*Izabela Tabak, Joanna Mazur*

# SOCIAL SUPPORT AND FAMILY COMMUNICATION AS FACTORS PROTECTING ADOLESCENTS AGAINST MULTIPLE RECURRENT HEALTH COMPLAINTS RELATED TO SCHOOL STRESS

## WSPARCIE SPOŁECZNE I KOMUNIKACJA W RODZINIE JAKO CZYNNIKI CHRONIĄCE MŁODZIEŻ PRZED NASILENIEM DOLEGLIWOŚCI SUBIEKTYWNYCH ZWIĄZANYCH ZE STRESEM SZKOLNYM

Department of Child and Adolescent Health, Institute of Mother and Child, Warsaw, Poland

**Abstract**

***Introduction:*** *One reason of increased psychological and somatic health problems in adolescence is intensification of stress in school and everyday life. There is little evidence to what extent the level of school achievements shapes this relationship.*

***Aim:*** *The aim of the study was to investigate determinants of subjective health complaints in school-aged children, taking into account the interaction effects.*

***Methods:*** *Anonymous survey was conducted in Poland in 2013/2014 on the sample of 4,545 students, as a part of the HBSC (Health Behaviour in School-aged Children) study. On the basis of prevalence of eight symptoms in the past 6 months, a standardized index of health complaints (SCL – Subjective Complaints Checklist) was calculated (0-100). To predict its variability three hierarchical linear models (five blocks) were estimated, separately for three levels of school achievements. Support from family, classmates and teachers as well as family communication were considered as protective factors, which can reduce the negative impact of stress. All analyses were adjusted for age, gender and family affluence.*

***Results:*** *The standardized SCL index was equal to 23.2 in boys and 32.5 in girls. The high level of school stress was reported by 28.5% boys and 35.6% girls, respectively. Regarding these two measures, similar patterns of change were observed, increase with age and with deterioration of academic achievement. Final multivariate models explained 22-25% variability of SCL, slightly more among worst students. Accumulation of low family support and high level of school stress caused the highest increase in the SCL index in very good students.*

***Conclusions:*** *School performance is an important determinant of subjective health complaints in adolescence, also modifying the impact of other risk and protective factors.*

**Key words:** subjective health complaints, school stress, school achievements, social support, family communication, adolescents

**Streszczenie**

***Wstęp:*** *Jednym z powodów nasilenia w okresie dojrzewania dolegliwości subiektywnych o charakterze psychicznym lub somatycznym, jest ciągłe narażenie na stres w szkole i w życiu codziennym. Brak jest badań na temat wpływu osiągnięć szkolnych na ponoszenie skutków zdrowotnych stresu szkolnego.*

***Cel:*** *Celem pracy było zidentyfikowanie czynników determinujących subiektywne dolegliwości młodzieży szkolnej, z uwzględnieniem efektów interakcji między tymi czynnikami.*

***Metody:*** *Anonimowe badanie ankietowe przeprowadzono w Polsce w roku szkolnym 2013/2014 na próbie 4,545 uczniów, w ramach badań HBSC (Health Behaviour in School-aged Children). Opierając się na danych na temat występowania w ostatnich 6 miesiącach ośmiu symptomów zbudowano, znany z literatury, indeks dolegliwości SCL (Subjective Complaints Checklist), który został wystandaryzowany na zakres 0-100 punktów. Badając źródła jego zmienności, oszacowano trzy hierarchiczne modele liniowe (pięć bloków zmiennych), oddzielnie dla trzech poziomów osiągnięć szkolnych. Wsparcie ze strony rodziny, kolegów i nauczycieli, a także komunikacja w rodzinie uznane zostały za potencjalne czynniki ochronne, które mogą zmniejszyć negatywny wpływ stresu. Wszystkie analizy skorygowano na wiek, płeć i zamożność rodziny.*

***Wyniki:*** *Standaryzowany wskaźnik SCL wynosił 23,2 u chłopców oraz 32,5 u dziewcząt. Wysoki poziom stresu szkolnego deklarowało odpowiednio 28,5% chłopców i 35,6% dziewcząt. Oba wskaźniki podlegały podobnym prawidłowościom, wyrażającym się tendencją wzrostową wraz z wiekiem oraz pogarszaniem osiągnięć w nauce. Końcowe modele wielowymiarowe wyjaśniały 22-25% zmienności SCL, nieco więcej wśród słabszych uczniów. Współwystępowanie niskiego poziomu wsparcia rodziny i wysokiego poziomu stresu szkolnego powodowało największy wzrost wskaźnika SCL w grupie uczniów bardzo dobrych.*

***Wniosek:*** *Osiągnięcia szkolne są ważnym predyktorem dolegliwości subiektywnych, ale też modyfikują wpływ czynników ryzyka i ochronnych na nasilenie symptomów psychosomatycznych w okresie dojrzewania.*

**Słowa kluczowe:** dolegliwości subiektywne, stres szkolny, osiągnięcia szkolne, wsparcie społeczne, komunikacja w rodzinie, młodzież

DEV PERIOD MED. 2016;XX,1:27-39

## INTRODUCTION

Young people in the period of adolescence are considered to be the healthiest part of the population, judging by objective indicators. Many authors, however, point to the fact that despite the lack of organic disease, a significant number of adolescents experience psychosomatic disorders (such as headaches, stomach aches, feeling low and irritation) related primarily to stress and difficulties in coping with developmental tasks [1-3]. These complaints should not be ignored because, as research has shown, their frequent experiencing might be a predictor of worse health in adulthood [2-4].

The research on the so-called "subjective health complaints" (currently preferred term which has replaced "psychosomatic disorders", as it does not unambiguously impose the etiology and the direction of dependence) increasingly often points to the co-existence of groups of complaints [3, 5]. Researchers have identified groups of symptoms which might have common determinants, and have emphasised that, in the period of adolescence, the burden of repeating disorders and groups of various symptoms has a significant negative impact on the quality of life, leading to more frequent use of medical services, medication and truancy [5-6].

Polish HBSC (Health Behaviour in School-aged Children) studies from 1990-1998 showed a rising tendency with regard to most of the analysed symptoms, which the authors used to link to political transformation [7]. International analyses conducted about a dozen years later indicated a relative stability in this area in 1994-2010 in most European countries, including Poland [8]. The most recent study demonstrated the return of the rise in somatic complaints among Polish 15-year-olds, in particular girls [6].

Explaining the reasons for recurrent disorders among adolescents is an important area of research. Based on a literature review, S. Karvonen et al. identified three potential groups of causes: (1) negative changes in the functioning of the family and an increasingly complex process of transition from adolescence to adulthood; (2) educational factors, especially rising expectations for students; (3) potential influence of deteriorating access to medical services adjusted for the needs of adolescents [9-10].

