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**Aneta Grochowska<sup>1</sup>,A-F, Iwona Bodys Cupak<sup>2</sup>,C-F, Anna Majda<sup>2</sup>,D-F**

**CIGARETTE SMOKING BY YOUNG PEOPLE  
ATTENDING HEALTH PROMOTING SCHOOLS –  
SELECTED CAUSES AND STRUCTURE**

**Palenie papierosów przez młodzież uczęszczającą do szkół promujących  
zdrowie – wybrane przyczyny i struktura**

<sup>1</sup>Department of Nursing, State Higher Vocational School in Tarnów, Faculty of Health Sciences, Polska

<sup>2</sup>Department of Health Sciences, Jagiellonian University Medical College, Polska

A – Koncepcja i projekt badania, B – Gromadzenie i/lub zestawianie danych, C – Analiza i interpretacja danych, D – Napisanie artykułu, E – Krytyczne zrecenzowanie artykułu, F – Zatwierdzenie ostatecznej wersji artykułu

Aneta Grochowska – ID 0000-0002-1371-7655

Iwona Bodys Cupak – ID 0000-0002-8445-4442

Anna Majda – ID 0000-0003-3632-1319

**Abstract (in Polish):**

**Cel pracy**

Palenie papierosów wśród młodzieży staje się coraz poważniejszym problemem. Rozwiązanie problemów związanych z paleniem papierosów może przynieść stała przebudowa wzorców postępowania, systematyczna zmiana obyczajów i wzorców kulturowych, wpisana w edukacyjne programy antynikotynowe Szkół Promujących Zdrowie. Celem tego badania była ocena struktury palenia papierosów, czynników demograficznych i środowiskowych determinujących palenie papierosów przez młodych ludzi w szkołach

promujących zdrowie.

### **Materiał i metody**

Badanie przeprowadzono w pięciu szkołach promujących zdrowie w Tarnowie i okolicach (gimnazjum, liceum). W badaniu wzięło udział 663 uczniów w wieku 13-18 lat. Badanie zostało przeprowadzone dwa razy wśród tych samych osób: kiedy uczestnicy rozpoczęli naukę i pod koniec edukacji. Uczniowie wypełnili autorski kwestionariusz ankiety, w którym pytania zostały oparte na raporcie HBSC.

### **Wyniki**

W pierwszym badaniu palenie papierosów zadeklarowało 32,0% uczniów (chłopcy –  $S=1,15$ ;  $SD=0,36$ ; dziewczęta –  $S=1,12$ ,  $SD=0,32$ ). W drugim badaniu palenie zadeklarowało 37,3% uczniów (chłopcy –  $S=1,3$ ,  $SD=0,36$ ; dziewczęta –  $S=1,18$ ;  $SD=0,39$ ). Chłopcy kiedykolwiek palili znacznie częściej niż dziewczęta (pierwsze badanie –  $p=0,0131$ , drugie badanie –  $p=0,0028$ ). Na wsi mieszkało statystycznie istotnie więcej osób palących papierosy (28,5%) w porównaniu do osób mieszkających na obszarach miejskich (19,9%) ( $p=0,006$ ).

### **Wnioski**

Badanym szkołom promującym zdrowie nie udało się opóźnić i zapobiec inicjacji tytoniowej wśród młodzieży. Skutecznej profilaktyki nie sposób było realizować również bez wsparcia rodziców.

### **Abstract (in English):**

#### **Aim**

Smoking among young people is becoming an increasingly serious problem. The solution to the problems related to smoking can be brought about by the constant reconstruction of behavior patterns, a systematic change of customs and cultural patterns, included in the educational anti-smoking programs of Health Promoting Schools. The aim was to evaluate the structure of cigarette smoking, the demographic and environmental factors that determine smoking among young people.

#### **Material and methods**

The study was conducted in five Health Promoting Schools in Tarnów (Junior High School, High School). 663 students from five schools participated in the study, age 13-18. The study has been conducted two Times among the same sample: when the participants started school and in the end of education. The students completed an author's questionnaire based on the HBSC report.

#### **Results**

Cigarette smoking was declared by 32.0% of the students in the first study (boys –  $S=1,15$ ;  $SD=0,36$ ; girls –  $S=1,12$ ,  $SD=0,32$ ). In the second study, cigarette smoking was declared by 37.3% (boys –  $S=1,3$ ,  $SD=0,36$ ; girls –  $S=1,18$ ;  $SD=0,39$ ). Boys have ever smoked significantly more often than girls (1st study –  $p=0.0131$ , 2nd study –  $p=0.0028$ ). There were statistically significantly more people living in rural areas and smoking cigarettes (28.5%) compared to people living in urban areas (19.9%) ( $p=0.006$ ). During school education, both boys and girls increased the number of cigarettes smoked and the frequency of smoking.

