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# Mental health of Warsaw middle school students. Mokotow Study 2004–2016

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**Summary**

**Aim.** The aim of the study was to estimate the prevalence of mental health problems in subpopulation of Warsaw adolescents and to identify trends in 2004–2016.

**Method.** The cross-sectional study, conducted every four years, covered the third grade Warsaw middle school students from three Warsaw districts: Mokotów, Ursynów and Wilanów. Sample was randomly selected with the adjustment for cluster selection. The self-administered questionnaire had been completed during school lessons. Indicators were related to following problems: (1) internalizing (symptoms of depression measured by the shortened CES-D scale and other emotional problems, based on subjective assessment); (2) externalizing – coexistence of two out of three types of behaviors (psychoactive substances abuse, being perpetrator of violence and delinquent behavior); (3) mixed.

**Results.** In 2016, 42% of youth exhibited symptoms of mental health disorders. These problems more often affected girls (48%) than boys (36%). Between 2008 and 2016, the percentage of young people experiencing internalizing problems increased significantly. This was due to the increase in the prevalence of depressive symptoms. At the same time, there was a significant decrease in the percentage of young people demonstrating externalizing problems. The last result was a consequence of the decrease in substance abuse and violence.

**Conclusions.** Growing prevalence of internalizing problems, depressive symptoms and other emotional problems among teenagers indicates an urgent need to develop or adapt effective prevention programs and to improve the access to psychological and psychiatric support.

**Key words**: epidemiology, mental health, adolescents

## Introduction

We do not possess a univocal definition of 'mental health', grounded in the theory and research practice. This term is defined differently depending on the adopted theoretical perspective, views on the nature of human being or psychological and philosophical concepts [1, 2]. It can be understood as:

- lack of symptoms of mental disorders and ailments;
- mental or psychological well-being or, more broadly, biopsychosocial well--being;
- disposition, in other words potential or resource;
- the process of seeking and maintaining the balance;
- a value.

In scientific literature, the definition of the World Health Organization is often quoted. According to the WHO 'mental health' is defined as "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" [3, 4]. This definition, however, is not widely accepted, and sometimes it is directly criticized [5].

In the research practice, the consequence of different mental health definitions are its various indicators. Thus, we have clinical and non-clinical indicators, positive and negative, subjective and objective indicators. In population studies, it is very difficult to take into account all aspects of mental health and its complexity. For this reason, usually only selected indicators of health or health problems are analyzed [6, 7]. Relatively often, the attention of researchers focuses on problems that are most threatening to mental health, such as depressive and anxiety symptoms as well as suicide attempts and thoughts [8–16]. In the case of adolescent mental health surveys, the definition of a standard or norm is additionally difficult, especially in relation to conduct problems [17]. Symptomatic seems to be the coexistence of different problem behaviors as opposed to less severe, isolated behaviors, which can often be treated as normative during adolescence [18].

The Mokotow Study, project described in this article, has been conducted since 1984 and repeated every four years in the same age population of 15-year-old Warsaw youth attending schools in three districts of the city: Mokotów, Ursynów and Wilanów. Nearly a quarter of the capital's population lives in this area. Initially, the Study included only data on the prevalence of psychoactive substance use [19]. With time, the scope of research has been extended to include other risky behaviors, and since 2004 there have been added several questions on the prevalence of mental health disorders [20–22]. The choice of survey questions and indicators was based on the experience gathered during the previous research project focused on the mental health among middle school students in the Warsaw-Centrum Municipality [23, 24].

In its concept, the Mokotow Study refers to the biomedical model [2] and focuses on mental health problems. At the conceptual level, as in many other studies on mental health problems, externalizing and internalizing indicators are taken into account [25–28]. The first category includes risky behaviors related to violations of social norms, such psychoactive substance abuse, being a perpetrator of violence, delinquency, etc. Second category includes emotional problems, such as depressive and anxiety symptoms, excessive stress, etc. A third category is also distinguished, that takes into account the existence of these two types problems, i.e., 'mixed' problems.

