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PSYCHOSOMATIC DISORDERS IN SECONDARY SCHOOL STUDENTS IN OSIJEK

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SUMMARY – Psychosomatic disorders occur quite commonly in adolescence. The aim of the study was to define the prevalence of psychosomatic disorders in the population of secondary school students in Osijek, and to compare the groups of students with psychosomatic disorders and psychosomatic reactions with the group of healthy students according to their socioeconomic, family, relational and hereditary contextual factors. A total of 508 secondary school students from Osijek (170 male and 338 female) aged 15-19 years were included in the study. Study subjects were divided into three groups: (a) healthy students (n=272; 53.54%); (b) students with psychosomatic reactions (n=190; 37.40%); and (c) students with psychosomatic disorders (n=46; 9.06%). Accordingly, 37.40% and 9.06% of student sample suffered from psychosomatic reactions and psychosomatic disorders, respectively. The most common psychosomatic reactions were allergies (22.04%), dysmenorrhea (21.01%) and acne (16.00%). The most common psychosomatic disorders were asthma (4.33%) and hypertension (1.96%). Psychosomatic reactions occurred more often in female than in male students. The number of divorced parents was significantly higher in the group of students with psychosomatic disorders (52.20%) as compared with the group of healthy students (15.10%). The rate of psychosomatic disorders was significantly lower among parents of healthy students (28.70%) as compared with parents of students with psychosomatic reactions (47.90%) and those with psychosomatic disorders (67.40%). Study results pointed to a conclusion that hereditary factors (predisposition) and factors representing the source of intense fear in childhood and adolescence (e.g., parents' divorce) played a significant role in the onset of psychosomatic disorders.

Key words: *Psychophysiologic disorders – diagnosis; Psychophysiologic disorders – epidemiology; Incidence; Adolescence; Risk assessment*

Introduction

Adolescence is a long transitional developmental period between childhood and adulthood. It is a period of rapid mental and physical maturation. The processes of maturation include physical, psychological, cognitive, and social transformations marked by remarkable changes in the behavior and psychosocial adjustments to adult roles and expectations. Physical changes and expansion of cognitive capacity initiate more extensive psychological and social changes formed by cultural, socioeconomic, and historical context in which the adolescence occurs. Adaptive development of the adolscent is not uniform. On the contrary, adjustments are individual and depend on the context. The individual development of the adolescent is formed through his/her sex, socioeconomic status, historical context, climate, race, cultural values, ethnicity, family upbringing, parents' expectations, and the individual's specific qualities[1]. These contextual factors may facilitate the development into a healthy adult or they may enforce inadequate adaptive efforts with the consequent unsound reactions and disorders. Since mental and physical processes in this phase of development are open to changes and depend on each other, the psychosomatic reactions and disorders have become the most common form of developmental adaptive failure.

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An increased number of psychosomatic disorders may be expected in individuals who are prone to react psychosomatically, and in cultures, societies and families where emotional and psychological needs are not adequately supported, which are authoritative and religiously orthodox, and where there is a strong sexual repression, i.e. inhibition of freedom of thinking, feeling and behaving. According to definition, psychosomatic persons are those persons who cannot describe by words their feelings and emotions, whose phantasms and imagination are undeveloped, who are conventional and self-restrained in manner (the concept of alexithymia by Sifneos), and whose way of thinking and problem solving is specific (operational thought, according to Paris school). This is the reason why they tend to make conventional solutions common to a particular culture, without originality, fantasy, and imagination. They are separated from their unconscious and well adapted to their environment, but at the price of strong auto-destructive internal forces that, in moments of adaptive exhaustion, initiate psychosomatic reactions and cause psychosomatic disorders[2].

In order to explain the onset of psychosomatic disorders, terms like 'psychophysiologic complementarity' (relieving through behavior or through somatism), 'the state of hopelessness' (reactive exhaustion due to paralysis of the ego defenses), 'family incoherency' (security lost due to a family discord), 'psychosocial model of psychosomatic disorder' (psychosocial stimuli cause physiologic reactions of the autonomic and endocrine systems), 'social readaptation' (congruence of several occurrences in a short period of time lead to the attempt of readaptation and psychosomatic reaction), 'emotional reactivation' (stresses set emotional reactivation, and emotional reactivation decompensates defense mechanisms), and 'brosothymia' ('swallowing', the inhibition of anxiety or aggression)[3-6]. Among biologic factors, hereditary factors (psychosomatic disorders are 5-10 times more frequent in female relatives of the first generation of psychosomatic patients in relation to other population), genetic factors (higher frequency of blood type '0' in patients with peptic ulcer, higher frequency of particular HLA antigens in patients with diabetes), and numerous neurologic dysfunctions (lowered pain threshold, impaired verbal communication, interruption in the pathways between centers for higher mental functions and hypothalamus) have been studied[2,7,8].