#### **Conclusions**

The health promoting schools surveyed failed to delay and prevent tobacco initiation among adolescents. Effective prophylaxis cannot be implemented also without the support of parents.

**Keywords (in Polish):** zdrowie, palenie, uczeń, promocja.

**Keywords (in English):** health, smoking, pupil, promotion.

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### **Corresponding author**

Iwona Bodys Cupak

Department of Health Sciences, Jagiellonian University Medical College, 31-126 Kraków ul. Michałowskiego 12, 31-126, Kraków, Polska; email: i.bodys-cupak@uj.edu.pl

Phone: 048 512396382

## **Introduction**

The tobacco smoking addiction and tobacco trade have played a significant social and economic role since the introduction of tobacco into the Western Civilisation more than 300 years ago. At present, tobacco smoking, generally in the form of cigarettes, is known to almost all societies throughout the world. According to WHO, about one third of the adult population in the most industrialised countries smokes, whilst the proportion of smoking women is slightly lower than men. By 2025, the number of smokers will have increased to 1.6 billion [1]. There are 47% of smoking men and 12% of smoking women worldwide [2].

The studies also show an increase in the percentage of smoking adolescents. The studies conducted in Great Britain in 2008 indicate that 27% of all students tried smoking and 13% smoked many times [3]. In Africa, Nairobi and Kenya, it is estimated that approximately 32.2% of 16-year-olds smoke [4]. The studies conducted among private and public secondary school students in Beirut and Lebanon demonstrated the prevalence of smoking among 11.4% of adolescents [5].

The example given by adults, getting accustomed to their behaviours are conducive to children and adolescents starting smoking and then becoming addicted [6]. Every day, many young people light their first cigarette and become potential smokers. Adolescents who have tried a cigarette, get addicted more easily in the future, regardless of the time that has passed since their first contact with a cigarette. The studies of adolescent risk behaviours, including smoking, conducted in Poland in 2002 as part of the HBSC study showed that 7% of teenagers smoked cigarettes regularly [7]. The studies conducted in 2010 showed an increase in tobacco smoking among adolescents to 18% [8].

According to those studies, teenagers can get addicted after just a few weeks of smoking even two cigarettes a week [9,10]. The factors that increase the risk of smoking by young people include having at least one smoking parent or a smoking friend, at least one alcohol intoxication, ignorance or lack of acceptance of health risks and a positive attitude towards smoking. Wickram's studies showed that the risk of starting and regular smoking by children of smoking parents (especially mothers) is much higher than that by children of non-smoking parents. The reason for this phenomenon may be not only the intergenerational "transmission" of health behaviours, but also the impact of long-term exposure to passive smoking [11,12]. The peer environment, peer behaviour and pressure of potential young smokers play

a significant role in this aspect. Young people who are smokers themselves are more likely to stay in rooms where other people smoke compared to their non-smoking peers [13,14].

The frequency and intensity of smoking among adolescents during puberty are lower than in adults, but increase steadily with age. Murray and Lopez estimate that if this trend continues, the number of deaths due to smoking will rise up to 250 million a year [15]. Many people still smoke, despite the fact that it is so harmful to our health. Considering the high cost of smoking, both in terms of cigarettes and later treatment and health care, it is important to emphasise the importance of programmes helping smokers to quit. Tobacco is one of the most common psychoactive substances worldwide. It causes strong addiction which is even stronger than addiction to opiates, alcohol or other substances [16].

Smoking addiction is not indifferent to health, especially for young people. The symptoms of chronic nicotine poisoning are visible not only in adult smokers but also in adolescents who smoke longer. The degree of damage and severity of poisoning symptoms depend not only on the number of cigarettes smoked, but also on their type, manner of smoking and especially on the individual characteristics of the smoker [17,18]. If current trends in tobacco consumption do not change, a half of long-term smokers will die prematurely, out of whom 50% will die in their production age, reducing their life expectancy by 20-25 years [19]. Refraining from the inhalation of tobacco smoke (quitting smoking) is meaningful at every stage of the smoker's life [20].

The reasons for smoking among young people given in the literature on the subject are unchanged, e.g. curiosity, imitation of smoking parents or older colleagues, persuasion of peers, willingness to impress others and emphasize the courage of decisions. Most often, children light their first cigarette at the encouragement of their friends. After that, smoking becomes a way to release frustration and stress. Young people say that smoking is fashionable. They have relatively easy access to cigarettes and virtually unlimited purchase. Due to the popularity of a healthy lifestyle, the percentage of adults who smoke daily tobacco decreased in Poland from 31% in 2011 to 21% in 2019. In 2011-2019 the percentage of smoking men decreased from 39% to 24%, and 23% to 18%. Still, a fairly large group of people smoke, as many as 8 million Poles. We are still a long way from countries such as Canada and Sweden, where 13% and 14% of the population are addicted to tobacco, while smoking among children and adolescents is growing. 4% of students smoke cigarettes regularly in primary schools, middle schools – 14%, and secondary schools – 22% [21].