In Poland, epidemiological studies aimed at assessing mental health problems in the populations of young people are conducted rarely. For this reason, our knowledge on mental health of young people is still insufficient [7, 29]. Therefore, the monitoring of mental health in selected populations was identified as one of the important tasks of the National Health Program for 2016–2020 and the National Mental Health Program for 2017–2022 [30, 31].

The aim of the presented study was:

– assessment of the prevalence of mental health problems in the population of the third grade, Warsaw middle school students, participating in the last wave of the Mokotow Study in 2016;
– description of short-term and long-term trends in the prevalence of mental health problems in the studied population.

## Material and method

### Study samples

In all four waves of the Mokotow Study, conducted between 2004 and 2016, a random, stratified-cluster selection of samples of third grade middle school students were used. The cluster was a grade, stratification was designated by the type of school – public and non-public. The selection included a two-fold increase in the sample size, compared to a random individual selection, due to an adjustment to the cluster selection (so-called 'design effect') [32].

Table 1. **Description of the samples. The Mokotow Study 2004–2016**

| Year | Number of students participating in the study | Response rate | Non-public school students | Students delayed in education n (%)* | Sex – girls n (%)* |
|---|---|---|---|---|---|
| 2004 | 1,471 | 90% | 155 (10.5%) | 101 (7.0%) | 703 (48.1%) |
| 2008 | 1,229 | 89% | 200 (16.3%) | 54 (4.5%) | 617 (50.5%) |
| 2012 | 984 | 80% | 131 (13.3%) | 44 (4.5%) | 488 (50.1%) |
| 2016 | 761 | 60% | 119 (15.6%) | 41 (5.4%) | 360 (47.4%) |

* Valid percent

As shown in Table 1, the size of the sample in the subsequent waves had been decreasing, from 1,471 students in 2004 to 761 students in 2016. The main reason was the reduction of both the nationwide and local population of Warsaw youth. According to data from the Central Statistical Office of Poland, between 2005 and 2015, the population of 15–19-year-olds in Warsaw decreased almost by 1/3.

Between 2004 and 2012 the response rate, i.e., the proportion of reliable questionnaires number to the number of selected respondents was high and reached 80–90%. In 2016, it was possible to gather data of much less respondents, only 60% of the selected sample. This was a consequence of the exceptionally large, i.e., 20% absenteeism

of students on the day of the data collection, caused by the flu pandemic. The second important reason was the lack of consent of some parents for their children participation in the study (2 entire groups) and the refusal to cooperate from the school authorities in seven schools (14 groups). Due to the refusals of school principals, despite additional supplementary visits in groups which had a high absenteeism rate (over 20%), and supplementing the sample with several groups selected on purpose, the response rate remained quite low. In the comparison with previous Mokotow Study waves the problems described above were exceptional. The experience of other researchers, however, indicates that such obstacles may occur, for example, in a study conducted in Ontario (Canada) [33].

Mokotow study samples between 2008 and 2016 had similar characteristics in terms of gender distribution, the percentage of students from non-public schools and students older than the majority of respondents. Only the 2004 characteristics of study sample were slightly different from the other study waves. There was the highest percentage of older students (7%) and the lowest percentage of students from non-public schools (11%).

## Research procedure

All of the Mokotow Study waves were carried out according to the same procedure. The self-administered anonymous questionnaire had been completed during school lessons with respect for anonymity as well as guaranteeing the confidentiality of group and school data. Voluntary participation of students as well as the right of parents to not agree for their child's participation in study were respected. Before each wave approval from the Bioethical Commission operating at the Institute of Psychiatry and Neurology in Warsaw was obtained. The surveys were conducted by trained interviewers, according to the standard procedure.

## Indicators and research tools

The indicator of internalizing problems was the sum of two component indicators: a high risk of depression and emotional problems other than depression.