In 1975, Minuchin *et al.* described a psychosomatic type of family that, according to them, had four characteristics: (a) interweavement – excessive closeness, lack of privacy, vague interpersonal bonds; (b) overprotection – mutual excessive concern for health and safety; (c) rigidity – inflexibility to changes in interpersonal relations; and (d) excessive aversion to conflict situations with consequential compromising conflict solutions[9]. The concept of stress, elaborated by Hans Selye during the 1930s when he found in experimental animals that the body responded to various harmful agents (physical, mental and social) by the same pathoanatomic picture, i.e. adrenal gland hypertrophy, thymus atrophy, and development of peptic ulcer in the stomach, is closely connected to the concept of psychosomatic disorders[10]. Stress, and failure to overcome it, i.e. breakdown of the compensation mechanisms, is a prerequisite for the psychosomatic disorders to occur. At the age of 15-19 (secondary school age), besides hormonal and physical changes, mental functions directed to the formation of psychosomatic unity and maturity are being intensely transformed. It is the age when psychosomatic disorders may occur for the first time, usually related to real or imaginary increased demands of the person's environment[11].

The aim of this study was to assess the prevalence of psychosomatic disorders in the population of secondary school students in Osijek, in total and according to diagnostic categories, and to compare the groups of secondary school students with psychosomatic disorders and psychosomatic reactions with the group of healthy students. We presumed that differences between these groups according to socioeconomic, family, relational and hereditary contextual factors, and some psychological characteristics and health conditions could point to the key contextual factors in the onset of psychosomatic disorders in secondary school students in Osijek.

Subjects and Methods

Initially, 515 students from five Osijek secondary schools were included in the study, i.e. one class from each of four grades in each school (grammar school, catering school, high school of civil engineering, trade school and nursing school). Seven students were excluded from further study for obvious lack of cooperation and providing inadequate information, thus data on 508 students (338 female and 170 male) aged 15-19 were included in statistical processing. The necessary information was obtained by use of a questionnaire that was so designed as to be filled out during the school period under the supervision of the respective class homeroom teacher. The following data were collected: general data (name, family name, grade, school, date of birth, sex); data on treatment and on pres-

ence or absence of psychosomatic disorder; data on socioeconomic factors (place of residence and living conditions, household income, parents' occupation and employment); data on family factors (family structure, position in the family, parents' inter-relations, parents' relation toward the subject, and subject's relation toward his/her parents); data on some psychological characteristics and alexithymia (sense of responsibility, ability to fantasize, imagination, sensibility, introversion, inability to describe feelings by words); data on his/her relation toward school and his/her peers (school success, a wish to go to school, number of friends, is he/she accepted among peers); data on hereditary factors (presence of psychosomatic disorders in the subject's parents); and data on health condition in the past year (number of visits to physicians, hospitalizations, present condition).

Analyzing the information concerning the treatment and presence or absence of psychosomatic disorders, the subjects were divided into three groups: (a) healthy students (n=272; 53.54%); (b) students with psychosomatic reactions (n=190; 37.40%); and (c) students with psychosomatic disorders (n=46; 9.06%). Psychosomatic reaction was defined as a disorder without a pathologic anatomic substrate or clear pathophysiologic process. Psychosomatic disorder was defined as a disorder with a pathologic anatomic substrate or clear pathophysiologic process.

Data were statistically analyzed by Paradox 3.5, Excel and Statistics for Windows 95 softwares. Because of the nature of the information processed, on statistical processing we used χ^2-test and Yeates correlation, and every difference between the observed and expected frequencies prior to squaring was reduced by 0.5. Differences at 99% probability ($p<0.01$) were considered statistically significant.

Results

Study results showed 37.40% of the participants to have experienced psychosomatic reactions and 9.06% to suffer from psychosomatic disorders. Table 1 presents psychosomatic reactions and disorders according to diagnostic categories. The most common psychosomatic reactions were allergies (22.04%), dysmenorrhea (21.01%) and acne (16.00%). The most common psychosomatic disorders were asthma (4.33%) and hypertension (1.96%). Coexistence of two and three or more psychosomatic disorders was recorded in 61 (12%) and 35 (6.9%) students, respectively (Table 1).