Researchers in Poland point to the socioeconomic determinants of adolescent subjective health complaints. The studies conducted in 2006 identified the significance of both school climate and family relationships, as well as family affluence and socioeconomic status of the neighbourhood, for the intensification of subjective ailments [11]. In 2002-2010 Ottova et al. conducted analyses of trends in subjective complaints, along with their determinants, in 34 countries [12]. They showed that the most important and consistent determinants of subjective health complaints included gender (female), the experience of peer violence, smoking and the exposure to school stress.

According to the data from the Polish HBSC surveys, a significant rise was noted in 2010-2014 in the percentage of students suffering from school stress: from 21.8% in 2010 to 32.1% in 2014, both in boys and in girls [6]. Increased subjectively perceived school stress may result not only in the intensification of subjective complaints but also in undertaking risky behaviours in terms of health [13-14] and decreased psychological wellbeing [10].

The 2010 HBSC survey showed that school stress is a mediator of relationship between school performance

and the intensification of subjective health complaints [10]. This means that school performance needs to be taken into account in the search for the determinants of adolescent subjective complaints. This is because school performance may be considered a measure of social status, reflecting the level of adult education, as poorer school performance may be indicative of a lower level of final education and poorer employment opportunities (and, therefore, lower income) in the future [6]. Longitudinal studies have shown that school performance is related to adult health, and school failures may result not only in young people engaging in risky behaviours but also their maintaining in adult life [15]. In this context, research results are worrying; they indicate that adolescent school performance deteriorated in Poland in 2010-2014. This was manifested in the lower percentage of very good grades, the greater number of good grades, while the level of worse grades remained the same [6].

Over the last years, in accordance with the resilience theory, there has been a search not only for the determinants of disorders and also, if not primarily, for the factors which protect health, and whose influence will reveal in unfavourable circumstances [16-17]. Nowadays, protective factors provide the basis for launching effective positive prevention and health promotion programmes. These factors include good social relationships, primarily in the family, but also at school, pointing to the significance of the so-called school atmosphere of which key element is the quality of relationships among students and teachers [3, 11, 18-21]. Social support, as well as the quality of family communication, are considered very important from the point of view of health and adolescent life satisfaction [10, 21-24].

Taking into account numerous research results relating to the determinants of adolescent subjective health complaints, it was decided that analyses should be conducted of potential protective factors in the family and school environments, including possible differences resulting from the level of school performance.

The aim of the study was to investigate selected determinants of subjective health complaints in school-aged children, including an attempt to answer the following research questions:

1. Does the intensification of school stress and subjective health complaints vary depending on gender, age and family affluence?
2. Is the intensification of school stress related to the level of school achievements?
3. Do the social support in the family and school environments, as well as family communication, vary among groups of students with varying stress levels and school achievements?
4. Which individual and social factors are independent predictors of adolescent subjective health complaints with varying levels of school achievements?

## MATERIAL AND METHOD

### Sample

Anonymous auditorium surveys were conducted in schools in the 2013/2014 school year. They were part of the international HBSC survey [6]. The consent of the directors of selected schools and the parents was obtained for carrying out the survey. The questionnaire used in the survey and its organisational model had been approved by the Bioethical Committee at the Institute of Mother and Child. The analyses were conducted as part of the implementation of a project funded by the National Science Centre (2013/09/B/HS6/03438), which was integrated with the HBSC survey which concerns the school-related determinants of adolescent health.

The respondents were 4,545 students of primary schools and junior high schools aged 10.5-16.5 (M=13.57, SD=1.65). Girls made up 50.2% of the examined sample. Students included in each of the groups – "11-year-olds" (aged 10.51-12.50), "13-year-olds" (12.51-14.50) and "15-year-olds" (14.51-16.50) – made up a third of the sample.

### Measures

The research tool was the questionnaire used in the survey, which included, among others, questions and scales relating to:

1. **The demographic (gender, age) and economic variables.** The FAS III (*Family Affluence Scale*) was applied, which had been used in its modified versions in the HBSC survey since 1993/94. It comprises six questions on having one's own room, the number of cars in the family, the number of computers in the family, summer/winter holidays abroad with the family, the number of bathrooms in the home, having a dishwasher in the household; a higher value of the summary indicator indicates greater affluence [6].
2. **The frequency of subjective health complaints.** The scale of complaints used in the HBSC survey is often called HBSC-SCL (*HBSC Symptom Checklist*). This is a shortened version of the 15-symptoms scale which comes from the Norwegian studies [25]. Young people were asked: *How often in the last 6 months did you experience the following: headaches, stomach aches, backache, feeling low, irritability or bad temper, nervousness, difficulties in getting to sleep, dizziness,* with the categories of answers being: *almost every day (4), more than once a week (3), almost every week (2), almost every month (1), rarely or never (1).* The complaints were called "subjective", because it is difficult to establish whether they are caused by somatic or psychological changes. A summary scale was used in the paper, with a range of 0-32 points, where higher score indicates a greater intensity of complaints [26]. The obtained results were converted into a 0-100 scale. Psychometric analysis showed a good scale reliability: Cronbach's alpha was 0.873. Factor analysis indicated its homogeneity (the main factor explained 53.1% of overall variability).
3. **School stress.** Students were asked: *How pressured do you feel by the schoolwork you have to do?* The categories of answers were as follows: *not at all, a little, some, a lot.* This is a question used in the HBSC survey since 1994, though its wording underwent slight modifications over the years [6].
4. **School achievements.** According to the HBSC research protocol, questions were asked about the perception

of school performance; they were made objective by a reference to the opinion of the class teacher: *In your opinion, what does your class teacher(s) think about your school performance compared to your classmates?* The following categories of answers were possible: *very good, good, average, below average*. Validation studies indicate that a subjective assessment of school performance carried out this way is a good indicator of performance objectively achieved by the student [6,27].

