

PSYCHOSOMATIC PROBLEMS AS THE RESULTS OF PARTICIPATION IN BULLYING BEHAVIOUR OR RISK FACTOR FOR INVOLVEMENT IN BULLYING BEHAVIOR

Damir SESAR¹, Kristina SESAR²

¹Pediatric Primary Care
Health Centre Široki Brijeg
Bosnia and Herzegovina
²Centre for Mental Health
Health Centre Široki Brijeg
Široki Brijeg
Bosnia and Herzegovina

Kristina Sesar
Centre for Mental Health
Health Center Široki Brijeg
88220 Široki Brijeg
Bosnia and Herzegovina
kristina.sesar@tel.net.ba
Tel.: + 387 39 703 870
Fax.: + 387 39 704 936

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paediatricstoday@ukctuzla.ba

Objective - To find out whether involvement in bullying behaviour precedes psychosomatic symptoms or whether these symptoms precede involvement in bullying behaviour.

Subjects and methods - A six-month longitudinal study with baseline measurements taken in the autumn of 2008 and follow-up measurements in the spring of 2009 in four elementary schools in the Široki Brijeg municipalities. The study included 536 children aged 11 to 15 years, who participated by filling out a questionnaire on both occasions of data collection. A self-administered questionnaire measured peer violence and a wide variety of psychosomatic symptoms.

Results - Children involved in bullying behaviour at the beginning of the school year compared to children who were not involved in bullying behaviour had significantly higher chances of developing psychosomatic symptoms such as nervousness and tension (OR=2.59; p=0.010), feeling tired for no reason (OR=2.0; p=0.008) and a feeling of energy loss (OR=2.18; p=0.050) during the school year. At the same time, some psychosomatic problems increase the likelihood of involvement in bullying behaviour. Children who were identified at the beginning of the school year as neutral and who had psychosomatic symptoms which had manifested as dizziness (OR=0.97, p=0.019), feeling tired for no reason (OR=1.84, p=0.018), pain (OR=2.45, p=0.001), eye problems (OR=1.94, p=0.047) and a feeling of energy loss (OR=2.06, p=0.045) were at greater risk of participation in peer violence during the school year.

Conclusion - Many psychosomatic health problems follow involvement in bullying behaviour. Furthermore, our results indicate that children with some psychosomatic health symptoms are at increased risk of being involved in bullying behaviour.

Key words: Bullying ▪ Longitudinal study ▪ Psychosomatic difficulties

Introduction

Research into peer violence was started in the Scandinavian countries under the term "mobbing", introduced by the school doctor, Heinemann. Heinemann's (1) study was the first research into peer violence among elementary school children. His observations made teachers, as well as researchers start thinking about acceptance of such behaviour (2). This was followed by research by Dana Olweus (3), who systematically studied the nature, frequency and long-term consequences of peer violence (mobbing) in Scandinavian schools. In the early 90th, the research was started in Great Britain by using Olweus's instrument for studying violence among children (2). However, in the research the volume of behaviour related to child violence was extended. The validation also included behaviour such as: spreading rumors, social isolation, destruction, as well as loss or stealing of personal property. Due to the changes in the definition of violent behaviour, the term mobbing was substituted by the term bullying (4, 5).

In our language the term bullying is used to replace the following terms: child violence, child abuse, victimization, problems of the bully/victims, peer violence and school violence. Despite the fact that the term "child violence" is the most commonly used, Olweus (3) distinguishes the terms violence and bullying. He defines violence as aggressive behaviour, where the abuser uses his body or some other object in order to injure somebody (relatively seriously), or to hurt somebody. Therefore, Olweus states that the terms violence and bullying can be used as synonyms only if negative actions include physical force.

Generally speaking, bullying behaviour is defined as behaviour whose goal is to hurt or harm somebody. It is characterized by repetition, as well as the difference between the physical and psychological force between the

abuser and the child being abused (6, 7, 8). It can be manifested in the form of verbal abuse, physical aggression or relational abuse. The first two forms of violent behaviour are sometimes called "direct" peer violence, because they include direct aggressive behaviour. Relational violent behaviour is seen in manipulation of relationships in the peer group in order to exclude somebody from that peer group (9).