Sex distribution of psychosomatic reactions and psychosomatic disorders revealed the former to be present in 49 (28.82%) and the latter in ten (5.88%) of 170 male students. Out of 338 female students, psychosomatic reactions were recorded in 141 (41.72%) and psychosomatic disorders in 36 (10.65%) students, the former yielding significant female predominance ($\chi^2=11.1$; df=2; $p<0.01$).

According to study results, socioeconomic factors did not have any major impact on the occurrence of psychosomatic disorders in the study sample (Table 2).

Since none of the students with psychosomatic disorders was the only son or daughter, there was a significant difference on this basis between this group and the groups of healthy students ($\chi^2=6.83$; df=2; $p<0.01$) and of students with psychosomatic reactions ($\chi^2=7.21$; df=2; $p<0.01$). The number of students' divorced parents was significantly higher in the group of students with psychosomatic disorders (52.2%) than in the groups of healthy students (15.10%) ($\chi^2=32.38$; df=2; $p<0.01$) and of students with psychosomatic reactions (14.70%) ($\chi^2=29.51$; df=2; $p<0.01$). The students with psychosomatic disor-

Table 1. Incidence of psychosomatic reactions and psychosomatic disorders in secondary school students in Osijek (N=508 except for dysmenorrhea n=338)

Psychosomatic reaction	n	%	Psychosomatic disorder	n	%
Allergy	112	22.04	Asthma	22	4.33
Urticaria	8	1.57	Peptic ulcer	4	0.79
Acne	82	16.14	Diabetes	2	0.39
Obesity	16	3.14	Hyperthyroidism	2	0.39
Thinness	19	3.74	Neurodermatitis	5	0.98
Anemia	42	8.27	Rheumatoid arthritis	2	0.98
Migraine	6	1.18	Ulcerative colitis	5	0.98
Epilepsy	4	0.79	Hypertension	10	1.96
Dysmenorrhea (n=308)	71	21.01			

Table 2. Comparison of socioeconomic factors and psychosomatic reactions and disorders

				H-PR		H-PD		PR-PD	
Socioeconomic factors	Healthy	PR	PD	χ^2	Significance	χ^2	Significance	χ^2	Significance
1. I live in:									
a) community apartment	40	29	4	0.01	NSD	1.05	NSD	1.62	NSD
b) own apartment	50	36	10	0.00	NSD	0.23	NSD	0.16	NSD
c) own house	138	99	24	0.01	NSD	0.06	NSD	0.03	NSD
d) subtenancy	23	12	3	0.8	NSD	0.43	NSD	0.1	NSD
e) refugee settlement	7	3	2	0.7	NSD	0.25	NSD	0.91	NSD
f) other	14	11	3	0.1	NSD	0.1	NSD	0.09	NSD
2. I live in:									
a) town	172	111	30	1.0	NSD	0.11	NSD	0.77	NSD
b) village	59	42	9	0.00	NSD	0.2	NSD	0.23	NSD
c) suburb	36	24	5	0.00	NSD	0.36	NSD	0.24	NSD
d) refugee settlement	5	3	2	0.2	NSD	0.65	NSD	0.91	NSD
3. Total family income									
a) less than 100 DM	6	6	2	0.4	NSD	0.41	NSD	0.16	NSD
b) between 100 and 300 DM	88	78	20	3.6	NSD	2.09	NSD	0.11	NSD
c) between 300 and 500 DM	106	63	16	1.6	NSD	0.35	NSD	0.06	NSD
d) between 500 and 1000 DM	54	35	6	0.1	NSD	1.43	NSD	0.94	NSD
e) more than 1000 DM	16	8	2	0.7	NSD	0.47	NSD	0.15	NSD
4. Employed family members are:									
a) father and mother	139	94	22	0.1	NSD	0.19	NSD	0.07	NSD
b) only father	81	55	11	0.00	NSD	0.77	NSD	0.57	NSD
c) only mother	27	26	8	1.5	NSD	1.88	NSD	0.34	NSD
d) none	12	11	3	0.4	NSD	0.23	NSD	0.09	NSD
e) someone else	13	4	2	2.4	NSD	0.22	NSD	0.5	NSD
5. Father's education:									
a) unfinished elementary school	7	6	3	0.1	NSD	1.36	NSD	0.81	NSD
b) elementary school	35	24	3	0.00	NSD	1.89	NSD	1.71	NSD
c) secondary school	148	95	26	0.8	NSD	0.1	NSD	0.66	NSD
d) college	35	22	7	0.2	NSD	0.14	NSD	0.36	NSD
e) university	35	30	3	0.7	NSD	1.89	NSD	3.04	NSD
f) I do not know	12	13	4	1.2	NSD	1.07	NSD	0.15	NSD
6. Mother's education:									
a) unfinished elementary school	21	8	5	2.4	NSD	0.35	NSD	2.59	NSD
b) elementary school	65	58	8	2.5	NSD	1.12	NSD	3.38	NSD
c) secondary school	130	81	27	1.2	NSD	1.89	NSD	3.84	NSD
d) college	18	18	2	1.2	NSD	0.69	NSD	1.68	NSD
e) university	31	23	3	0.00	NSD	1.33	NSD	1.52	NSD
f) I do not know	7	2	1	1.6	NSD	0.39	NSD	0.38	NSD