5. **Quality of family communication.** To assess the quality of communication, a shortened version of the communication clarity scale was used, which had been taken from the *Family Dynamics Measure* - FDM II. A full Polish version of this tool was designed at the Institute of Mother and Child in 2009 [28], and a shortened, 4-item version of the scale was first used in the 2013/2014 international HBSC survey. Students need to relate to each of the statements on correct communication (discussing important issues, careful listening, clarifying misunderstandings) by selecting one of the answers: *strongly agree, agree, neither agree or disagree, disagree, strongly disagree*. A score of 1-5 points can be obtained for each of the answers; a higher score indicates better communication. The summary indicator of the scale was converted to a 0-100 scale. Psychometric analysis showed a good scale reliability: Cronbach's alpha was 0.845. Factor analysis indicated its homogeneity (the main factor explained 68.4% of overall variability).
6. **Family support.** The scale of family support is one of the sub-scales of the *Multidimensional Scale of Perceived Social Support* (MSPSS) questionnaire [29] first used in the international HBSC survey 2013/14, though it had been used in Poland before [23]. The scale of parental support comprises four statements: *My family really tries to help me; I get the emotional help and support I need from my family; I can talk about my problems to my family; My family is willing to help me make decisions*. The answers range from *very strongly disagree* to *very strongly agree*. Possible score for each answer ranges from 1 to 7 points. A higher score indicates a greater amount of social support. The summary indicator of the scale was converted to a 0-100 scale. Psychometric analysis showed a good scale reliability: Cronbach's alpha was 0.939. Factor analysis indicated its homogeneity (the main factor explained 84.7% of overall variability).
7. **Teacher support.** The scale of teacher support comprises 3 statements on teacher perception (*...they accept me as I am, ...they care about me as a person, I feel a lot of trust in the teachers*). Young people were asked to specify, using a 5-degree scale, to what extent they agree or disagree with those statements. It has been used in the HBSC survey since its 2001/02 round. The summary indicator of the scale was converted to a 0-100 scale (the higher the score, the greater the support). Psychometric analysis showed a good scale reliability: Cronbach's alpha was 0.847. Factor analysis indicated its homogeneity (the main factor explained 77.2% of overall variability).
8. **Peer support.** The scale of peer support comprises three questions (*The students in my class(es) enjoy being together; Most of the students in my class(es) are kind and helpful; Other students accept me as I am*). Young people were asked to specify, using a 5-degree scale, to what extent they agree or disagree with those statements. The questions form part of the compulsory HBSC questionnaire, in use since the 1993/94 round. The summary indicator of the scale was converted to a 0-100 scale (the higher the score, the greater the support). Psychometric analysis showed a good scale reliability: Cronbach's alpha was 0.742. Factor analysis indicated its homogeneity (the main factor explained 66.1% of overall variability).

### Statistical analysis

Statistical analysis conducted using SPSS v.22 comprised analyses of inter-group differences for categorical variables ($\chi^2$test) and a comparison of means using the analysis of variance (ANOVA) with Tukey's post hoc test and an evaluation of the effect size. Regression models were also estimated (stepwise analysis) in order to assess prediction of the intensity of adolescent subjective health complaints by sociodemographic factors, taking into account stratification caused by school performance. The following were taken into account in the models: sociodemographic variables, school stress, peer support, teacher support, family support and communication, and only those interactions among variables which proved to be statistically significant. Regression results were presented as standardised indexes of multivariate regression (β) together with the level of significance of those parameters. As good fit statistics a non-adjusted coefficient of determination $R^2$ was presented, and its change ($\Delta R^2$), following the introduction of subsequent groups of variables to the model along with the statistical significance of that change.

## RESULTS

**1. Intensification of school stress and the experience of subjective health complaints among adolescents depending on gender, age and family affluence.**

The standardized subjective health complaints index was equal to 27.93 (SD=24.3) in the whole group; 23.2 (SD=22.5) in boys and 32.5 (SD=25.1) in girls (tab. I). A third of the students of Polish schools experience intensified school stress: 35.6% of girls and 28.5% of boys responded *quite a lot* or *a lot* to the question about the extent of experienced school-related stress. The percentages of young people experiencing stress grow with age; in all the age groups those are higher in girls than in boys. Similar relationships occur for the intensification of subjective health complaints: they are much more often reported by girls and older students than by boys and younger students (all the statistically significant differences at the level of $p<0.001$). The correlations between the level of family affluence and the experience of stress and subjective complaints were statistically insignificant.

**2. Social support, family communication and student health with a varying stress intensity and level of school performance: univariate analyses.**

Table I. Intensification of school stress (%) and the experience of subjective health complaints (M (SD)) in adolescents by gender and age.

*Tabela I. Nasilenie stresu szkolnego (%) i odczuwania dolegliwości subiektywnych (M (SD)) u młodzieży wg płci i wieku.*

| **Gender** ***Płeć*** | **Variable** ***Zmienna*** | | **Age group/*Grupa wieku*** | | | **Total** ***Ogółem*** **N=4432** | **p** |
|---|---|---|---|---|---|---|---|
| | | | **11 yrs/** ***11-latki*** **n=1479** | **13 yrs/** ***13-latki*** **n=1494** | **15 yrs/** ***15-latki*** **n=1459** | | |
| Boys *Chłopcy* | Intensification of school stress *Nasilenie stresu* | Not at all/*Wcale* | 22.9 | 22.4 | 24.1 | 23.1 | 0.026 |
| | | A little/*Trochę* | 52.7 | 47.7 | 44.3 | 48.4 | |
| | | Some/*Dość dużo* | 17.3 | 19.6 | 21.6 | 19.4 | |
| | | A lot/*Bardzo dużo* | 7.1 | 10.3 | 10.0 | 9.1 | |
| | Subjective health complaints *Dolegliwości subiektywne* | M (SD) | 19.03 (20.4) | 23.37 (23.4) | 27.40 (22.9) | 23.21 (22.5) | <0.001 |
| Girls *Dziewczynki* | Intensification of school stress *Nasilenie stresu* | Not at all/*Wcale* | 16.3 | 15.9 | 10.4 | 14.1 | <0.001 |
| | | A little/*Trochę* | 54.7 | 51.4 | 45.1 | 50.3 | |
| | | Some/*Dość dużo* | 21.9 | 22.4 | 28.4 | 24.3 | |
| | | A lot/*Bardzo dużo* | 7.1 | 10.3 | 16.1 | 11.3 | |
| | Subjective health complaints *Dolegliwości subiektywne* | M (SD) | 24.92 (22.6) | 32.65 (25.6) | 39.26 (24.8) | 32.53 (25.1) | <0.001 |

The greatest percentages of young people experiencing intensified stress can be found among students with poorer school performance (for both genders $p<0.001$; fig. 1).

Because of the low percentages in some groups distinguished for intensification of school stress and level of school performance, groups of students experiencing great stress intensity (*quite a lot* or a *lot*) and those whose school performance was worse than good (*average* and *below average*) were put together in the analyses of variance and regression. Students achieving very good school performance and not experiencing school stress obtain the highest mean values for the analysed social variables (with the exception of family support, the highest among students experiencing a little bit of stress) and the lowest values for the intensification of subjective health complaints (tab. II). Post hoc analyses (Tukey's test) showed that statistically significant differences with regard to all the analysed variables exist between the group of students with at best average school performance and students whose performance are considered to be good or very good, and between students not experiencing school stress or experiencing it only to a small extent and those experiencing it quite a lot or a lot. In the case of family communication and teacher support, the differences between groups of students achieving good and very good performance were also significant. In the case of family support and subjective complaints, the differences between students not experiencing stress at all and experiencing it a little bit were significant. The biggest differences among students with varying level of school performance concerned the level of teacher support ($\eta^2=0.092$), while among students experiencing varying levels of stress intensity these differences concerned subjective health complaints ($\eta^2=0.091$).