The problem of smoking in the population of children and adolescents up to 18 years of age is extremely important from the point of view of the negative impact of this addiction on the health of children and health consequences in adulthood. Therefore, a question should be asked how to protect children and adolescents from nicotine addiction and how to convince them of the harmfulness of smoking. The appropriate step is to take actions known as nicotine prophylaxis.

Effective prophylaxis cannot be implemented without the support of parents, schools and healthcare professionals. However, the family has the greatest impact on shaping the child's personality and behavior, and it is in the family that basic preventive measures should be implemented. The low percentage of parents who talk to their children about the harmfulness of smoking is due to the fact that most parents of students who smoke cigarettes also smoke. That is why it is important to shape the attitudes of the young generation towards the addiction, not only through knowledge of its harmfulness, but also through your own example. Every opportunity should be used to shape the correct attitude of young people towards a healthy lifestyle. The research presented below shows the impact of the immediate environment on smoking among adolescents: school, family.

### **The aim**

The aim of this study was to evaluate the structure of cigarette smoking, the demographic and environmental factors that determine smoking among young people in health promoting schools.

### **Material and methods**

The study was conducted in five Health Promoting Schools in Tarnów and the surrounding area. Schools were attended by students aged 13-18. As many as 663 students from five schools participated in the study, including 336 girls (51%) and 327 boys (49%). Considering the place of residence, the respondents were classified into two groups: 336 residents of urban areas (51%) and 327 residents of rural areas (49%).

The study involved two stages. The first research was carried out among students who started their education in a health promoting school, whereas the second one was carried out in the last year of students' education. Each student as well as his/her parents/guardians were informed about the purpose and method of conducting the research. The study began after obtaining approvals and written consents of the school Principal, students' parents/guardians as well as consents of the students to participate in the study prior to its commencement. The students were informed about the possibility of withdrawing from the study at any stage.

The students completed an author's questionnaire which consisted of a sociodemographic and a problematic part. The questions about health behaviours, including smoking, were based on the HBSC report [7].

A statistical analysis was performed after all the research results were collected. The questionnaires were checked for completeness of data and encoded. The statistical analysis of the collected research material was based on the following methods, using Statistica v. 7.1 statistical software by StatSoft as well as Microsoft Excel 2000 and Microsoft Excel 2007 by Microsoft. Statistical description methods were used to present the characteristics of a set of features (variables) measured. The normality of the variable distribution was checked using the Kolmogorov-Smirnov test as amended by Lilliefors as well as the Shapiro-Wilk test. For the comparison of two groups of data collected according to the unrelated variables model, the Mann-Whitney U test was used. For the comparison of two groups of data collected according to the related variables model, the Wilcoxon matched pairs test was applied.

### **Results**

The results indicate that both boys and girls were persuaded to smoke and there was no significant difference between them. Cigarette smoking was declared by 32.0% of the students in the first study. In the second study, this number increased by 5.3%. This increase significantly involved boys ( $p=0.0323$ ). Boys have ever smoked significantly more often than girls (1st study –  $p=0.0131$ , 2nd study –  $p=0.0028$ ). During school education, both groups increased smoking, smoking frequency and the number of cigarettes smoked (Boys –  $p<0.0001$ , Girls –  $p<0.0001$ ). The number of people who had smoked within 30 days before the study (Boys –  $p<0.0001$ , Girls –  $p=0.0018$ ) also increased (Table 1).