H, healthy; PR, psychosomatic reactions; PD, psychosomatic disorders; NSD, no statistically significant difference

Table 3. Comparison of family factors and psychosomatic reactions and disorders

				H-PR		H-PD		PR-PD	
Family factors	Healthy	PR	PD	χ^2	Significance	χ^2	Significance	χ^2	Significance
I live with:									
a) father	227	153	37	0.6	NSD	0.2	NSD	0.04	NSD
b) mother	246	179	44	2.2	NSD	1.79	NSD	0.43	NSD
c) brothers	123	95	23	1.0	NSD	0.38	NSD	0.03	NSD
d) sisters	124	82	23	0.2	NSD	0.32	NSD	0.71	NSD
e) stepfather	10	8	0	0.1	NSD	2.76	NSD	2.94	NSD
f) stepmother	4	0	0	3.3	NSD	2.02	NSD	0.01	NSD
g) guardian	1	0	0	2.0	NSD	3.02	NSD	0.01	NSD
h) someone else	49	29	8	0.6	NSD	0.07	NSD	0.11	NSD
Number of brothers and sisters:									
a) no brothers and sisters	32	24	0	0.00	NSD	6.83	SD	7.21	SD
b) 1	152	115	33	1.0	NSD	4.17	NSD	2.09	NSD
c) 2-3	77	45	11	1.2	NSD	0.48	NSD	0.03	NSD
d) more than 3	12	6	2	0.5	NSD	0.16	NSD	0.16	NSD
Order of birth:									
a) the oldest	100	78	19	0.8	NSD	0.34	NSD	0.03	NSD
b) the youngest	103	68	23	0.2	NSD	2.37	NSD	3.10	NSD
c) other	69	44	4	0.3	NSD	6.58	NSD	5.15	NSD
I confide most in:									
a) father	22	7	3	3.8	NSD	0.35	NSD	0.51	NSD
b) mother	117	85	18	0.1	NSD	0.29	NSD	0.52	NSD
c) someone else	133	94	22	0.00	NSD	0.04	NSD	0.07	NSD
d) nobody	0	4	3	5.6	NSD	13.32	SD	1.86	NSD
My parents:									
are not divorced	231	162	22	0.00	NSD	32.38	SD	29.51	SD
quarrel often	50	50	15	4.1	NSD	4.57	NSD	0.68	NSD
I hate my father	13	13	3	0.8	NSD	0.15	NSD	0.14	NSD
I hate my mother	2	2	0	0.3	NSD	2.18	NSD	2.04	NSD
I love my father	249	173	42	0.00	NSD	0.07	NSD	0.1	NSD
I love my mother	267	184	45	0.8	NSD	0.24	NSD	0.56	NSD
father is stern more than other fathers	45	42	7	2.2	NSD	0.14	NSD	1.26	NSD
mother is stern more than other mothers	21	22	4	1.9	NSD	0.06	NSD	0.52	NSD
parents beat me often	4	5	2	0.8	NSD	1.04	NSD	0.27	NSD
I had a happy childhood	237	153	37	3.6	NSD	1.24	NSD	0.04	NSD
my father loves me	253	170	44	1.7	NSD	0.81	NSD	2.12	NSD
my mother loves me	268	182	45	3.2	NSD	0.22	NSD	0.92	NSD
I have not been separated from my parents for more than 3 months	135	100	19	0.4	NSD	1.13	NSD	1.93	NSD

H, healthy; PR, psychosomatic reactions; PD, psychosomatic disorders; NSD, no statistically significant difference; SD, statistically significant difference

Table 4. Comparison of psychologic characteristics and alexithymia with psychosomatic reactions and disorders