(1) 'High risk of depression' – symptoms of depression were measured using a shortened Center for Epidemiologic Studies Depression Scale (CES-D) [34]. This scale consists of four questions related to the symptoms of sadness, feelings of loneliness, depression, and crying during the last 7 days before the data collection. This CES-D scale was taken (with permission) from the Ontario study [26] and it was assumed after Canadian researchers that the answers 'often' or 'all the time' to all four scale questions indicate a high risk of depression.

(2) 'Other (than depression) emotional problems' – one question from a set called the Health Related Quality of Life (HRQOL-4) [35] was used: "Now thinking about your mental health, which includes stress, depression, and problems

with emotions, for how many days during the past 30 DAYS was your mental health not good?". The indicator was the percentage of people who endorsed the persistence of psychological bad well-being for at least 14 days in the last month, excluding persons affected by high risk of depression.

The indicator of externalizing problems was defined as the coexistence of at least two out of three types of problem behaviors: psychoactive substance abuse, delinquent behavior and being a perpetrator of violence.

(1) 'Psychoactive substance abuse' – the dichotomous indicator included the occurrence of at least one of three behaviors: (i) using any illegal drug at least once during the last year; (ii) daily cigarette smoking; (iii) alcohol intoxication during the last 30 days. Alcohol intoxication was defined analogically to the binge drinking indicator used in population-based studies in the USA [36] – blood alcohol concentration (BAC) $\geq$ 0.8 ‰. The number of standard alcohol drinks consumed in one occasion reported by the respondents, had to exceed the calculated, given threshold, higher for boys than for girls [37]. Drinking alcohol was measured by questions used in the Mokotow Study for over 30 years and related to the amount of alcohol consumed at the last occasion [38].
(2) 'Delinquent behavior' – the indicator adapted from the Ontario study [26], included the occurrence at least one of five behaviors in the last year: (i) petty theft; (ii) property damage; (iii) drug trafficking; (iv) escape from home; (v) taking a car for a ride without the owner's permission.
(3) 'Being a perpetrator of violence' – this indicator was defined by at least one of three behaviors in the last year: (i) frequent and active participation in physical or psychological violence against other students in the school (once a week or more); (ii) participation in fights on the school grounds (six or more times in the last year); as well as (iii) deliberate hitting or hurting someone, at least once in the last year [26].

'Mixed problems' indicator allowed to estimate the percentage of respondents showing symptoms of both internalizing and externalizing problems. The name of this indicator refers to the nomenclature used in the classification of mental disorders ICD-10, where a group of 'mixed behavior and emotions disorders' was specified (F92).

'The lack of mental health disorders' is a dichotomous indicator which, in the presence of any problems: internalizing, externalizing or mixed, cotrasts lack of mental health problems, i.e., relatively good mental health.

Detailed information on all indicators used in the Mokotow Studies and survey questions can be found in the previous paper [22]. When assessing the significance of intergroup differences by gender and consecutive waves, the $\chi^2$ test was used, calculated always for 2 × 2 tables, with a commonly accepted significance threshold $p \leq 0.05$.

## Results

### Prevalence of internalizing, externalizing and mixed disorders

The results of the latest wave of the Mokotow Study conducted in the Autumn of 2016, showed that approximately 16% of third grade middle school students experienced internalizing problems (Figure 1). A similar percentage, about 18% of students, reported externalizing problems. Respondents that confirmed mixed problems constituted about 8% of the study group. In total, it can be estimated that approximately 42% of students could be at risk of mental health problems due to various types of problems. On the other hand, it is worth noting that the majority of students (56%) did not demonstrate clear symptoms of mental health problems and probably enjoyed good mental health.