**Table 1. Comparison of students' answers regarding their smoking**

No.	1 <sup>st</sup> study				2 <sup>nd</sup> study				Boys -Girls 2007 Z2 P	Boys -Girls 2009 Z2 P	
	Total N=663 X±SD Me; (min- max)	Boys N=327 X±SD Me; (min- max)	Girls N=336 X±SD Me; (min- max)	Total N=663 X±SD Me; (min- max)	Boys N=327 X±SD Me; (min- max)	Girls N=336 X±SD Me; (min- max)	Total Z1 P	Boys Z1 P			Girls Z1 P
Within 30 days, student has been persuaded into smoking (scale of answers: 1 - no, 2 - yes)											
1.	1.32±0.47 1; (1 - 2)	1.32±0.47 1; (1 - 2)	1.32±0.47 1; (1 - 2)	1.24±0.43 1; (1 - 2)	1.28±0.45 1; (1 - 2)	1.20±0.40 1; (1 - 2)	<b>3.82*</b> <b>&lt;0.0001</b>	1.26 0.2049	<b>3.47</b> <b>0.0005</b>	0.05 0.9531	1.75 0.0788
Refusal to smoke (scale of answers: 1 - no, 2 - yes)											
2.	1.18±0.38 1; (1 - 2)	1.18±0.38 1; (1 - 2)	1.18±0.38 1; (1 - 2)	1.09±0.28 1; (1 - 2)	1.10±0.30 1; (1 - 2)	1.07±0.26 1; (1 - 2)	<b>4.98*</b> <b>&lt;0.0001</b>	<b>2.66</b> <b>0.0077</b>	<b>3.55</b> <b>0.0003</b>	-0.02 0.9788	0.52 0.6014
Smoking cigarettes ever before (scale of answers: 1 - no, 2 - yes)											
3.	1.32±0.47 1; (1 - 2)	1.38±0.49 1; (1 - 2)	1.27±0.44 1; (1 - 2)	1.37±0.48 1; (1 - 2)	1.44±0.50 1; (1 - 2)	1.31±0.46 1; (1 - 2)	<b>81.01**</b> <b>&lt;0.0001</b>	<b>2.14</b> <b>0.0323</b>	1.38 0.1674	<b>2.48</b> <b>0.0131</b>	<b>2.98</b> <b>0.0028</b>
Being a smoker currently (scale of answers: 1 - no, I have never been a smoker, 2 - no, I quit smoking more than 6 months ago, 3 - no, I have quit smoking within the last 6 months, 4 - yes, I smoke currently)											
4.	1.56±1.03 1; (1 - 4)	1.64±1.08 1; (1 - 4)	1.49±0.98 1; (1 - 4)	1.89±1.27 1; (1 - 4)	2.07±1.34 1; (1 - 4)	1.71±1.17 1; (1 - 4)	<b>8.90</b> <b>&lt;0.0001</b>	<b>6.49</b> <b>&lt;0.0001</b>	<b>4.03</b> <b>&lt;0.0001</b>	1.62 0.1051	<b>3.22</b> <b>0.0012</b>
Smoking within the last 30 days (scale of answers: 1 - no, 2 - yes)											
5.	1.13±0.34 1; (1 - 2)	1.15±0.36 1; (1 - 2)	1.12±0.32 1; (1 - 2)	1.24±0.43 1; (1 - 2)	1.30±0.36 1; (1 - 2)	1.18±0.39 1; (1 - 2)	<b>3.82*</b> <b>&lt;0.0001</b>	<b>5.36</b> <b>&lt;0.0001</b>	<b>3.11</b> <b>0.0018</b>	0.82 0.4119	<b>2.70</b> <b>0.0069</b>
Frequency of smoking (scale of answers: 1 - I do not smoke at all, 2 - less than once a week, 3 - at least once a week but not every day, 4 - every day)											
6.	1.23±0.66 1; (1 - 4)	1.26±0.69 1; (1 - 4)	1.20±0.63 1; (1 - 4)	1.52±1.01 1; (1 - 4)	1.65±1.10 1; (1 - 4)	1.38±0.89 1; (1 - 4)	<b>8.32*</b> <b>&lt;0.0001</b>	<b>7.08</b> <b>&lt;0.0001</b>	<b>4.32</b> <b>&lt;0.0001</b>	0.87 0.3805	<b>2.62</b> <b>0.0086</b>
Number of cigarettes smoked (scale of answers: 1 - 0, 2 - 1-10, 3 - 11 - 20, 4 - 21-50)											
7.	1.16±0.44 1; (1 - 4)	1.19±0.50 1; (1 - 4)	1.13±0.38 1; (1 - 4)	1.33±0.64 1; (1 - 4)	1.41±0.70 1; (1 - 4)	1.25±0.57 1; (1 - 4)	<b>6.78</b> <b>&lt;0.0001</b>	<b>5.63</b> <b>&lt;0.0001</b>	<b>3.96</b> <b>&lt;0.0001</b>	0.92 0.3560	<b>2.57</b> <b>0.0100</b>

N – number of students; X±SD – arithmetic mean±standard deviation; Me – median; min-max – minimum-maximum; p – significance level; Z1 – value of Wilcoxon matched pairs test for dependent samples; Z2 – value of Mann-Whitney U test for independent pairs, \* sign test, \*\* McNemar's test

There was a statistically significant difference between smoking and particular results in all respondents ( $p < 0.001$ ). In the second study, there were statistically significantly more students (24.1%) smoking cigarettes at that time than in the first study (13.4%). In the second study, there were fewer students (56.3%) who had never smoked cigarettes compared to the first study (71.5%) (Table 2).