				H-PR		H-PD		PR-PD	
Psychologic characteristics and alexithymia	H	PR	PD	χ^2	Significance	χ^2	Significance	χ^2	Significance
More responsible than most peers	130	106	28	2.8	NSD	2.71	NSD	0.43	NSD
More sensitive than most peers	142	98	28	0.00	NSD	1.23	NSD	1.33	NSD
Fantasize often	209	151	39	0.4	NSD	1.67	NSD	0.83	NSD
Never fantasize	24	11	3	1.5	NSD	0.52	NSD	0.09	NSD
Easily cries	111	99	25	5.7	NSD	2.92	NSD	0.1	NSD
Writes poetry	66	62	18	3.8	NSD	4.25	NSD	0.67	NSD
Dreams almost every night	152	109	32	0.1	NSD	3.11	NSD	2.38	NSD
Dreams rarely at night	78	61	7	0.6	NSD	3.9	NSD	5.4	NSD
Has difficulty to describe feelings by words	168	137	29	5.3	NSD	0.06	NSD	1.38	NSD
Easily falls in love	106	87	17	2.1	NSD	0.11	NSD	1.23	NSD
Feels lonely	91	67	23	0.1	NSD	4.57	NSD	3.35	NSD
Feels best when alone	64	51	13	0.6	NSD	0.42	NSD	0.05	NSD
Feels that has to bee perfect in everything	99	72	20	0.1	NSD	0.82	NSD	0.48	NSD
Never does anything without giving it full consideration	124	71	16	3.1	NSD	1.93	NSD	0.15	NSD
Has difficulty to concentrate on one job for a longer period of time	88	74	16	2.1	NSD	0.11	NSD	0.33	NSD
Reads more books than his/her peers	47	39	8	0.7	NSD	0.04	NSD	0.34	NSD

H, healthy; PR, psychosomatic reactions; PD, psychosomatic disorders; NSD, no statistically significant difference

ders were more distrustful (8.70%) than healthy students (0%) (χ^2=13.32; df=2; p<0.01) (Table 3).

There was no statistically significant difference between the groups according to particular psychological characteristics and alexithymia (Table 4). Neither there was any statistically significant difference between the groups of students according to their relation toward school and their peers, although the students who did not like to go to school showed a higher rate of psychosomatic disorders (Table 5).

Hereditary factors and factors related to students' health condition were found to significantly influence the occurrence of psychosomatic reactions and psychosomatic disorders. Parents of healthy students had a significantly lower rate of psychosomatic disorders (28.70%) than either parents of students with psychosomatic reactions (47.90%) (χ^2=17.10; df=2; p<0.01) or parents of students with psychosomatic disorders (67.40%) (χ^2=25.82; df=2; p<0.01). Mothers of students with psychosomatic reactions and psychosomatic disorders had a significantly higher rate of psychosomatic disorders (39.10%) than mothers of healthy students (16.50%) (χ^2=12.06; df=2; p<0.01). The number of students who had not visited physician in the past year was significantly greater in the group of healthy students than in the group of students with psychosomatic reactions (23.90% *vs* 11.60%) (χ^2=11.20; df=2; p<0.01). In the past year, the students with psychosomatic reactions had visited physician significantly more often, i.e. more than 10 times (26.10%) than either healthy students (6.20%) (χ^2=17.37; df=2; p<0.01) or

Table 5. Student relationship toward school and peers, and psychosomatic reactions and psychosomatic disorders

				H-PR		H-PD		PR-PD	
Relationship toward school and peers	H	PR	PD	χ^2	Significance	χ^2	Significance	χ^2	Significance
Would like to have more friends	191	141	31	0.9	NSD	0.14	NSD	0.81	NSD
Feels accepted by his/her peers	26	17	40	3.8	NSD	4.59	NSD	0.5	NSD
Number of good friends:									
a) none	5	2	0	0.7	NSD	2.09	NSD	2.04	NSD
b) one	23	12	6	0.8	NSD	0.75	NSD	1.98	NSD
c) two or three	81	58	15	0.00	NSD	0.14	NSD	0.08	NSD
d) four and more	163	118	25	0.2	NSD	0.5	NSD	0.92	NSD
What kind of student you are									
a) poor	19	17	5	0.5	NSD	0.61	NSD	0.13	NSD
b) fair	107	62	14	2.1	NSD	1.41	NSD	0.13	NSD
c) good	111	83	20	0.3	NSD	0.13	NSD	0.03	NSD
d) excellent	34	27	7	0.2	NSD	0.19	NSD	0.05	NSD
Reattender	8	10	3	1.5	NSD	0.99	NSD	0.11	NSD
Often warned for not being attentive during the class	68	36	11	2.4	NSD	0.08	NSD	0.5	NSD
Does not like to go to school	100	77	26	0.6	NSD	6.32	NSD	3.83	NSD