**3. Adolescent subjective complaints depending on the level of social support, family communication, stress intensity and school performance: multivariate analyses.**

Stepwise regression was used to estimate the prediction of the intensity of adolescent subjective complaints by sociodemographic factors depending on school performance (tab. III). Five models, analysed in subsequent steps, were estimated for three groups of adolescents (those with at best average performance, with good performance, with very good performance). Only sociodemographic variables were included in the first model; school stress in the second one; peer and teacher support in the third one; family communication and support in the fourth one; the interaction between school stress and family

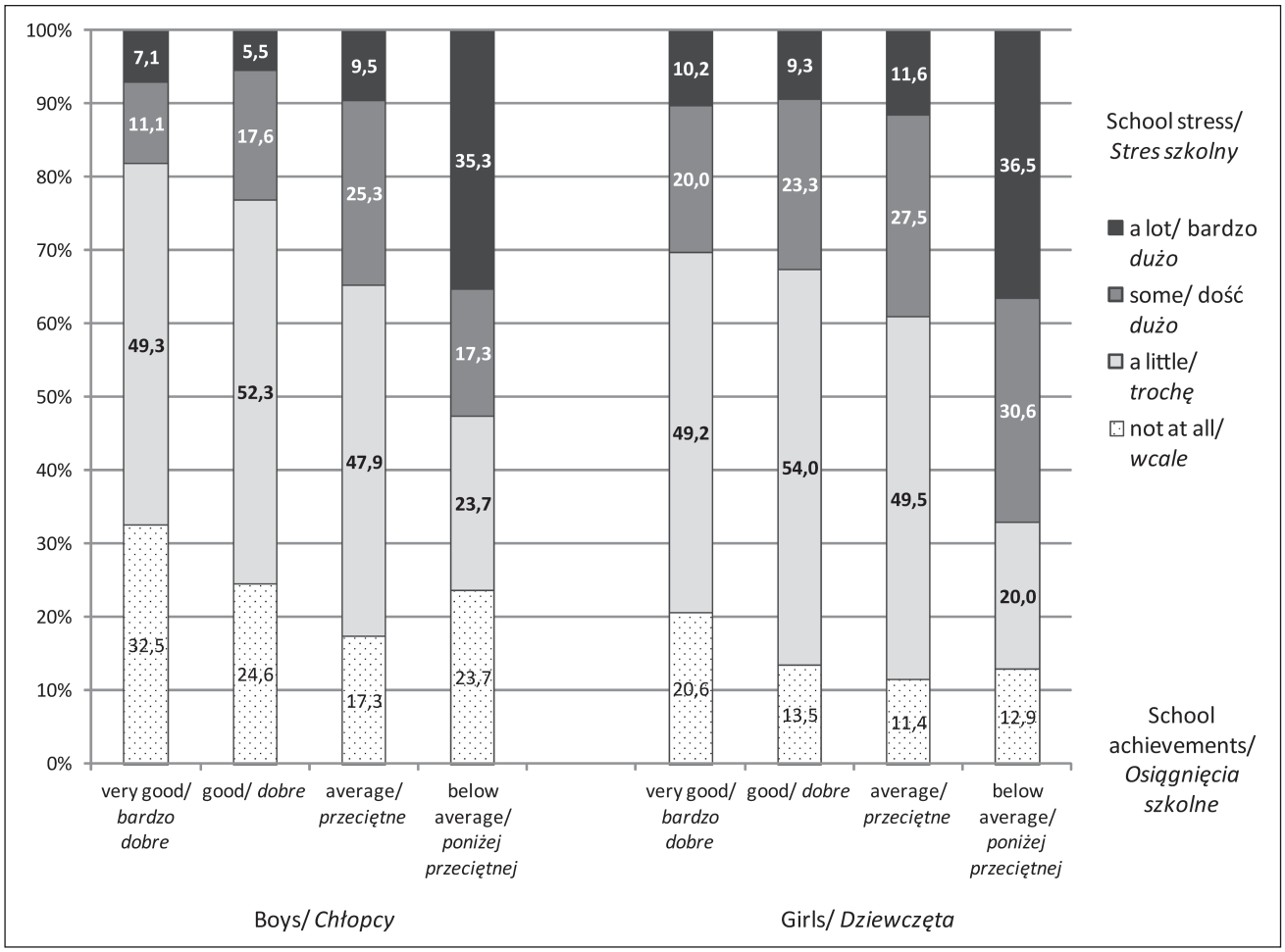


Fig. 1. Intensification of school stress in young people by gender and school achievements.

*Ryc. 1. Nasilenie stresu szkolnego u młodzieży wg płci i osiągnięć szkolnych.*

support in the fifth one (other interactions were statistically insignificant). In general, all the analysed factors explained 25% of the variability of the index of subjective health complaints among worst performing students and a little less (22-23%) among good and very good students.

Gender and age proved to be significant determinants of subjective complaints in all the analysed groups of young people, while family affluence was not included in any final model. School stress was responsible for about 9% of the variance of adolescent subjective complaints in good, average or worse-than-average performing students; it explained less than 6% of the variance of the dependent variable in very well performing students. The introduction of peer support and teacher support to the model enhanced goodness of fit: the percentage of explained variability of the index of subjective health complaints grew by about 4% among worst-performing students and 2% in very good students. It should be pointed out, however, that the factor of support provided at school proved to be statistically insignificant in the final model in this group. Family relations were responsible for about 4% of the variance of the subjective complaints variable in good or worse performing students, and for 8% of the variance in the group of very good students. In the groups of good and very good students, the interaction between family support and school stress was also included in the model. Well-performing students, if raised in families with low level of support, would react with a high rise in the intensity of subjective complaints to episodes of increased school stress (fig. 2).

## DISCUSSION

The paper presents the results of univariate and multivariate analyses relating to the social factors protecting young people from experiencing subjective complaints determined by, among other things, excessive school stress. Data obtained from 4,545 primary school and junior high school students from all over Poland, participating in the HBSC survey, were used. Thanks to sample representativeness, the indicated relationships may be generalized to the whole population of adolescents 11-15 year olds.

The study results showed unambiguously that a third of Polish school-aged young people experience intensified stress resulting from the burden of studying; this experience is stronger in girls than in boys and grows with age. Similar correlations connected with

Table II. Social support, family communication and subjective complaints of students with varying stress intensity and level of school achievements.