**Table 2. Smoking cigarettes by respondents**

Answers	Respondents		
	1 <sup>st</sup> studyN (%)	2 <sup>nd</sup> studyN (%)	TotalN (%)
no, I have never been a smoker	474 (71.5)	373 (56.3)	847 (63.9)
no, I quit smoking more than 6 months ago	92 (13.9)	108 (16.3)	200 (15.1)
no, I have quit within the last 6 months	8 (1.2)	22 (3.3)	30 (2.3)
yes, I smoke currently	89 (13.4)	160 (24.1)	249 (18.8)
Total answers	663 (100)	663 (100)	1,326 (100)

N – number of students surveyed,  $\chi^2(n = 1,326, df = 3) = 40.10, p < 0.001$ , Wilcoxon test  $Z(n = 663) = 8.90, p < 0.001$

It was observed that there was a statistically significant difference in smoking within the last 30 days in individual results ( $p < 0.001$ ). In the second study, the percentage of people who had smoked cigarettes in the past 30 days increased by 10.7% of all respondents (increase from 13.4% to 24.1% of all respondents). However, 2.3% of the students changed their answer from “yes” to “no” and 13.0% of them changed their answer from “no” to “yes” (Table 3).

**Table 3. Smoking cigarettes by respondents within the last 30 days**

Answers	Respondents		
	1 <sup>st</sup> studyN (%)	2 <sup>nd</sup> studyN (%)	TotalN (%)
yes	89 (13.4)	160 (24.1)	249 (18.8)
no	574 (86.6)	503 (75.9)	1077 (81.2)
Total answers	663 (100)	663 (100)	1,326 (100)

N – number of students surveyed,  $\chi^2(n = 1,326, df = 1) = 24.93, p < 0.001$

Boys smoked tobacco more often, but on the other hand, at the end of school education they thought about quitting more often (2<sup>nd</sup> study –  $p = 0.0014$ ) (Table 4).

**Table 4. Comparison of students' answers regarding their smoking**

No.	1 <sup>st</sup> study				2 <sup>nd</sup> study				Boys -Girls 2007 Z2 p	Boys -Girls 2009 Z2 p	
	Total N=663 X±SD Me; (min- max)	Boys N=327 X±SD Me; (min- max)	Girls N=336 X±SD Me; (min- max)	Total N=663 X±SD Me; (min- max)	Boys N=327 X±SD Me; (min- max)	Girls N=336 X±SD Me; (min- max)	Total Z1 p	Boys Z1 p			Girls Z1 p
1.	1.50±0.94 1; (1 - 5)	1.58±1.02 1; (1 - 5)	1.42±0.84 1; (1 - 5)	1.80±1.22 1; (1 - 5)	1.96±1.29 1; (1 - 5)	1.64±1.14 1; (1 - 5)	5.06* <0.0001	6.02 <0.0001	3.92 <0.0001	1.77 0.0755	3.18 0.0014
Thinking seriously about quitting smoking (scale of answers: 1 - I have never been a smoker, 2 - I do not smoke currently, 3 - no, I do not think about quitting smoking, 4 - yes, within the next 6 months, 5 - yes, within the next 30 days)											
2.	1.54±0.92 1; (1 - 4)	1.58±0.92 1; (1 - 4)	1.49±0.92 1; (1 - 4)	1.71±1.04 1; (1 - 4)	1.82±1.07 1; (1 - 4)	1.60±1.00 1; (1 - 4)	5.13* <0.0001	3.70 0.0002	1.96 0.0495	1.46 0.1416	2.74 0.0061
Frequency of quitting smoking within the last 12 months, at least for 24 hours (scale of answers: 1 - I have never been a smoker, 2 - I have never made such an attempt, 3 - I do not smoke currently, 4 - I have been quitting smoking)											
3.	1.78±1.61 1; (1 - 7)	1.87±1.67 1; (1 - 7)	1.69±1.55 1; (1 - 7)	2.23±2.00 1; (1 - 7)	2.50±2.13 1; (1 - 7)	1.96±1.82 1; (1 - 7)	5.73* <0.0001	6.04 <0.0001	3.00 0.0026	1.67 0.0942	3.28 0.0010
Time without smoking (scale of answers: 1 - I have never been a smoker, 2 - I do not smoke currently, 3 - less than 1 hour, 4 - 1-3 hours, 5 - more than 3 hours but less than a day, 6 - the entire day, 7 - several days but less than a week)											

N – number of students; X±SD – arithmetic mean±standard deviation; Me – median; min-max – minimum-maximum; p – significance level; Z1 – value of Wilcoxon matched pairs test for dependent samples; Z2 – value of Mann-Whitney U test for independent pairs, \* sign test



The students used tobacco for various reasons. The most frequent one was the desire to try (1st study – 18.6%, 2nd study – 16.9%) and peer persuasion (1st study – 12.1%, 2nd study – 8.3% (Table 5). Even though there was a decrease in the number of boys who were persuaded to smoke ( $p=0.0433$ ), there was a significant increase in the number of boys who started smoking in order to feel like an adult ( $p=0.0029$ ). When it comes to girls, the desire to impress others was a smaller reason for starting smoking ( $p=0.0071$ ). There were no significant differences in the reasons for starting smoking between boys and girls.