The frequency of bullying behaviour varies in relation to how bullying behaviour is defined, as well as in relation to the country in which the research is being conducted in a range from 9% to 54% (10, 11-13). When we take into account the frequency of violent behavior in regard to the role in violent behavior, the research results show that there are 7–23% of children included in violent behaviour categorized as bullies, 5–12% of children are categorized as victims and 2–21% as bully/victims (12, 14-17). According to the research results of Nansel et al. (10) conducted in 25 countries, the smallest number of bullies (3%) is in Sweden and Wales, whereas the largest number of such children is in Denmark (20%). Lithuania has the largest number of bully/victims (20%), whereas Sweden has the lowest (1%).

Research into bullying behavior in Bosnia and Herzegovina (BH) is still at its beginning. The results of one such study whose goal was to define the frequency of bullying behavior in the senior grades of elementary school showed that 57% of children participating in the total sample were identified as participants in bullying behavior, 13% were identified as bullies, 16% were identified as victims, whereas 28% were identified as bully/victims (18).

Cerni Obrdalj et al. (19) conducted research to identify the forms of violent behaviour among elementary school children in two cities in Bosnia and Herzegovina. The research included 484 students (4th - 8th gra-

de of elementary school) in Stolac and Posusje. It was found that the most common form of violence in school was verbal abuse (59%), whereas the least common form of violence was sexual abuse (2.2%). The boys were more commonly involved in physical violence, whereas the girls were more involved in verbal violence.

Some recent research results indicate that there is a correlation between participation in bullying behavior and psychosomatic difficulties (16, 20-23). Psychosomatic difficulties are defined as clinical symptoms which do not have organic pathology. The most common psychosomatic symptoms manifested in the pre-school and school age, as well as in the adolescence include: abdominal pains, headaches, chest pains, fatigue, back pains, leg pains, concerns for health and breathing problems. These commonly seen symptoms should be distinguished from somatic or neurotic disorders which are more commonly seen in adults. The frequency of psychosomatic difficulties in children and adolescents is around 10% - 25%. Psychosomatic symptoms are the most common response to stress.

In her theory of life changes, Dohrenwend (24) explained how stressors and stressful reactions contribute to the development of physical and/or psychological disorders. According to this author, the first phase includes stressful life events varying depending on how far they are defined by the environment, or in relation to the psychological characteristics of the central person in the event. The next step in the model is based on the difference between the stimulus or the event, indicating the stressful reaction and reactions to that stimulus or event. Physiological reactions to stressful stimulus can be various – physical, psychological and behavioural responses (palpitations, anger, impulsiveness), i.e. an increased level of excitement. Psychological responses to stressful events can have various forms, including changes of behaviour and a wide spectrum of

pathological symptoms (25), as well as some symptoms usually related to serious psychotic disorders.

In the third phase, the author suggests that what follows after a momentary and temporary stressful reaction depends on the intervention of situational and psychological factors defining the context in which the reactions happen, and which may increase or reduce their intensity.

The factors which usually reduce stressful reactions include phenomena such as: a wide spectrum of effective strategies for dealing with stress, the help and support of friends and family, a strong feeling of controlling stressors, optimism and a point of view that stressors are a challenge. The factors increasing the effects of stressors include: lack of social support, inappropriate strategies of dealing with problems, pessimism, a feeling of uselessness and a feeling that the stressors are a terrible threat. In the fourth phase, the interaction between particular stressors, particular people and particular circumstances causes physical and/or psychological problems which may be mild and temporary (weak anxiety, headache or a few sleepless nights) or serious and permanent (anxious disorder, temper disorder or physical illness).

An increased level of excitement as a reaction to a stressful event, as well as the correlation between the increased level of excitement and psychological and health difficulties, are not only found in children exposed to violent behaviour, but also in children involved in violent behaviour, as bullies, i.e. bully/victims (26, 27).

In research conducted among senior-grade elementary school students in Australia, a list of symptoms of health problems was presented to the examinees. The boys and girls who reported being exposed to violent behaviour at least once a week in the previous year had higher results on this scale in comparison with other children. The most

important difference between the children exposed to violent behaviour and the others was seen in headaches, inflammation of the throat and chest pains.

