sample that adolescents with high BMI more often perceive themselves as victims of bullying peer behaviour. At the same time, they do not feel good at school and report that they do not have friends at school. Farhat et al. (2010) showed that older obese adolescent boys pay more attention to guns than adolescents of normal weight do. This finding can be interpreted through the theory of individual psychology, which states that every behaviour is goal-oriented and that in children who experience humiliation or bullying, retaliation is a common goal.

The results confirm that the overall prevalence of risk behaviour increases up to the age of 14. In the age cohort of 15-year-olds, we recorded a slight decrease in risk behaviour, but the score remains higher than in the 13-year-old group. In the subscale of addictive behaviour, the average score also increases among adolescents aged 15 years and reaches the highest level among the observed age groups. With increasing age, problematic behaviour in the areas of family relations, school and friendship, and delinquent behaviour also increases significantly. We did not observe statistically significant differences in the area of bullying and inadequate eating habits and physical activity.

We also monitored the risk behaviour of the adolescents in relation to sex. We identified differences between the boys and girls in the area of family relations, where more girls perceive a lack of interest on the part of their parents. Our findings also correspond to the results of Čerešník and Banárová (2021), who identified a higher rate of alienation from their parents (especially their father) among adolescent girls. In the area of risk behaviour, we captured statistically significant differences in addictive behaviour and delinquent behaviour, with the boys being at greater risk. On the subscale of inadequate eating habits and physical activity, girls display higher levels of risk behaviour.

On the basis of our findings, in relation to sex we can support statistical hypotheses 1, 3, 4, and 6; in relation to age we can support statistical hypotheses 8, 9, 10, 11, and 14, and in relation to BMI we can support statistical hypotheses 15, 18, 20, and 21.

There are multiple avenues for future research because of the multifactorial nature of the problem. We perceive the greatest challenge as lying in the combination of healthy lifestyle, strengthening personal competences, working with personal beliefs, and working with the family environment. Adolescents also represent a risk population in relation to the predicted epidemic of overweight and obesity. From the perspective of prevention and intervention, the key variables appear to be effective use of free time, sufficient exercise, strengthening of personal interests, and setting eating rituals with control over sugar and fat intake. From a psychological perspective, it is necessary to adjust the self-schema in accordance with body proportions, an appropriate attitude to food that is not based either on excessive control over food or on trivializing the importance of healthy eating, avoiding/dealing with emotional injuries, and building a healthy belief system, e.g. in the form of "My value does not depend on how I look." However, it is not possible to meet all these challenges without cooperation with the family, particularly the parents. If we fail to cooperate with the family, the adolescent's success in dealing with overweight and related problems is at risk. Therefore, it requires the cooperation of a multidisciplinary team and work with the family as a system, not just pointing to an identified member, who in this case is an overweight adolescent who behaves in a risky way.

5 CONCLUSIONS

The results lead us to conclude that, compared to boys, adolescent girls display more risky behaviours in the area of inappropriate eating habits and physical activity, which can result in eating disorders. They are also more sensitive to family relationships and the interest expressed by their parents; they become alienated from their parents sooner and attach themselves to peers. Adolescent boys behave in a more risky way in the area of abuse and delinquency, which is mainly related to solving the developmental task of inclusion in a peer group. In relation to age, the prevalence of risk behaviour rises continuously until the 14th year; in the 15th year, we recorded a slight decline for all the subscales except the addictive behaviour and inappropriate eating and physical activity subscales. Body proportions, represented by BMI, act as an important variable in some risk behaviours. They can be a screening indicator leading to targeted professional intervention.

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