**Table 5. Reason for commencing smoking by students – 1<sup>st</sup> and 2<sup>nd</sup> study**

Reason for commencing smoking	Answers given by students			
	Yes		No	
	1 <sup>st</sup> studyN (%)	2 <sup>nd</sup> studyN (%)	1 <sup>st</sup> studyN (%)	2 <sup>nd</sup> studyN (%)
Desire to impress others	24 (3.6)	6 (0.9)	639 (96.4)	657 (99.1)
Peer persuasion	80 (12.1)	55 (8.3)	583 (87.9)	608 (91.7)
Desire to try	123 (18.6)	112 (16.9)	540 (81.4)	551 (83.1)
Desire to feel like an adult	16 (2.4)	38 (5.7)	647 (97.6)	625 (94.3)
Keeping up with smoking peers	7 (1.1)	9 (1.4)	656 (98.9)	654 (98.6)
Other	28 (4.2)	62 (9.4)	635 (95.8)	601 (90.6)

N – number of students surveyed

The students were more likely to smoke in the company of friends (1<sup>st</sup> study –  $3.16+0.76$ , 2<sup>nd</sup> study –  $3.08+0.79$ ) or alone (1<sup>st</sup> study –  $2.80+0.82$ , 2<sup>nd</sup> study –  $2.36+0.94$ ). Usually, they did not smoke in the presence of their parents (father: 1<sup>st</sup> study –  $1.16+0.37$ , 2<sup>nd</sup> study –  $1.06+0.34$ ; mother: 1<sup>st</sup> study –  $1.05+0.26$ , 2<sup>nd</sup> study –  $1.06+0.31$ ). There were slight differences between girls and boys in relation to the people with whom they smoked. These differences were not statistically significant. The number of boys ( $p<0.0001$ ) and girls ( $p=0.0277$ ), who were not allowed to smoke at home during their school education, increased.

Among the students' families, the highest number of smokers were in the fathers' group (1<sup>st</sup> study – 62.6%, 2<sup>nd</sup> study – 64.3%), the lowest among the sisters (1<sup>st</sup> study – 8.2%, 2<sup>nd</sup> study – 13.3%) (Table 6).

**Table 6. Comparison of smoking by parents in the groups of students surveyed**

No.	1 <sup>st</sup> study			2 <sup>nd</sup> study			Total Z1 P	Boys Z1 P	Girls Z1 P	Boys -Girls 2007 Z2 P	Boys -Girls 2009 Z2 P
	Total N=663 X±SD Me; (min- max)	Boys N=327 X±SD Me; (min- max)	Girls N=336 X±SD Me; (min- max)	Total N=663 X±SD Me; (min- max)	Boys N=327 X±SD Me; (min- max)	Girls N=336 X±SD Me; (min- max)					
Smoking by parents (scale of answers: 1 - no, 2 - yes, 3 - I do not know)											
1.	Mother	1.92±0.99 1; (1 - 3)	1.98±1.00 1; (1 - 3)	1.86±0.99 1; (1 - 3)	1.81±0.98 1; (1 - 3)	1.83±0.99 1; (1 - 3)	1.79±0.98 1; (1 - 3)	2.97 <b>0.0029</b>	1.66 0.0951	1.36 0.1732	0.17 0.5866
2.	Father	2.26±0.96 3; (1 - 3)	2.28±0.96 3; (1 - 3)	2.24±0.96 3; (1 - 3)	2.31±0.94 3; (1 - 3)	2.37±0.91 3; (1 - 3)	2.25±0.96 3; (1 - 3)	1.47 0.1390	0.09 0.9239	0.54 0.5833	1.37 0.1696
Frequency of smoking by parents (scale of answers: 1 - less than once a week, 2 - at least once a week, 3 - every day)											
1.	Mother	2.64±0.66 3; (1 - 3)	2.53±0.73 3; (1 - 3)	2.77±0.54 3; (1 - 3)	2.73±0.51 3; (1 - 3)	2.72±0.54 3; (1 - 3)	2.74±0.47 3; (1 - 3)	0.54 0.5973	0.04 0.9659	-2.33 <b>0.0193</b>	0.54 0.5866
2.	Father	2.75±0.51 3; (1 - 3)	2.76±0.52 3; (1 - 3)	2.74±0.51 3; (1 - 3)	2.86±0.40 3; (1 - 3)	2.87±0.39 3; (1 - 3)	2.85±0.42 3; (1 - 3)	2.03 <b>0.0423</b>	1.32 0.1866	0.39 0.6909	0.37 0.7066
Student wants his/her parents to quit smoking (scale of answers: 1 - no, 2 - yes, 3 - it makes no difference to me)											
1.	Mother	2.41±0.73 3; (1 - 3)	2.42±0.74 3; (1 - 3)	2.41±0.71 3; (1 - 3)	2.64±0.59 3; (1 - 3)	2.62±0.57 3; (1 - 3)	2.65±0.61 3; (1 - 3)	1.88 0.0608	1.72 0.0838	0.27 0.7831	-0.60 0.5467
2.	Father	2.34±0.74 3; (1 - 3)	2.39±0.70 3; (1 - 3)	2.29±0.79 3; (1 - 3)	2.43±0.64 3; (1 - 3)	2.39±0.64 3; (1 - 3)	2.47±0.64 3; (1 - 3)	0.40 0.6974	0.13 0.8952	0.98 0.3266	-1.17 0.2410