However, it was found that bully/victims, had more psychosomatic difficulties in comparison with victims (28). Fekkes et al. (29) also found an increased risk of development of health problems in children involved in bullying behavior. Children being exposed to violent behaviour had an increased risk of developing psychosomatic difficulties such as: headaches, problems with sleeping, abdominal pains, problems with appetite and nocturnal enuresis. It was found that children who were violent towards other children had an increased risk of headaches and nocturnal enuresis.

Bully/victims had an increased risk of abdominal pains, problems with appetite, nocturnal enuresis and fatigue. The risk of development of health problems was greatly increased in comparison with children for children involved in bullying behavior.

The research mentioned previously included data from other research indicating a correlation between involvement in peer violence and psychosomatic difficulties. However, the problem is whether psychosomatic symptoms occur before involvement in bullying behavior, or participation in involvement in bullying behavior precede psychosomatic symptoms. There has not been much research dealing with a prospective examination of the influence of involvement in bullying behavior on children's health. In one piece of prospective research, according to our findings, dealing with an examination of the cause-and-effect relationships of peer group violence and health problems, Fekkes et al. (30) found that the children involved in bullying behavior had a greater risk of developing new psychosomatic difficulties in comparison with children who are not involved in violence in any way. At the same time, according to the results of their research, he-

alth problems did not precede victimization.

However, this research did not include a wide spectrum of psychosomatic difficulties such as: headaches, abdominal pain, sleeping problems, skin problems, emotional tension, nausea, fatigue, and problems with appetite. Finding out if involvement in bullying behavior precede these symptoms or if these symptoms occur before participation in peer violence may help prevent peer violence, as well as to prevent these psychosomatic difficulties. Every day, many paediatricians and other health workers see children who have been involved in peer violence or who display psychosomatic symptoms. Therefore, it is important to know which symptoms increase the risk of children participating in bullying behavior, i.e. it is important to know if involvement in bullying behavior increases the risk of developing particular psychosomatic symptoms.

The aims of this prospective research were to examine: (1) if involvement in bullying behavior at the beginning of a school year increases the risk of developing psychosomatic difficulties during the school year; (2) if psychosomatic difficulties at the beginning of the school year increase the risk that a child will be involved in bullying behavior during the school year.

Material and methods

The research was conducted among 6th and 8th grade students of all the elementary schools in the municipality of Siroki Brijeg. The participants were students at the First Elementary School in Siroki Brijeg (203 students), the Second Elementary School in Siroki Brijeg (132 students), the Kocerin Elementary School (64 students) and the Biogranci Elementary School (79 students). Two elementary schools are located in the town area, whereas the other two schools are located in the rural area of the municipality. The first survey was conducted in November 2008,

and it was repeated in May 2009. In the first round of research 536 examinees were included. The first sample included results of 478 examinees – 232 females (48.5%) and 246 males (51.5%). The second sample included 535 examinees – 253 females (47.7%) and 282 males (52.3%). The processing included only those examinees whose questionnaires were appropriately completed in the first round of the research, that is 478 examinees. The examinees were from 10 to 14 years old (12.30 ± 1.64 years).

Participation in bullying behavior was estimated using the School Relationship Questionnaire - SRQ, which was modified for self-evaluation of peer violence. The modification included a reduction in the number of questions, as well as the more appropriate formulation of questions for adolescents (31, 32). Standardized questions were used in the questionnaire, and these were questions about students' relationships with other students. The use of the questionnaire in this research was approved by the authors of the questionnaire.

For the needs of this research, the questionnaire was translated into Croatian according to recommended standards for translation of psychological instruments. The questionnaire was translated from English into Croatian, and afterwards a reverse translation from Croatian into English was undertaken. The reverse translation showed minor omissions, so the necessary corrections were made in the Croatian version of the questionnaire. The questionnaire consists of two parts. In the first part, the examinees evaluate exposure to direct aggressive behaviour (Have you had your personal belongings taken?, Have you been threatened or blackmailed?, Have you been hit or beaten up?, Have other things happened to you?) and exposure to verbal-relational aggression by other students (Have other pupils called you nasty names?, Have other pupils not wanted to hang around with you

(to make you upset)?, Have other pupils said they wouldn't be friends with you anymore, or said they would tell-tale (tell other people things about you)?, Have other pupils told lies, said nasty things, or told stories about you that were not true?, Have other pupils spoilt activities (for example, sports games or class activities) on purpose (to make you upset)?