*Tabela II. Wsparcie społeczne, komunikacja w rodzinach oraz dolegliwości subiektywne uczniów z różnym nasileniem stresu i poziomem osiągnięć szkolnych.*

| | **School achievements** ***Osiągnięcia szkolne*** | **M** | **SD** | **F** | **p** | **η²** |
|---|---|---|---|---|---|---|
| Family communication *Komunikacja w rodzinie* | Average or below *Przeciętne lub poniżej* | 69.06 | 22.1 | 88.93 | <0.001 | 0.039 |
| | Good *Dobre* | 75.85 | 19.3 | | | |
| | Very good *Bardzo dobre* | 79.69 | 19.5 | | | |
| Family support *Wsparcie rodzinne* | Average or below *Przeciętne lub poniżej* | 70.41 | 27.5 | 72.64 | <0.001 | 0.032 |
| | Good *Dobre* | 79.18 | 23.9 | | | |
| | Very good *Bardzo dobre* | 81.23 | 25.2 | | | |
| Peer support *Wsparcie uczniów* | Average or below *Przeciętne lub poniżej* | 67.29 | 21.3 | 38.57 | <0.001 | 0.017 |
| | Good *Dobre* | 71.94 | 18.6 | | | |
| | Very good *Bardzo dobre* | 73.91 | 20.9 | | | |
| Teacher support *Wsparcie nauczycieli* | Average or below *Przeciętne lub poniżej* | 58.07 | 24.1 | 222.25 | <0.001 | 0.092 |
| | Good *Dobre* | 70.36 | 20.3 | | | |
| | Very good *Bardzo dobre* | 75.65 | 22.0 | | | |
| Subjective health complaints *Dolegliwości subiektywne* | Average or below *Przeciętne lub poniżej* | 33.19 | 25.8 | 69.61 | <0.001 | 0.031 |
| | Good *Dobre* | 24.63 | 22.3 | | | |
| | Very good *Bardzo dobre* | 24.14 | 23.1 | | | |

gender and age relate to the experience of subjective complaints. These results are consistent with previous analyses [3, 10, 30] and with studies by other authors [1, 24, 31-32]. According to Thorsheim et al., this indicates that adolescence should be considered as a period of increasing health inequalities [33].

The conducted univariate analyses showed statistically significant relationship between the level of school performance and the experienced stress: the worse the school performance, the greater the school stress. These results were confirmed both by European [34] and US [36] studies, whose authors introduced the notion of school burnout, the key element of which is exactly the experience of school stress. The authors point to the fact that intensified stress has a negative impact on the cognitive functioning of students and thus their school performance. Conversely, the pressure put on students by schools increases their effort and extends the time spent on studying and thus enhances their school performance [39]. However, it is the way students are motivated to study that is important; the outcome should be better performance and not greater stress intensity and subjective complaints.

The discussed studies proved that poor-performing students who experience excessive levels of school stress have the lowest level of family and school support and the worst communication with the parents. This means that those young people who are at the greatest risk of deterioration of health are to a significant extent deprived of the most important protective factors. Good family relations based on clear communication, which provide support and the feeling of safety, enhance the mental health of children and young people and reduce the frequency of anti-health behaviours [21, 23].

Table II. Cd.

*Tabela II. Cont.*

| | **Intensification of school stress** ***Nasilenie stresu szkolnego*** | **M** | **SD** | **F** | **p** | **$\eta^2$** |
|---|---|---|---|---|---|---|
| Family communication *Komunikacja w rodzinie* | Some or a lot/ *Dość lub bardzo duże* | 70.04 | 22.5 | 36.97 | <0.001 | 0.017 |
| | A little *Trochę* | 75.07 | 19.4 | | | |
| | Not at all *Wcale* | 76.99 | 20.9 | | | |
| Family support *Wsparcie rodzinne* | Some or a lot *Dość lub bardzo duże* | 72.16 | 27.7 | 26.07 | <0.001 | 0.012 |
| | A little *Trochę* | 78.55 | 23.4 | | | |
| | Not at all *Wcale* | 76.03 | 28.8 | | | |
| Peer support *Wsparcie uczniów* | Some or a lot *Dość lub bardzo duże* | 65.81 | 21.9 | 56.18 | <0.001 | 0.025 |
| | A little *Trochę* | 72.09 | 18.1 | | | |
| | Not at all *Wcale* | 73.75 | 21.7 | | | |
| Teacher support *Wsparcie nauczycieli* | Some or a lot *Dość lub bardzo duże* | 59.47 | 25.1 | 93.95 | <0.001 | 0.041 |
| | A little *Trochę* | 69.37 | 20.1 | | | |
| | Not at all *Wcale* | 70.03 | 25.2 | | | |
| Subjective health complaints *Dolegliwości subiektywne* | Some or a lot *Dość lub bardzo duże* | 38.32 | 25.4 | 219.44 | <0.001 | 0.091 |
| | A little *Trochę* | 24.49 | 21.8 | | | |
| | Not at all *Wcale* | 19.42 | 22.6 | | | |

Multivariate analyses enabled to identify the key factors responsible for the intensification of subjective health complaints as well as those protecting against them. The factor definitely increasing the intensity of subjective complaints was school stress, especially in good, average and below-average students. The most important protective factors proved to be good family relations connected with support and clear communication, which played the greatest part among best-performing students. Studies by Petanidou et al. also indicated that family support is the strongest factor protecting against intensified subjective complaints out of all the discussed sources of support (school, peers) [22]. The support received at school from students and teachers played the greatest protective role among poorest-performing students. Previous analyses pointed out that teacher support was an independent predictor of physical complaints, while the same was true for good family relations and emotional complaints [3]. This might indicate a need to conduct further analyses taking into account both school performance and the type of health complaints.

In the groups of well and very well performing students, a very important determinant of subjective complaints was the interaction between family support and school stress. Well-performing students (who made up over 40% of the examined adolescents), if raised in families with low level of support, would react with a high rise in the intensity of subjective complaints to episodes of increased school stress. For these students, family support is of particular importance.

Analyses taking into account the interactions between support and the stress caused by being bullied by peers as the determinants of subjective complaints, were conducted by Fridh et al. [24]. They showed that boys from families with a low level of support react much stronger with the intensification of subjective complaints in the event of repeated bullying than their peers from families with a high level of support. Analogical correlations concerned

Table III. Sociodemographic factors as the predictors of the intensity of adolescent subjective complaints depending on school performance – results of stepwise regression.

*Tabela III. Wyniki krokowej analizy regresji dla czynników społeczno-demograficznych jako predyktorów nasilenia dolegliwości subiektywnych młodzieży w zależności od osiągnięć szkolnych.*