H, healthy; PR, psychosomatic reactions; PD, psychosomatic disorders; NSD, no statistically significant difference

Table 6. Hereditary factors and health condition associated with psychosomatic disorders and reactions

				H-PR		H-PD		PR-PD	
Hereditary factors and health state	H	PR	PD	χ^2	Significance	χ^2	Significance	χ^2	Significance
Family members treated for psychosomatic disorders:									
a) yes	78	91	31	17.7	SD	25.82	SD	5.68	NSD
b) mother	45	20	18	6.4	NSD	12.06	SD	2.84	NSD
c) father	20	23	7	2.9	NSD	2.62	NSD	0.26	NSD
Visits to doctor's office									
in the past year:									
a) none	65	22	7	11.2	SD	1.92	NSD	0.36	NSD
b) one	64	42	5	0.1	NSD	4.05	NSD	3.23	NSD
c) two to three	102	85	18	2.4	NSD	0.06	NSD	0.52	NSD
d) five to ten	24	24	4	1.7	NSD	0.09	NSD	0.79	NSD
e) more than ten	17	17	12	1.1	NSD	17.37	SD	9.42	SD
Hospitalizations in the past year	4	9	6	4.2	NSD	14.98	SD	3.66	NSD
Currently ill	10	42	22	37.8	SD	82.4	SD	12.07	SD

H, healthy; PR, psychosomatic reactions; PD, psychosomatic disorders; NSD, no statistically significant difference; SD, statistically significant difference

students with psychosomatic reactions (8.90%) (χ^2=9.42; df=2; p<0.01). The rate of hospitalization in the past year was statistically significantly higher in the group of students with psychosomatic disorders (13.00%) than in the group of healthy students (1.50%) (χ^2=14.98; df=2; p<0.01). The number of subjects who were ill at the time of the study was greater in the group of students with psychosomatic disorders (47.80%) than in the groups of healthy students (3.70%) (χ^2=82.40; df=2; p<0.01) and of students with psychosomatic reactions (22.10%) (χ^2=12.07; df=2; p<0.01) (Table 6).

Discussion

According to study results, 9.06% of study students suffered from psychosomatic disorders (asthma, peptic ulcer, diabetes, hyperthyroidism, neurodermatitis, rheumatoid arthritis, ulcerative colitis, hypertension), whereas 37.40% of study students experienced psychosomatic reactions, yielding a total of 46.46% of the study sample. Other authors also report on the high prevalence of psychosomatic disorders and psychosomatic reactions in the adolescent population. Depending on the number of psychosomatic disorders investigated in particular studies, their prevalence ranges from 15% to 65%[1,5,12]. In fact, there are only few studies that included such a wide range of psychosomatic disorders as in the present study, thus making direct comparison impossible. Most of these studies investigated one or a few of psychosomatic disorders. In his literature review, Graham found asthma to be present in 5%-10%, diabetes in 0.1%-0.2%, and juvenile arthritis in 0.06% of American children[13]. In their epidemiologic study, Linna *et al.* found 2.8% and 0.7% of Finnish children to have migraine and asthma, respectively[14]. Our study showed asthma to be the most common psychosomatic disorder (4.33%), which is consistent with Graham's report[13], whereas the prevalence of diabetes (0.39%) and juvenile arthritis (0.98%) was much higher in our study. Fagot-Campagna *et al.* report on type 2 diabetes in 5.09% of Pima Indian adolescents, and in 4.5% of all American Indians. In this population, the prevalence of diabetes increased sixfold from 1967-1976 till 1987-1996[15]. In our study, the prevalence of obesity among Osijek adolescents was 3.14%, whereas in Canadian Indians this rate rises to 60%-64%[16]. Such a great difference is in part due to different criteria for obesity. Nevertheless, the finding of 11% of overweight American children and adolescents (aged 6-17) in the 1988-1994 period confirms the trend of putting on weight in this population[17]. Urticaria, alopecia, or acne are considered as psychosomatic disorders[18]. In the onset and exacerbation of these and other psychosomatic disorders, life stressors play a major role[19,20]. According to our study results, neurodermatitis was present in 0.98%, urticaria in 1.57%, and acne in 16.14% of secondary school students. Acne poses a problem not only to adolescents but also to adults in whom, according to Goulden *et al.*, it occurs in a clinically significant form in 3% of men and 12% of women[21]. In our study sample, 1.96% of students had arterial hypertension, which is consistent with the results of literature review by Temple and Nahata, who found the prevalence of hypertension in the population of children and adolescents to range from 1% to 3%[22]. In adolescents, blood pressure elevation should be expected to continue later in life because it is influenced by stress associated with modern lifestyle and accompanied by cardiovascular reactivity[23,24], the adolescents exhibiting type A behavior pattern being especially at risk[25]. The prevalence of anemia in our sample was tenfold that reported in an American children population[13]. This was probably due to better health education and prevention of this disorder in American children and adolescents. Our sample revealed a 1.18% prevalence of migraine. Other authors report on the migraine prevalence of 0.8%[13], 2.8%[14], and even 5%[26] in adolescent popoulations. These differences could probably be explained by different methodologic approaches and diagnostic criteria used in particular studies. In our sample, peptic ulcer that is closely connected with separation or loss in predisposed adolescents[27], was present in 0.79% of students.