In the second part of the questionnaire, personal aggressive behaviour was evaluated (Have you ever taken others personal belongings?, Have you threatened/blackmailed someone?, Have you hit or beaten someone up?, Have you done any other things?) as well as verbal/relational aggression directed to other students (Have you called other pupils nasty names? Have you not hung around with another pupil/other pupils (to make them upset)? Have you told other pupils that you did not want to be friends with them anymore, or said that you would tell-tale (tell other people things about them)? Have you told lies, said nasty things, or told stories about other pupils that were not true? Have you spoilt activities for other pupils (for example, sports games or class activities) on purpose (to make them upset)?).

The responses were evaluated on a scale of 1 to 3, depending on how the examinee had been included in a violent situation ("not at all/rarely"=1, "often"=2, "very often"=3) in the previous three months. The responses 2 or 3 (often and very often) in the part of the questionnaire in which the examinees were asked about which behaviour they experienced were categorized as exposure to violent behaviour or victims. The responses 2 or 3 (often and very often) in the part of the questionnaire in which the examinees were asked about their behaviour towards other children were categorized as violent behaviour directed at other children or bullies.

The responses 2 or 3 (often and very often) in the part of the questionnaire in which the examinees were asked about which behaviour

they had experienced and the responses 2 or 3 (often or very often) in the part of the questionnaire in which the examinees were asked about their behaviour towards other children, resulted in the categorization of the children who were exposed to violent behaviour, but who were also violent towards other children or bully/victims. All the other examinees were categorized as neutral. In the confirmative factor analysis conducted on all 18 items particles of the School Relationship Questionnaire in order to check the factor structure of the questionnaire with the analysis of basic components with varimax rotation, four factors were extracted – “Direct aggression directed towards others”, which explained 15.7% of the total variance, the second factor – “Exposure to direct aggressive behaviour” explained 15.5% of the total variance, the third factor – “Exposure to verbal/relational aggression” explained 14.5% of the total variance, and the fourth factor – “Verbal/relational aggression directed towards others” explained 11.9% of the total variance. In our research, the alpha coefficients obtained for every subscale showed the satisfactory reliability of the type of internal consistency varying from 0.74 to 0.77. The alpha coefficient for the whole scale was $\alpha=0.88$.

The frequency of the health symptoms was evaluated using a scale for self-evaluation which we constructed for the needs of this research, presenting the health symptoms (problems with appetite, anxiety, dizziness, feeling of fatigue without a clear reason, pain (except headaches and abdominal pains), headaches, nausea, vision problems, skin problems, abdominal pains, vomiting, sleeping problems, and energy loss). For each of these symptoms the examinees were asked to evaluate its presence and frequency in the last 4 weeks on a scale from 1 to 3, depending on the frequency of the presence of the symptoms (“not at all/rarely” = 1, “often” = 2, or “very often” = 3).

Statistical analysis

The presence of psychosomatic difficulties at the end of the school year and the number of children participating in bullying behavior was presented as absolute and relative frequencies. The proportion of the appearance (odds ratio) with a 95% confidence interval were calculated for the needs of learning the role of participation in peer violence as a risk factor for particular types of psychosomatic difficulties, as well as for the evaluation of the role of psychosomatic symptoms as a risk factor for participation in peer violence. The data processing was undertaken using the statistical program SPSS 17 for Windows (SPSS Inc., Chicago, IL, the USA). For evaluation of the importance of the results, the importance level $p<0.050$ was used.

Results

There were 536 examinees in the first research. The questionnaires of 58 examinees were incomplete and were not included in the statistical processing. The processing included data from 478 examinees (89%).

There were 535 examinees in the second round of research. The processing only included data of the 478 examinees whose data had been processed in the first round. There were 232 females (48.5%) and 246 males (51.5%). In the first round, 14% of the examinees were identified as victims, 6.9% were identified as bullies and 18.8% were identified as bully/victims.

In the second round of research 9.2% of children were identified as victims, 14.2% were identified as bullies and 29.7% were identified as bully/victims.

The first aim of the research was to find out if participation in bullying behavior at the beginning of the school year (as victims, bullies and bully/victims) would increase the risk of development of psychosomatic difficulties at the end of the school year. All three roles in the bullying behavior (victims, bulli-

es and bully/victims) were included together and categorized as participation in bullying behavior.