| **School achievements** ***Osiągnięcia szkolne*** | **Independent variables** ***Zmienne niezależne*** | **Model 1** | | **Model 2** | | **Model 3** | | **Model 4** | | **Model 5** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **β*** | **p** | **β*** | **p** | **β*** | **p** | **β*** | **p** | **β*** | **p** |
| Average or below *Przeciętne lub poniżej* | Gender/*Płeć* | 0.258 | 0.000 | 0.240 | 0.000 | 0.231 | 0.000 | 0.223 | 0.000 | 0.223 | 0.000 |
| | Age/*Wiek* | 0.116 | 0.000 | 0.107 | 0.000 | 0.074 | 0.001 | 0.061 | 0.005 | 0.061 | 0.005 |
| | Affluence*Zamożność* | 0.008 | 0.738 | 0.000 | 0.991 | -0.001 | 0.970 | 0.015 | 0.483 | 0.015 | 0.484 |
| | School stress/*Stres szkolny* | | | 0.297 | 0.000 | 0.253 | 0.000 | 0.246 | 0.000 | 0.244 | 0.000 |
| | Peer support *Wsparcie uczniów* | | | | | -0.099 | 0.000 | -0.071 | 0.002 | -0.071 | 0.002 |
| | Teacher support *Wsparcie nauczycieli* | | | | | -0.150 | 0.000 | -0.099 | 0.000 | -0.099 | 0.000 |
| | Family communication *Komunikacja w rodzinie* | | | | | | | -0.104 | 0.000 | -0.104 | 0.000 |
| | Family support *Wsparcie rodzinne* | | | | | | | -0.134 | 0.000 | -0.134 | 0.000 |
| | Stress*family support *Stres*wsparcie rodzinne* | | | | | | | | | 0.002 | 0.973 |
| | $\Delta R^2$/p** | 0.086 | <0.001 | 0.088 | <0.001 | 0.040 | <0.001 | 0.038 | <0.001 | 0.001 | 0.973 |
| Good *Dobre* | Gender/*Płeć* | 0.192 | 0.000 | 0.146 | 0.000 | 0.141 | 0.000 | 0.141 | 0.000 | 0.139 | 0.000 |
| | Age/*Wiek* | 0.135 | 0.000 | 0.115 | 0.000 | 0.078 | 0.001 | 0.049 | 0.031 | 0.050 | 0.027 |
| | Affluence/*Zamożność* | -0.032 | 0.176 | -0.032 | 0.146 | -0.030 | 0.177 | -0.003 | 0.872 | -0.003 | 0.901 |
| | School stress/*Stres szkolny* | | | 0.305 | 0.000 | 0.276 | 0.000 | 0.267 | 0.000 | 0.420 | 0.000 |
| | Peer support *Wsparcie uczniów* | | | | | -0.110 | 0.000 | -0.073 | 0.002 | -0.074 | 0.002 |
| | Teacher support *Wsparcie nauczycieli* | | | | | -0.097 | 0.000 | -0.049 | 0.045 | -0.051 | 0.037 |
| | Family communication *Komunikacja w rodzinie* | | | | | | | -0.136 | 0.000 | -0.128 | 0.000 |
| | Family support *Wsparcie rodzinne* | | | | | | | -0.116 | 0.000 | -0.123 | 0.000 |
| | Stress*family support *Stres*wsparcie rodzinne* | | | | | | | | | -0.161 | 0.013 |
| | $\Delta R^2$/p** | 0.060 | <0.001 | 0.091 | <0.001 | 0.027 | <0.001 | 0.041 | <0.001 | 0.003 | 0.013 |

*standardized multivariate regression coefficients/*standaryzowane współczynniki regresji wielowymiarowej*;

**the overall coefficient of determination change (ΔR2) after entering to the model further groups of variables with statistical significance of this change/*zmiana ogólnego współczynnika determinacji (ΔR2) po wprowadzeniu do modelu kolejnych grup zmiennych wraz z istotnością statystyczną tej zmiany.*

Table III. Cont.
*Tabela III. Cd.*

| School achievements *Osiągnięcia szkolne* | Independent variables *Zmienne niezależne* | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | β* | p | β* | p | β* | p | β* | p | β* | p |
| Very good/ *Bardzo dobre* | Gender/*Płeć* | 0.101 | 0.004 | 0.063 | 0.069 | 0.064 | 0.064 | 0.090 | 0.007 | 0.089 | 0.007 |
| | Age/*Wiek* | 0.223 | 0.000 | 0.196 | 0.000 | 0.157 | 0.000 | 0.103 | 0.003 | 0.101 | 0.004 |
| | Affluence/*Zamożność* | -0.070 | 0.048 | -0.077 | 0.025 | -0.080 | 0.019 | -0.023 | 0.494 | -0.023 | 0.480 |
| | School stress/*Stres szkolny* | | | 0.242 | 0.000 | 0.218 | 0.000 | 0.206 | 0.000 | 0.030 | 0.753 |
| | Peer support *Wsparcie uczniów* | | | | | -0.068 | 0.073 | -0.014 | 0.698 | -0.020 | 0.597 |
| | Teacher support *Wsparcie nauczycieli* | | | | | -0.109 | 0.005 | -0.042 | 0.269 | -0.043 | 0.257 |
| | Family communication *Komunikacja w rodzinie* | | | | | | | -0.159 | 0.000 | -0.159 | 0.000 |
| | Family support *Wsparcie rodzinne* | | | | | | | -0.210 | 0.000 | -0.203 | 0.000 |
| | Stress*family support *Stres wsparcie rodzinne* | | | | | | | | | 0.187 | 0.047 |
| | $\Delta R^2$/p** | 0.065 | <0.001 | 0.057 | <0.001 | 0.020 | <0.001 | 0.081 | <0.001 | 0.004 | 0.047 |

*standardized multivariate regression coefficients/*standaryzowane współczynniki regresji wielowymiarowej*;
**the overall coefficient of determination change (ΔR2) after entering to the model further groups of variables with statistical significance of this change/*zmiana ogólnego współczynnika determinacji (ΔR2) po wprowadzeniu do modelu kolejnych grup zmiennych wraz z istotnością statystyczną tej zmiany.*