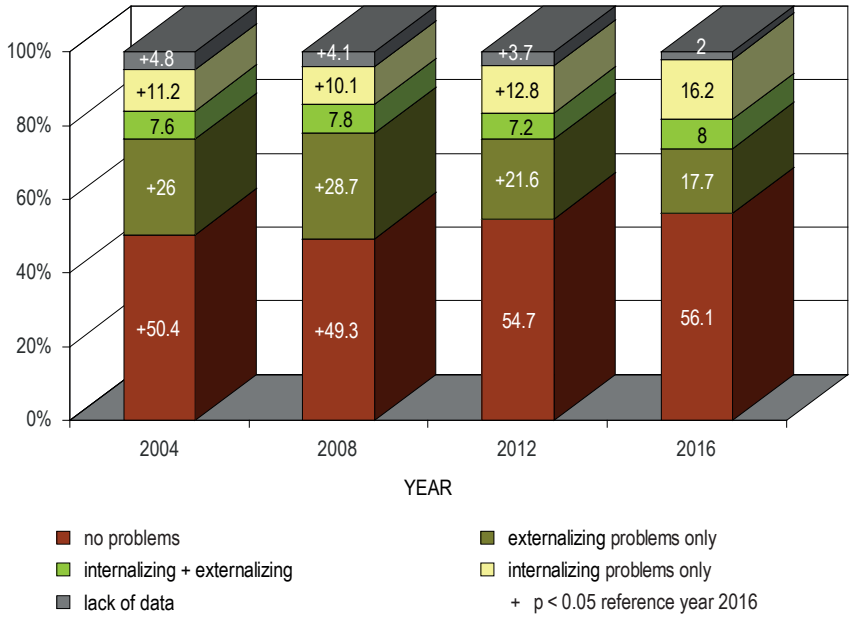


Figure 1. **Mental health of third grade middle school students. The Mokotow Study 2004–2016**

In 2016, the profile of problems among girls and boys was clearly different (Figure 2 and Figure 3). Among boys, externalizing problems occurred significantly more often than among girls – 22% and 13%, respectively ($\chi^2 = 10.38$; $p < 0.001$). In the case of girls, however, internalizing problems dominated (26%). Internalizing problems were three times more prevalent among girls than among boys (8%) ($\chi 2 = 44.28$; $p < 0.001$).

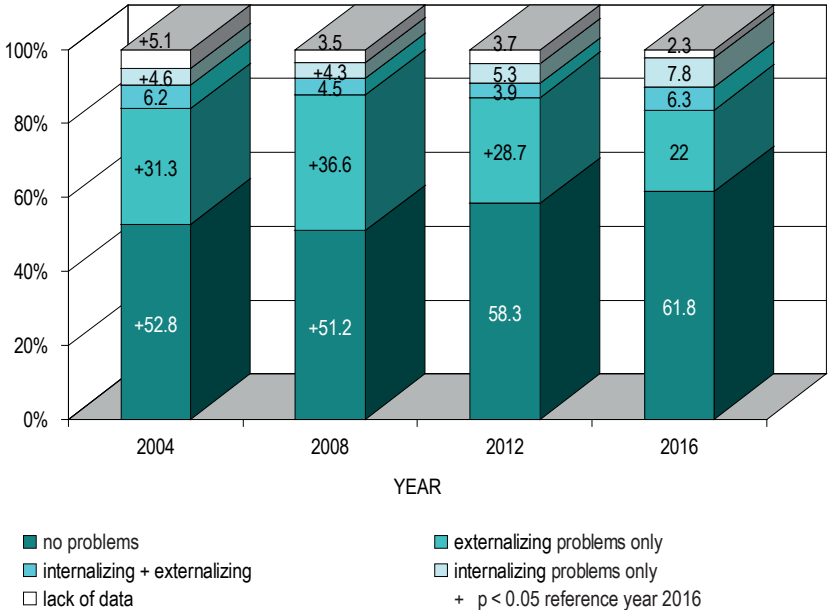


Figure 2. **Mental health of third grade middle school students – boys. The Mokotow Study 2004–2016**