In the present study, the most common psychosomatic reactions were allergic reactions (22.04%) and painful menstruation (21.01%). Female students had a significantly higher rate of psychosomatic reactions than male students. In his study of 234 twin pairs, Moilanen found a higher prevalence of psychosomatic disorders among female adolescents[28]. Similar results have been reported by Kashani *et al.* in a sample of 150 adolescents[29]. In a sample of 123 college students, Klein and Cross also observed significant female predominance for psychosomatic disorders. In addition, they found female adolescents with psychosomatic disorders to have troubled relationship with their mothers[30]. In a large study including 1100 Finnish preadolescents, Tomminen *et al.* found no sex differences in the prevalence of psychosomatic disorders[31]. Our study revealed no differences in socioeconomic factors among healthy students, those with psychosomatic reactions, and those with psychosomatic disorders. In a sample of asthmatic school children, McNichol *et al.* found no differenc-

es between healthy and ill children according to socioeconomic factors either[32]. On the other hand, Graham recorded more psychosomatic disorders in higher classes[13], and some others in families with more members. Comparing urban adolescents from the suburb of Oslo and adolescents from rural districts Lavik found a higher rate of psychosomatic disorders among the former[33]. Considering family factors, parental divorce appears to be most closely associated with psychosomatic disorders in children. In our study sample, as many as 38.89% of students with psychosomatic disorders were children of divorced parents. Furthermore, none of the students with psychosomatic disorders was the only child. Ikemi *et al.* also studied family factors in a population of Japanese students suffering from psychosomatic disorders. Out of 157 asthmatic students, 74% were first-born, last-born or only children. In another study investigating other psychosomatic disorders in 230 Japanese students, 84% of them were first-born, last-born and only children[34]. Studies in British asthmatic children showed the prevalence of a severe form of asthma to be higher in children with more family members[32]. Analyzing 234 twin pairs, Moilanen found psychosomatic disorders to occur more often in those twins who were favored by their mothers[28]. Veress observed the pathologic symbiosis with mother to be more common in children with atopic dermatitis[35]. Liettke reports on a more intimate mother-child and father-child relationship with more restrictive socialization in 30 children with asthma, 19 children with ulcerative colitis, and 30 children with atopic dermatitis, as compared with the control group of children with neurotic disorders[36]. According to Reich and Deyda, who compared families of psychosomatic and depressive children, interactions in the families of psychosomatic children were less ambiguous and more emotionally controlled with a tendency to avoid conflict[37]. Analyzing 29 families of psychosomatic children, Frank observed a pathologic mother-child symbiosis and emphasized the role of father in preventing such a symbiosis[38]. It was also confirmed in our study. After parents' divorce, the child usually lives with his/her mother, which often results in a symbiotic relationship that is more or less manifested. It is in turn a significant factor in the development of psychosomatic disorders. Our study did not confirm the classical learning of Paris and Boston psychosomatic schools concerning operational thinking and alexithymia. In our study, there were no significant differences among the groups of healthy students, of students with psychosomatic reactions, and of students with psychosomatic disorders according to psychological features that are generally considered characteristic of this type of disorder (lack of fantasy, creativity and imagination, impoverished dreams, introversion, adaptation, and alexithymia)[1]. In their study of a sample of 30 Pakistani adolescents with psychosomatic disorders, Ahmed *et al.* could not confirm this concept either[39]. The factors of school success and peer interrelations were comparable in our three student groups. Reattenders, bad, average and excellent students were equally distributed across the three study groups. However, this is in discordance with the study of Novak-Reis and Piacun-Gajer, who found a high prevalence of psychosomatic disorders among Zagreb elementary schoolers with the syndrome of school failure, and concluded that psychosomatic disorder was a common cause of school failure[40].