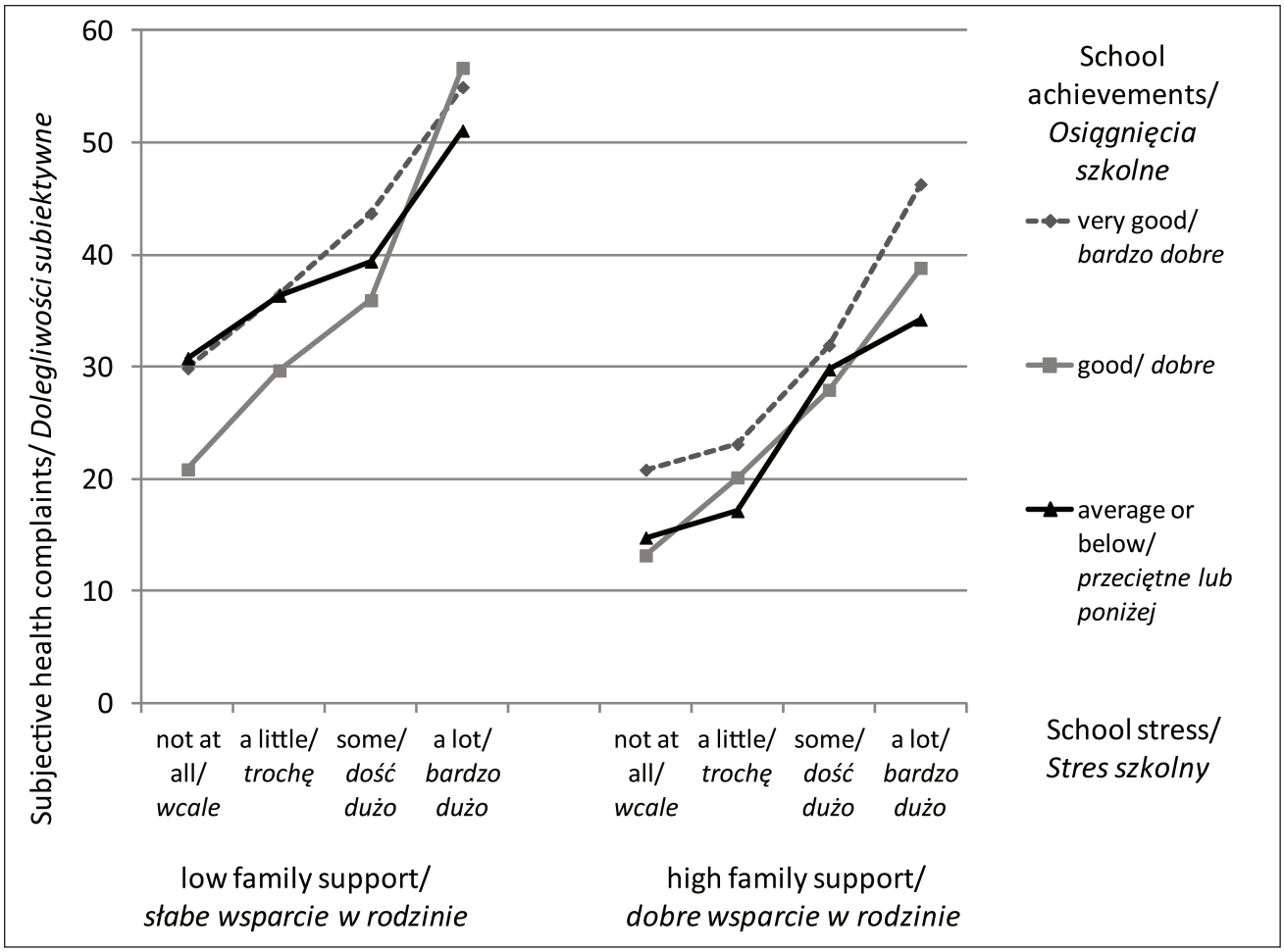


Fig. 2. Adolescent subjective complaints in families with varying level of support depending on stress intensity and school performance.

*Ryc. 2. Dolegliwości subiektywne młodzieży w rodzinach o różnym poziomie wsparcia w zależności od nasilenia stresu i osiągnięć szkolnych.*

the interaction with peer support. These results confirm the purposefulness of conducting analyses taking into account the interactions among social variables.

It is worth noting that none of the final models included family affluence (similar to the analyses by Petanidou et al. [22]). This may mean that the correlation between socioeconomic status and complaints, mentioned by some authors, is mediated through family relationships. It is also quite weak (in the discussed study, it was included in the model only in the group of best-performing students). A study based on the HBSC data from 2002-2006 indicated that the intensification of subjective health complaints is related more to low socioeconomic status of the neighbourhood than to family poverty [37]. In a report on the social determinants of health, drawing on the findings of the 2010 HBSC survey, a range of indirect correlations was identified in a situation where the atmosphere of the school and the affluence of the neighbourhood are the mediators of the correlation between family affluence and the experience of numerous subjective complaints [12].

Over the last few years, there have been quite a few publications, which took into account the protective influence of social support coming from various sources. Based on the results of the Canadian HBSC survey, J. Freeman et al. proved that a positive school environment might be a protective factor against the intensification of subjective complaints in adolescents with family problems, and risky behaviours play the role of a mediator of this correlation [38]. Furthermore, O'Malley et al. indicated that the correlation between school atmosphere and student school performance may vary depending on the family structure in which young people are raised [39]. Fan et al. [40] also mentioned diverse views on the school atmosphere among students raised in families of various structures. The study discussed in this paper points also to one more aspect which should be taken into account in further research: the varying role of support from different sources among students with varying level of school performance.

A limitation of the conducted analyses is the use of only one-item indicator of school stress. In future studies, it would be beneficial to consider using a scale for this issue. However, considering the positive experiences related to making use of this measure in the previous waves of the HBSC survey (the indicator has been used

since the 1990s), the obtained results may be treated as reliable. The use of only a subjective measure of school performance may be also perceived as a limitation of the study. The question was, however, validated in a joint project by researchers from Austria, Norway and Canada [27] as well as in Poland. A 2015 study demonstrated that the responses given to the above question by a group of junior high school students correlated with the grade the students had been awarded at the state examination at the end of the 6th grade of primary school, the objective of which is to provide a general assessment of one's intellectual capacity and the ability to learn [6].

## CONCLUSIONS

Summing up the obtained results, it may be concluded that non-specific subjective complaints are an important health problem among adolescents. The frequency of their occurrence increases with age, and is greater in girls than in boys. A similar trend of changes can be found in the indicators of school stress, which are an important source of intensifying subjective complaints. Moreover, the level of stress depends on school performance; it is visibly greater among worst-performing students. The paper identifies a range of factors protecting against the intensification of complaints, the root cause of which is school stress. These factors are connected with good relationships and parental support, peer support and teacher support, as well as with clear family communication. School performance is an important factor modifying the examined relationship. The influence of support in the school environment increases among poorer-performing students, while the same is true for the importance of family relations among better-performing students.