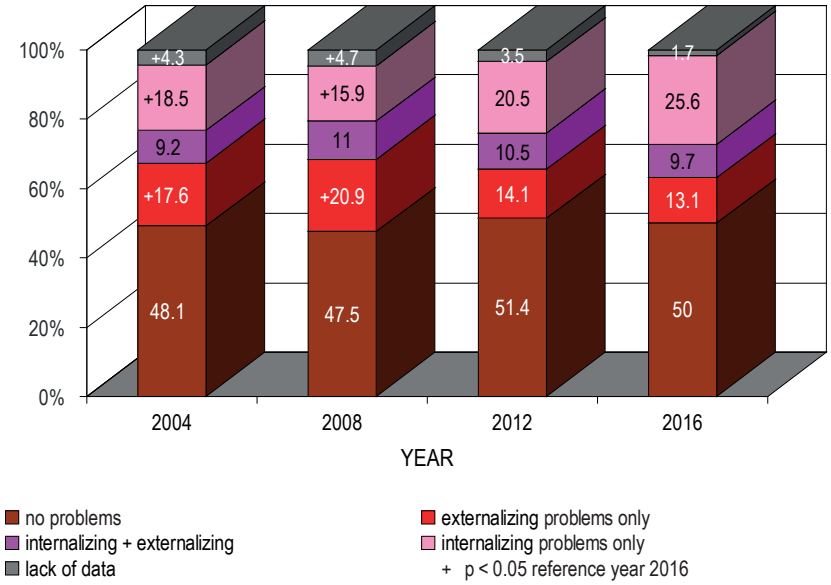


Figure 3. **Mental health of third grade middle school students – girls. The Mokotow Study 2004–2016**

### Changes in prevalence of mental health problems over the years

In comparison to the results of the previous Mokotow Study wave conducted in 2012, the prevalence of internalizing problems in the whole sample increased significantly (by 3.4 percentage points, $\chi^2 = 3.96$; $p < 0.05$). On the other hand, the percentage of externalizing problems decreased (by 3.9 percentage points), both in the whole sample ($\chi^2 = 4.10$; $p < 0.05$) and among boys ($\chi^2 = 5.24$; $p < 0.05$).

The above trends are even more evident in the longer term. Initially, between 2004 and 2008, the analyzed indicators did not change significantly. But between 2008 and 2016, the percentage of young people with internalizing problems increased significantly (by 6 percentage points, $\chi^2 = 15.95$; $p < 0.001$), while a significant decrease (by 11 percentage points) in the proportion of young people with externalizing problems was observed ($\chi^2 = 30.63$; $p < 0.001$). During this period of time, the percentage of young people who did not confirm clear symptoms of mental health problems also increased significantly (by 7 percentage points) ($\chi^2 = 8.71$; $p < 0.01$).

Analysis of the results conducted separately for girls and boys (Figures 2 and 3) showed significant long-term reduction of externalizing problems in both of these subgroups. Among girls the value of this indicator decreased from 21% in 2008 to 13% in 2016 ($\chi^2 = 9.49$; $p < 0.01$), and among boys from 37 to 22% ($\chi^2 = 24.04$; $p < 0.001$). Reduction of externalizing problems was accompanied by the increase in the prevalence of internalizing problems, both among girls (from 16 to 26%, $\chi^2 = 13.58$; $p < 0.001$) and among boys (from 4.3 to 7.8%, $\chi^2 = 5.33$; $p < 0.05$).

Throughout the whole 12-year period of the study the percentage of adolescents experiencing both internalizing and externalizing problems, i.e., mixed disorders remained stable – among boys it was at the level of 4–6%, and among girls at the level of 9–11%. Among girls there was also a stable subgroup (approximately 50%) characterized by the lack of clear symptoms of mental health problems. It was different among boys, in this subgroup lack of problems significantly increased since 2008 ($\chi^2 = 10.93$; $p \leq 0.001$), reaching 62% in the last wave of the Mokotow Study (gender differences in 2016: $\chi^2 = 10.63$; $p \leq 0.001$).