Hereditary factors appear to play a major role in the etiology of psychosomatic disorders. In the present study, parental psychosomatic disorders were recorded in 67% of students with psychosomatic disorders, 48% of students with psychosomatic reactions, and only 29% of healthy students. Maternal affection with psychosomatic disorder was recorded in 39% of students with psychosomatic disorders and only 16.5% of healthy students. Other authors also emphasize hereditary factors as the most important contributors to the development of these disorders. Walker *et al.* compared 41 children with psychosomatic disorders with a control group of children with organic disorders and a group of healthy children, and found a significantly higher rate of psychosomatic disorders in parents of the former[41]. If hereditary factors are accepted as unavoidable predisposition, then psychosomatic stressors play the major role in the genesis of psychosomatic disorders. School tasks and duties, family problems, peers' pressure, chronic diseases or parental disability, resettling, and parental psychiatric disorders are considered major stress sources in children and adolescents[42].

Conclusion

Psychosomatic reactions and psychosomatic disorders are quite common in secondary schoolers in Osijek. Psychosomatic disorders were found to be present in 9.06%, and psychosomatic reactions in 37.40% of study students, yielding a 46.46% total sample involvement. Asthma was the most common psychosomatic disorder (4.33%) and allergy reaction the most common psychosomatic reaction (22.04%) recorded in the study sample. Psychosomatic reactions showed a female predominance. Socioeconomic factors had no major impact on the onset of psychosomatic disorders and psychosomatic reactions, however, various

stressors combined with familial predisposition were found to significantly influence the increase recently recorded in the rate of psychosomatic disorders and psychosomatic reactions. Psychosomatic disorders were found to more frequently occur in children of divorced parents. In 67% of students with psychosomatic disorders, one or both parents were psychosomatic persons. In 48% of students with psychosomatic reactions, their parents also exhibited similar reactions. The results of the study point to a conclusion that hereditary factors (predisposition) and factors representing the source of great stress (e.g., parents' divorce) played a major role in the development of psychosomatic disorders in childhood and adolescence.

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Sažetak

PSIHOSOMATSKI POREMEĆAJI UČENIKA SREDNJIH ŠKOLA U OSIJEKU

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Psihosomatski poremećaji su česti u adolescenciji. Cilj istraživanja bio je utvrditi učestalost psihosomatskih poremećaja u populaciji učenika srednjih škola u Osijeku, te usporediti skupine učenika s psihosomatskim poremećajima i psihosomatskim reakcijama sa skupinom zdravih učenika prema njihovim socioekonomskim, obiteljskim, odnosnim i nasljednim kontekstualnim čimbenicima. Istraživanje je obuhvatilo 508 učenika srednjih škola u Osijeku (338 ženskih i 170 muških) u dobi od 15 do 19 godina. Sukladno cilju istraživanja ispitanici su bili podijeljeni u tri skupine: a) zdravi učenici (n=272; 53,54%); b) učenici s psihosomatskim reakcijama (n=190; 37,40%); i c) učenici s psihosomatskim poremećajima (n=46; 9,06%). U ispitivanom uzorku je 37,40% učenika imalo psihosomatske reakcije, a 9,06% učenika psihosomatske poremećaje. Najčešće psihosomatske reakcije bile su alergije (22,04%), dismenoreja (21,01%) i akne (16,00%). Najčešći psihosomatski poremećaji bili su astma (4,33%) i hipertenzija (1,96%). Psihosomatske reakcije su bile češće kod učenica negoli kod učenika. Broz razvedenih brakova roditelja učenika bio je značajno veći u skupini s psihosomatskim poremećajima (52,20%) nego u skupini zdravih učenika (15,10%). Roditelji zdravih učenika imali su značajno manje psihosomatskih poremećaja (28,70%) nego roditelji učenika s psihosomatskim reakcijama (47,90%) i onih s psihosomatskim poremećajima (67,40%). Rezultati istraživanja upućuju na zaključak da u nastanku psihosomatskih poremećaja značajnu ulogu imaju nasljedni čimbenici (predispozicija) i čimbenici koji predstavljaju izvore snažnog stresa u djetinjstvu i adolescenciji (npr., rastava braka roditelja).

Ključne riječi: *Psihofiziološki poremećaji – dijagnostika; Psihofiziološki poremećaji – epidemiologija; Incidencija; Adolescencija; Procjena rizika*