### REFERENCES


1. Låftman SB, Modin B. School-performance indicators and subjective health complaints: are there gender differences? Sociol Health Ill, 2012;34(4):608-625.
2. Tabak I. Płeć a zdrowie psychosomatyczne młodzieży w okresie dorastania. Zdrowie Publiczne, 2006;116(3):457-460.
3. Mazur J. Obciążenie dolegliwościami subiektywnymi w drugiej dekadzie życia. W: Szymborski J, Zatoński W (red.) Zdrowie dzieci i młodzieży w wymiarze socjomedycznym. Zdrowie Publiczne. Monografie. Tom II. Warszawa: Wszechnica Polska Szkoła Wyższa, 2013;11-31.
4. Hofstra M, van der Ende J, Verhulst F. Adolescents' self-reported problems as predictors of psychopathology in adulthood: 10-year follow-up study. Brit J Psychiatry. 2001;179:203-209.
5. Ravens-Sieberer U, Torsheim T, Hetland J et al. Subjective health, symptom load and quality of life of children and adolescents in Europe. Int J Public Health. 2009;54:151-159.
6. Mazur J. (red.). Zdrowie i zachowania zdrowotne młodzieży szkolnej w Polsce na tle wybranych uwarunkowań socjodemograficznych. Wyniki badań HBSC 2014. Warszawa: Instytut Matki i Dziecka, 2015.
7. Woynarowska B, Lutze I, Mazur J. Zmiany w zdrowiu i samopoczuciu psychospołecznym młodzieży szkolnej w okresie transformacji ustrojowej. Przegl Pediatr. 2002;32(3):218-222.
8. Ottová-Jordan V, Smith ORF, Gobina I et al. Trends in multiple recurrent health complaints in 15-year-olds in 35 countries in Europe, North America and Israel from 1994 to 2010. Eur J Public Health. 2015;25(Suppl. 2):24-27.
9. Karvonen S, Vikat A, Rimpela M. The role of school context in the increase in young people's health complaints in Finland. J Adolesc. 2005;28:1-16.
10. Mazur J. (red.). Społeczne determinanty zdrowia młodzieży szkolnej. Warszawa: Instytut Matki i Dziecka, 2011.
11. Mazur J, Tabak I, Kołoło H. Czynniki ryzyka i ochronne wśród uwarunkowań subiektywnych dolegliwości młodzieży 15-letniej. Przegl Epidemiol. 2008;62:633-641.
12. Ottová-Jordan V, Smith OR, Augustine L et al. Trends in health complaints from 2002 to 2010 in 34 countries and their association with health behaviours and social context factors at individual and macro-level. Eur J Public Health. 2015;25(Suppl. 2):83-89.
13. Archambault I, Janosz M, Morizot J et al. Adolescent behavioral, affective, and cognitive engagement in school: Relationship to dropout. J School Health. 2009;79(9):408-415.
14. Andersen A, Holstein BE, Due P. School-related risk factors for drunkenness among adolescents: risk factors differ between socio-economic groups. Eur J Public Health. 2007;17(1):27-32.
15. Hayatbakhsh MR, Najman JM, Bor W et al. School performance and alcohol use problems in early adulthood: a longitudinal study. Alcohol. 2011;45(7):701-709.
16. Fergus S, Zimmerman MA. Adolescence resilience: a framework for understanding healthy development in the face of risk. Annu Rev Public Health. 2005;26:399-419.
17. Mazur J, Tabak I. Koncepcja resilience. Od teorii do badań empirycznych. Med Wieku Rozwoj. 2008;2 cz. I (XII):599-605.
18. Patterson J. Understanding family resilience. J Clinic Psychol. 2002;58(3):233-246.
19. Borucka A, Raduj J, Okulicz-Kozaryn K, Pisarska A, Ostaszewski K. Spostrzeganie klimatu szkoły przez uczniów i nauczycieli gimnazjów warszawskich. W: Szymborski J, Zatoński W (red.) Zdrowie dzieci i młodzieży w wymiarze socjomedycznym. Zdrowie Publiczne. Monografie. Tom II. Warszawa: Wszechnica Polska Szkoła Wyższa, 2013.
20. Denny SJ, Robinson EM, Utter J, et al. Do schools influence student risk-taking behaviors and emotional health symptoms? J Adolesct Health. 2011;48:259-267.
21. Fridh M, Lindström M, Rosvall M. Subjective health complaints in adolescent victims of cyber harassment: moderation through support from parents/friends – a Swedish population-based study. BMC Public Health. 2015;15:949.
22. Rask K, Åstedt-Kurki P, Paavilainen E, et al. Adolescent subjective well-being and family dynamics. Scand J Car Sci. 2003;17:129-138.
23. Tabak I, Jodkowska M, Oblacińska A. Spożywanie wspólnych posiłków, wsparcie i komunikacja w rodzinie jako predyktory zdrowia subiektywnego i zadowolenia z życia nastolatków. Ped Pol. 2013;6(88):533-539.
24. Petanidou D, Daskagianni E, Dimitrakaki C, et al. The role of perceived well-being in the family, school and peer context in adolescents' subjective health complaints: evidence from

a Greek cross-sectional study. BioPsychoSocial Medicine. 2013;7:17.
25. Hetland J, Torsheim T, Aaro L. Subjective health complaints in adolescence: dimensional structure and variation across gender and age. Scand J Public Health. 2002;30(3):223-230.
26. Ravens-Sieberer U, Erhart M, Torsheim T, et al. An international scoring system for self-reported health complaints in adolescents. Eur J Public Health. 2008;18:294-299.
27. Felder-Puig R, Griebler R, Samdal O, et al. Does the school performance variable used in the International Health Behavior in School-Aged Children (HBSC) Study reflect students' school grades? J School Health. 2012;82(9):404-409.
28. Tabak I, Radiukiewicz K. Polska rodzina oczami nastolatków i ich rodziców. Adaptacja skali Family Dynamics Measure II (FDM II). Warszawa: Instytut Matki i Dziecka, 2009.
29. Zimet G, Dahlem N, Zimet S, et al. The Multidimensional Scale of Perceived Social Support. J Pers Assess. 1988;52:30-41.
30. Woynarowska B, Tabak I, Mazur J. Subiektywna ocena zdrowia i zadowolenie z życia młodzieży szkolnej w Polsce i innych krajach w 2002 roku. Med Wieku Rozwoj. 2004;VIII, 3, cz. I:535-550.
31. Sweeting H, West P. Sex differences in health at ages 11, 13 and 15. Soc Sci Med. 2003;56:31-39.
32. Jackson J, Chamberlin J, Kroenke K. Gender and symptoms in primary care practices. Psychosomatics. 2003;44(5):359-370.
33. Torsheim T, Välimaa R, Danielson M. Health and well-being. W: Currie C et al. (eds.) Young peoples health in context. Health Behaviour in School-aged Children (HBSC) Study: International Report from the 2001/2002 Survey. WHO, Denmark 2004;55-62.
34. Salmela-Aro K, Kiuru N, Leskinen E, Nurmi JE. School burnout inventory (SBI): Reliability and validity. Eur J Psychol Assess. 2009;25:48-57.
35. May RW, Bauer KN, Finchama FD. School burnout: Diminished academic and cognitive performance. Learning and Individual Differences. 2015;42:126-131.
36. Andrade FH. Co-occurrences between adolescent substance use and academic performance: School context influences a multilevel-longitudinal perspective. J Adolesc. 2014;37:953-963.
37. Mazur J (red.). Status materialny rodziny i otoczenia a samopoczucie i styl życia młodzieży 15-letniej. Warszawa: Instytut Matki i Dziecka, 2007.
38. Freeman J, King M, Kuntsche E, Pickett W. Protective roles of home and school environments for the health of young Canadians. J Epidemiol Community Health. 2011;65:438–444.
39. O'Malley M, Voight A, Renshaw TL. School climate, family structure, and academic achievement: A study of moderation effects. School Psychol Quarter. 2015;30(1):142-157.
40. Fan W, Williams CM, Corkin DM. A multilevel analysis of student perceptions of school climate: The effect of social and academic risk factors. Psychol Schs. 2011;48:632-647.

**Author's contributions/Wkład Autorów**
According to the order of the Authorship/Według kolejności

**Conflicts of interest/Konflikt interesu**
The Authors declare no conflict of interest.
Autorzy pracy nie zgłaszają konfliktu interesów.

**Nadesłano/Received:** 20.01.2016 r.
**Zaakceptowano/Accepted:** 27.01.2016 r.

**Published online/Dostępne online**

Address for correspondence:
*Izabela Tabak*
Instytut Matki i Dziecka
Zakład Zdrowia Dzieci i Młodzieży
ul. Kasprzaka 17 a, 01-211 Warszawa
tel. (+48 22) 32-77-410
e-mail: izabela.tabak@imid.med.pl