### Component variables of internalizing and externalizing problems

It is interesting to find out which of the variables that make up the internalizing and externalizing problems contributed significantly to the changes observed above. According to a study wave from 2004 (Figure 4), the high risk of depression applied to 6.3% of the sample and over the next years increased significantly, reaching 10.6% in 2016. This change was caused by the increase (by 8 percentage points) in the prevalence of depressive symptoms among girls (from 10.7% in 2004 to 18.9% in 2016, $\chi^2 = 13.82$; $p < 0.001$). Among boys, this index remained stable and low (1.8–3%). Between 2004 and 2016, the indicator of emotional problems other than depression (Figure 5) remained relatively stable among girls (approximately 16%), while among boys statistically significant increase was observed between 2008 and 2016 (from 6.8 to 11%, $\chi^2 = 5.51$; $p < 0.05$).

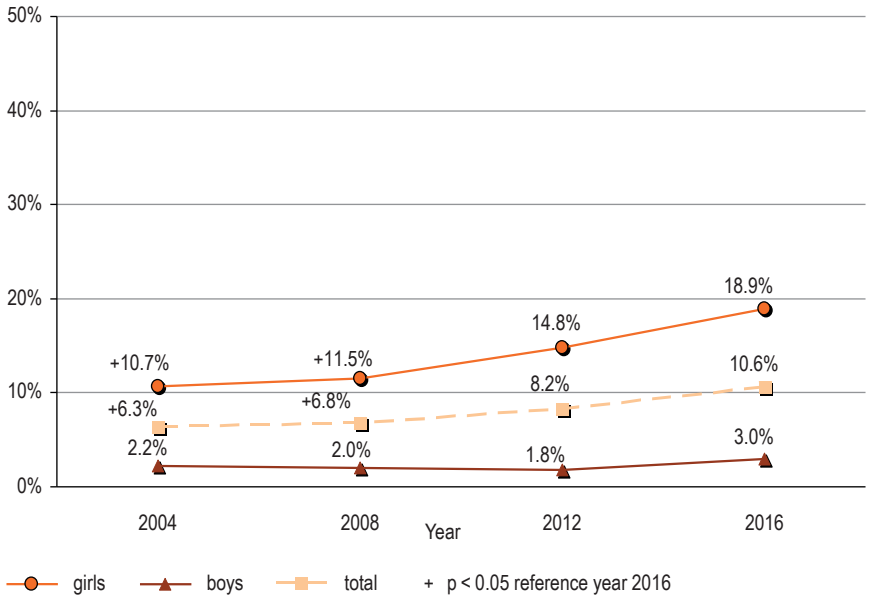


Figure 4. **Gender and high risk of depression. The Mokotow Study 2004–2016**

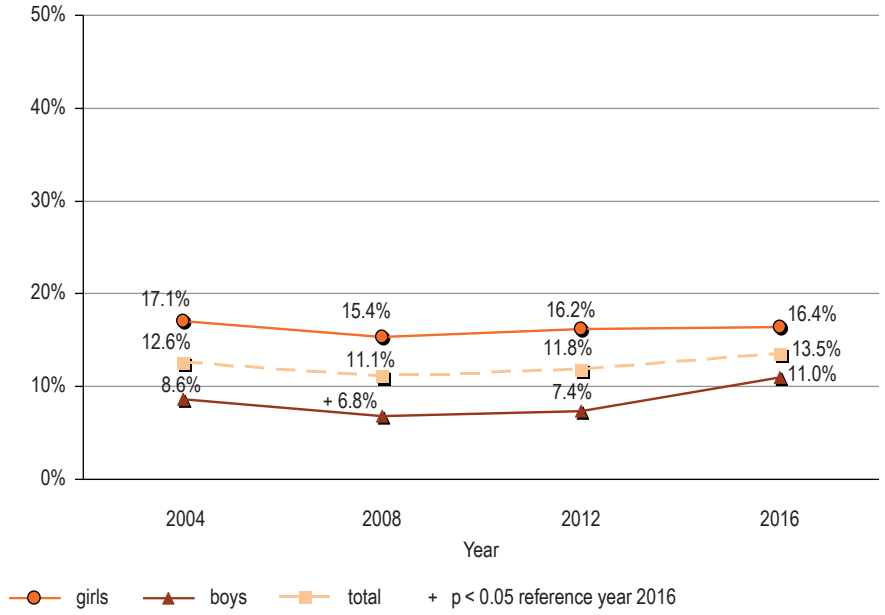


Figure 5. **Gender and emotional problems other than depression. The Mokotow Study 2004–2016**