In order to avoid errors in drawing conclusions about psychosomatic difficulties, children with specific psychosomatic difficulties at the beginning of the school year were excluded from processing. For example, in order to examine the frequency of headaches after the period of victimization, only those children categorized as "not having" headaches at the beginning of the scho-

ol year were included in the processing. These children were divided into two groups – those participating in bullying behavior and those not participating in bullying behavior during the year, and after that the incidence of headaches during the year for both groups was examined. Finally, the probability of development of specific psychosomatic difficulties during the school year were calculated.

Table 1 showed the incidence of new symptoms for the children participating

Table 1 Incidence of psychosomatic symptoms during the school year among children who were not involved in violent behaviour and children who were involved in violent behaviour (as victims, bullies and bully/victims) at the beginning of the school year

Psychosomatic symptoms	Involvement in violent behaviour at the beginning of the school year (only children without the specific psychosomatic symptom)	Incidence of psychosomatic symptoms at the end of the school year % (n/N)	Odds Ratio (95% CI)	P
Problems with appetite	No	23.6 (43/182)	1.34 (0.69-2.60)	0.385
	Yes	29.3 (17/58)		
Anxiety	No	19.0 (30/158)	2.59 (1.26-5.33)	0.010
	Yes	37.8 (17/45)		
Dizziness	No	7.4 (17/231)	1.65 (0.68-4.01)	0.268
	Yes	11.6 (8/69)		
Feeling of fatigue without a clear reason	No	15.3 (33/215)	2.40 (1.26-4.56)	0.008
	Yes	30.3 (20/66)		
Pains (except headaches and abdominal pains)	No	14.0 (31/221)	0.93 (0.40-2.13)	0.855
	Yes	13.1 (8/61)		
Headaches	No	31.0 (45/145)	1.03 (0.49-2.18)	0.935
	Yes	31.7 (13/41)		
Nausea	No	15.3 (31/202)	1.60 (0.77-3.29)	0.208
	Yes	22.4 (13/58)		
Vision problems	No	10.0 (24/241)	1.90 (0.91-3.94)	0.087
	Yes	17.3 (13/75)		
Skin problems	No	7.0 (17/242)	1.86 (0.82-4.26)	0.139
	Yes	12.3 (10/81)		
Abdominal pains	No	22.7 (34/150)	1.34 (0.64-2.84)	0.438
	Yes	28.3 (13/46)		
Vomiting	No	7.1 (14/196)	1.72 (0.66-4.47)	0.268
	Certainly	11.7 (7/60)		
Sleeping problems	No	9.6 (23/240)	1.92 (0.92-4.00)	0.083
	Yes	16.9 (13/77)		
Energy loss	No	9.9 (20/202)	2.18 (1.00-4.77)	0.050
	Yes	19.4 (12/62)		

Table 2 Incidence of involvement in violent behaviour (as victims, bullies and bully/victims) during the school year among children who were categorized as neutral and who had or who did not have specific psychosomatic symptoms at the beginning of the school year

Psychosomatic symptoms	Presence of specific psychosomatic symptoms at the beginning of the school year (only children who were not being involved in violent behaviour)	Incidence of involvement in violent behaviour at the end of the school year	Odds Ratio (95% CI)	p
Problems with appetite	No	41.1 (90/219)	0.94 (0.59-1.48)	0.775
	Yes	39.5 (45/114)		
Anxiety	No	36.5 (69/189)	1.47 (0.95-2.29)	0.087
	Yes	45.8 (66/144)		
Dizziness	No	37.6 (103/274)	1.97 (1.12-3.47)	0.019
	Yes	54.2 (32/59)		
Feeling of fatigue without a clear reason	No	36.9 (93/252)	1.84 (1.11-3.05)	0.018
	Yes	51.9 (42/81)		
Pains (except headaches and abdominal pains)	No	36.0 (95/264)	2.45 (1.43-4.21)	0.001
	Yes	58.0 (40/69)		
Headaches	No	38.1 (67/176)	1.24 (0.80-1.93)	0.331
	Yes	43.3 (68/157)		
Nausea	No	38.3 (92/240)	1.38 (0.85-2.24)	0.188
	Yes	46.2 (43/93)		
Vision problems	No	38.5 (112/291)	1.94 (1.01-3.71)	0.047
	Yes	54.8 (23/42)		
Skin problems	No	38.8 (111/286)	1.65 (0.87-3.06)	0.115
	Yes	51.1 (24/47)		
Abdominal pains	No	39.0 (71/182)	1.15 (0.74-1.78)	0.533
	Yes	42.4 (64/151)		
Vomiting	No	40.9 (97/237)	0.95 (0.58-1.53)	0.821
	Yes	39.6 (38/96)		
Sleeping problems	No	39.9 (114/286)	1.04 (0.46-2.37)	0.925
	Yes	44.7 (21/47)		
Energy loss	No	39.9 (97/243)	2.06 (1.02-4.16)	0.045
	Yes	42.2 (38/90)		