N – number of students; X±SD – arithmetic mean±standard deviation; Me – median; min–max – minimum-maximum; p – significance level; Z1 – value of Wilcoxon matched pairs test for dependent samples; Z2 – value of Mann-Whitney U test for independent pairs

Among those whose mothers did not smoke during the first and the second study, 90.7% of the students declared that their mother still did not smoke and 9% of them declared that their mother started smoking (during the student's school education). Out of those whose mothers smoked in the first study, 76.9% of the respondents in the second study declared that their mothers still smoked and 22.8% of them declared that their mothers did not smoke – i.e. they quit. Cigarette smoking by mothers changed significantly between the studies ( $p=0.002$ ).

The students evaluated the frequency of smoking not only among their parents, but also among their peers, brothers and sisters. According to both boys and girls, the frequency of smoking among their peers increased during their school education (Boys –  $p<0.0001$ ; Girls –  $p=0.0009$ ). There were no significant differences between their brothers and sisters. The students expressed their opinion about the number of smokers in their class. In the second study, both boys and girls significantly more often indicated that more than a half of the students in their class smoked (Boys –  $p=0.0029$ ; Girls –  $p=0.0186$ ), a half of the students in their class smoked (Boys –  $p=0.0070$ ; Girls –  $p=0.0477$ ) and less than a half of the students in their class smoked (Boys –  $p=0.0016$ ; Girls –  $p=0.0001$ ). In the same study, both groups significantly less often indicated that almost nobody (Boys –  $p = 0.0001$ ; Girls –  $p <0.0001$ ) or nobody (Boys –  $p = 0.0001$ ; Girls –  $p <0.0001$ ) in their class smoked. There were no significant differences between boys and girls as regards the number of smokers in their class.

A statistically significant difference was found between respondents' smoking at the time of the study and their place of residence. There were statistically significantly more people living in rural areas and smoking cigarettes (28.5%) compared to people living in urban areas (19.9%) ( $p=0.006$ ).

Among the first year school students, there were statistically significantly more people who had never smoked (81.6%), while among the last year school students, there were more people who had tried smoking in the past (44.0%) ( $p<0.001$ ).

## Discussion

As a result of tobacco epidemic, due to smoking-related diseases, dozens of thousands people in production age die in our country every year. As a consequence of international agreements and domestic initiatives, as part of health, social and economic policy, both at a national and local level, many legal solutions were adopted [22] owing to which it is possible to take actions aimed at limiting the effects of tobacco smoking (tobacco control) in Poland.

Significant reason for further absence of progress in the drop in smoking frequency among adolescents is the reduction in educational and intervention activities caused by significant limitation of funds for tobacco control programmes by the government [23].

Health is not a permanent state, therefore it must be taken care of and improved in all periods of life. It is important to promote healthy lifestyle, raise awareness and competences of the society in terms of health promotion. It is crucial to increase the effectiveness especially of health-promoting education in schools in such a manner so that young people could learn how to take care of their own and others' health.

Children and adolescents very easily follow their smoking parents' models of behaviour. The problem of tobacco smoking requires focused efforts of the entire society, government and local government institutions, public benefit organisations and, first of all, a decisive stance of parents and educators.