in bullying behavior as victims, bullies and bully/victims, as well as those children not participating in violent behaviour at the beginning of the school year, but who in the first round did not have psychosomatic difficulties.

The results indicated that the children participating in bullying behavior at the beginning of the school year were more anxious and tense (OR=2.59; $p=0.010$), were

more tired without a clear reason (OR=2.0; $p=0.008$) and felt energy loss (OR=2.18; $p=0.050$), i.e. they had an increased risk of developing psychosomatic difficulties during the school year, in comparison with children not included in bullying behavior.

The second goal of the research was to answer the question whether psychosomatic difficulties at the beginning of the school year were a risk factor for participation in

bullying behavior during the school year. The children participating in bullying behavior in the first round of the research (as victims, bullies and bully/victims) were excluded from this statistical analysis.

This procedure enabled examination of the incidence of new children participating in bullying behavior during the school year from among the children with specific psychosomatic difficulties on the first round of the research and those without any psychosomatic difficulties.

This statistical analysis also had the disadvantage of reducing the number of examinees included in the statistical processing. However, if the children who, on the first round of the research were participating in bullying behavior and who had specific psychosomatic difficulties had been included in the statistical processing, it would have been more difficult to examine the correlation between participation in bullying behavior and psychosomatic difficulties. If only the children participating in bullying behavior or those with specific psychosomatic difficulties had been included in the initial research, it would have been impossible to examine what happened first, i.e., it would have been impossible to define if participation in bullying behavior occurred before the psychosomatic difficulties, or psychosomatic difficulties occurred before participation in bullying behavior.

Table 2 shows the probability of participation in bullying behavior at the end of the school year for children identified as neutral at the beginning of the school year. The children identified as neutral examinees at the beginning of the school year had psychosomatic difficulties statistically more frequently, manifested as dizziness (OR=1.97; p=0.019), fatigue without a clear reason (OR=1.84; p=0.018), pains (OR=2.45; p=0.001), vision problems (OR=1.94; p=0.047) and energy loss (OR=2.06; p=0.045) and they were exposed to an increased risk of being invol-

ved in bullying behavior during the school year.

Discussion

Our results indicate that children who are involved in peer violence at the beginning of the school year showed an increased risk of developing new psychosomatic difficulties during the school year. Equally, the children who had particular psychosomatic difficulties at the beginning of the school year showed an increased risk of to be involved in peer violence during the school year.

According to the results of this research children involved in bullying behavior had an increased risk of developing psychosomatic difficulties manifested as: anxiety, tension, fatigue without a clear reason and energy loss, in comparison with the children who were not involved in bullying behavior. Equally, participation in bullying behavior was not defined as a risk factor for developing the other psychosomatic difficulties examined. Our research results were the same as the results of prospective research conducted in the Netherlands by Fekkes et al. (30), in which 1,118 children aged from 9 to 11 were included.

This research found that the children exposed to violent behaviour at the beginning of the school year had an increased risk of developing new psychosomatic difficulties, such as: bed wetting, abdominal pains and tension. As well as our research, the research conducted by Rigby (33) found a correlation between participation in peer violence and health problems such as: headaches, abdominal pains, coughs, inflammation of the throat and so on. Some previous research results conducted among adolescents (34) confirmed the correlation between stressful life events and psychosomatic difficulties.

Peer violence also has some specific characteristics in relation to other forms of violent behaviour. It is categorized by repeated

actions, sometimes over several years, which means continuous exposure to stressful events (35). According to some authors (33), which is also confirmed by this research results, it seems that an increase in the stress level as a result of involvement in bullying behavior mediates between involvement in peer violence and the health problems.