During puberty, adolescents often take actions that are hazardous to their health. Among them, smoking has an exceptionally adverse impact on health [24]. Own studies show that smoking was declared by one third of students in the first study, in the second study – there was an increase by 5.3% especially in the group of boys. Boys significantly more often than girls have ever smoked a cigarette. During school

education, there was an increase in tobacco smoking, frequency of smoking and number of cigarettes smoked in both groups. From the analysis of data, it results that in the second study significantly more boys than girls smoked cigarettes at the time of the study and smoked within 30 days prior to the study. At the same time, the number of smoking students increased statistically significantly during their school education. These results are similar to the findings of Kaczmarkiewicz and Szymański. In the groups studied by them, persons who did not smoke at the time of the study but had tried smoking cigarettes constituted the highest percentage: among the students of first year of secondary schools 58%, among the students of last year of schools 45%. The number of smoking people increased with respondents' age [25]. The studies carried out by Curyło show that vast majority of adolescents do not smoke cigarettes. However, a matter of concern is that almost 1/5 of studied girls and almost 1/3 of studied boys out of the oldest age group smoke [26]. According to Borzucka-Sitkiewicz, more than half of the respondents tried smoking, while almost 14% regularly smoke, including people under the age of 16 [27].

Own studies show that tobacco smoking is differentiated both by gender and by place of residence. There were statistically significantly more students who lived in rural areas and smoked compared to students living in urban areas. Similarly, the studies carried out by Zagórny show that 85% of adolescents living in rural areas smoke cigarettes, including 30% every day [28]. Opposite results were presented by Szczepańska et al., among the students they studied, smoking was declared by three times more students living in urban areas than in rural areas [29].

In own studies, the most frequently stated reasons for starting smoking were the desire to try and peer persuasion. The studies conducted by Smoleń et al. among a group of secondary school students demonstrated that the main reasons for starting smoking were curiosity, everyday stress and alcohol [30]. In the opinion of Siqueiry et al., stress plays an important role in starting smoking by young people, therefore they believe that preventive actions not only should be focused on information about the harmful effects of nicotine, but also should be aimed at creating programmes that could help young people to recognise stress symptoms and to use positive and adaptive methods of dealing with stress [31]. Smoking as a method of dealing with stress was indicated by 35.2% of students studied by Kostiukow et al. [32].

Own studies show that among the students' family members, the highest number of smokers was in the group of fathers and the smallest number in the group of sisters. Both boys and girls wanted their parents to stop smoking. Among the respondents, there were statistically significantly more respondents whose brothers smoked cigarettes and they themselves smoked cigarettes at that time. The studies of other authors indicate particularly negative impact of smoking by parents because it increases the probability of occurrence of diseases in smoking parents, it is conducive to health disorders in children (passive smokers) and it is one of the most important factors contributing to the early commencement of regular smoking by children [30, 33].

Owing to the serious nature of this problem, all methods of fighting tobacco addiction and in particular educational campaigns carried out among children and adolescents are extremely important. Equally important is conducting of adequate campaigns and making parents aware of the effects of smoking by them and their children. Especially important role in the promotion of a smoke-free lifestyle is to be played by the school, particularly because problems at school cause smoking cigarettes by children and adolescents. The greatest role, however, is to be played by families who have the largest possibilities of taking anti-smoking measures. First of all, parents need to reduce smoking and then it will be easier to convince adolescents to do the same [34].

From the studies conducted in Poland and in many countries worldwide, it results that the majority of adult smokers tried tobacco smoking when they were adolescents [34]. Therefore, to reduce this phenomenon, it is necessary to intensify preventive measures among children and adolescents. They should

aim both at sharing knowledge on the harmful effects of tobacco smoking and shaping of attitudes against smoking and skills that will be helpful in not attempting smoking or in quitting smoking. A very important element is also strengthening of self-esteem which constitutes one of the more important factors protecting children and adolescents from taking actions that are hazardous to their health, including tobacco smoking. Owing to the fact that more than half (60%) [34] of young children is exposed to passive smoking by one or both of their parents, the important task of preventive measures should be raising the knowledge among the parents of young children on its harmful effects and taking initiatives aimed at living in a tobacco smoke-free environment.

Early commencement of smoking is connected with a considerable challenge for health promoters. The required interventions must face social conditions that shape the behaviour of smokers in their childhood.

### **Limitations**

In the presented study, the largest limitation was the filling in of questionnaires by children and adolescents themselves. When questionnaires are filled in by children and adolescents themselves, they are affected by their subjective opinion about their smoking.

### **Conclusions**

Gender and place of residence determined anti-health behaviors of students – smoking, ie boys smoked more often than girls, similarly to youth living in the countryside.<sup>2</sup> Despite the fact that the respondents attended health-promoting schools, the number of smokers, the frequency of smoking and the number of cigarettes smoked increased among them.<sup>3</sup> Students smoking cigarettes were driven by the desire to try, to be adults, and the persuasion of their peers; fathers smoked most frequently in the families of the surveyed students.<sup>4</sup> The health promoting schools studied did not manage to delay and prevent tobacco initiation among adolescents. It was impossible to implement effective prophylaxis without parental support.

### **Human Subjects Approval Statement**

For these studies, the Bioethics Committees operating at the Regional Chamber of Physicians granted approval no. 8/01./77/2010.f

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