The second explanation for these research results are the results conducted by Vaillancourt et al. (36), who found that stress as the result of peer violence reduces the immunological functions of the organism, i.e. the cortisone mediates between the peer violence and the physical health.

If involvement in bullying behavior itself is not the cause of the psychosomatic difficulties, it should be examined whether a child having these psychosomatic difficulties has been a participant in bullying behavior in some way. An additional source of stress such as involvement in bullying behavior which a child has to deal with definitely will not help a child trying to deal with the psychosomatic difficulties.

The children who wasn't involved in peer violence at the beginning of the school years and who had psychosomatic difficulties manifested as: dizziness, fatigue without a clear reason, pains, vision problems and energy loss at the beginning of the school year, had increased risk to be involved in peer violence during the school year. The other psychosomatic symptoms were not indicated as risk factors for involvement in bullying behavior. It was found that problems with appetite at the beginning of the school year were a risk factor for involvement in bullying behavior during the school year, which was confirmed in the research conducted by Fekkes et al. (30). Despite the fact that in that research some other psychosomatic symptoms were examined such as: headaches, abdominal pains and night urination, they were not identified as risk factors. Unlike our research re-

sults, the research conducted by Nishin et al. (37) did not find that physical increased the risk for victimization.

A partial explanation of our research results was given by Olewus (3). He thought that psychosomatic difficulties could influence the fact that the children became more vulnerable and more exposed to violent behaviour, which made them easy victims for aggressive children. Their less assertive behaviour could make them easier targets due to the fact that there would be the least probability that they would fight for themselves.

However, it was possible that violent children expected less resistance from children with difficulties, which was the reason why they were more inclined to choose such children as their victims. According to the results of research conducted by Cook et al. (38), internalized psychological difficulties were not only the predictor for the fact that a child would be exposed to violent behaviour, but they were a predictor for involvement in bullying behavior as a bullies and bully/victims. However, what should be emphasized is the fact that according to its definition, bullying behavior happens in the social context and under the influence of the individual characteristics of a child, as well as under the influence of the environment where it occurs. As a result, it is important to become aware of the restrictions of such results when examining only the influence of individual predictors of bullying behavior, without examination of the environmental characteristics of the child, as well as the characteristics of the environment in which it occurs. Future research should also include the environment, for a better understanding of the conditions under which peer group violence occurs (39).

The restrictions of the study

Therefore, it is important to indicate the methodological restrictions of the research

conducted, which could influence the results. The evaluation of bullying behavior and other variables in the research was undertaken by means of questionnaires which is a frequent and valid research method (40). However, the evaluation of the children participating in bullying behavior by means of a questionnaire for self-evaluation could be a difficulty, especially for identification of those children who are frequently violent towards other children, but not aware of their negative behaviour towards other children, and they may refuse to admit their active role in bullying behavior. Some authors (2, 41, 42) also suggested that indirect aggression could be underestimated by self-evaluation due to the fact that it is often undefined by the aggressors and in some cases it may be unconscious. In order to minimize subjectivity, the examinees were given definitions of bullying behavior with examples of violent behaviour. Future research should include other measures of the peer group evaluation which would contribute to its objectivity, such as: an interview, monitoring children in their natural conditions, as well as examination of other children and the adults, not only in the school environment, but also in the family environment and the neighbourhood (43).

Equally, the fact is that depressive children have a tendency to experience things in a more negative way and they often have health problems or negative experiences (41). The data processing related to evaluation of the risk for developing psychosomatic diffi-

culties in the time between the two rounds of research, and only those children who recognized themselves as participants in bullying behavior were included initially, which meant that some children were excluded from the processing due to that fact. The research was conducted in the area of four schools in one municipality, therefore it cannot be said that it is an epidemiological sample, which restricts us from generalization of the results.

Conclusions

This research indicates that participation in bullying behavior increases the probability of developing psychosomatic difficulties in children involved in the bullying behavior. Equally, the presence of the psychosomatic difficulties in children who are not involved in bullying behavior increases the risk for those children to become participants of the bullying behavior. The research results are especially important for paediatricians and other health workers who should be aware of the role of involvement in bullying behavior in the etiology of these psychosomatic difficulties.

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