In the area of externalizing problems three main variables were analyzed: (1) psychoactive substance abuse, (2) being a perpetrator of violence and (3) delinquent behavior (Figures 6–8). Between 2004 and 2016, the prevalence of substance abuse

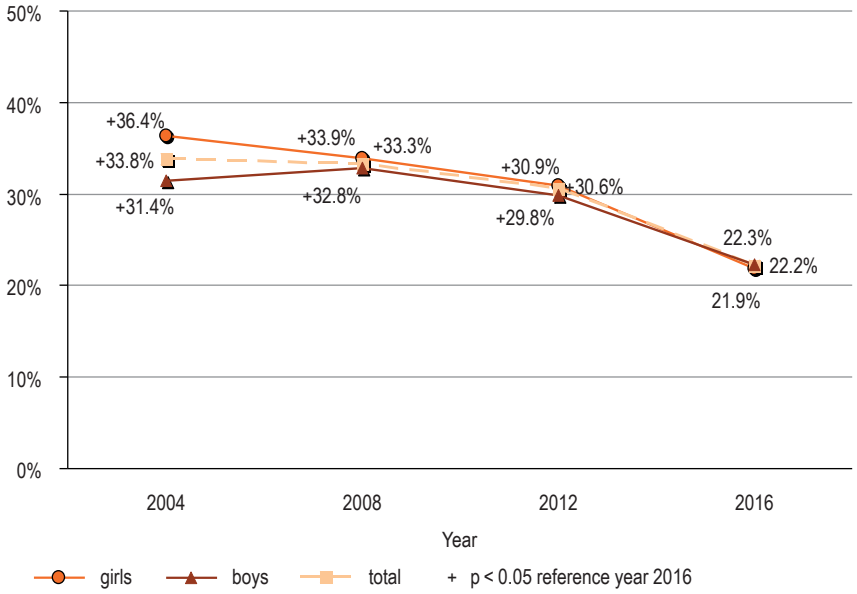


Figure 6. **Gender and psychoactive substance abuse. The Mokotow Study 2004–2016**

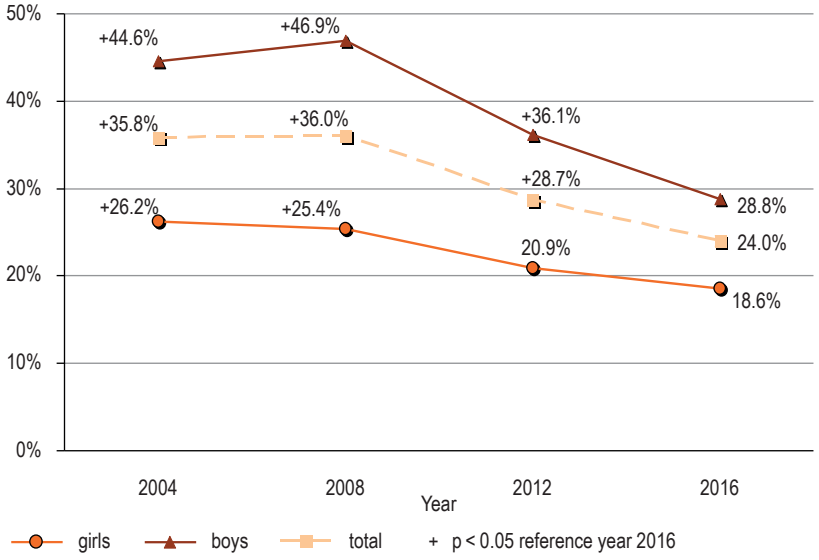


Figure 7. **Gender and violence. The Mokotow Study 2004–2016**

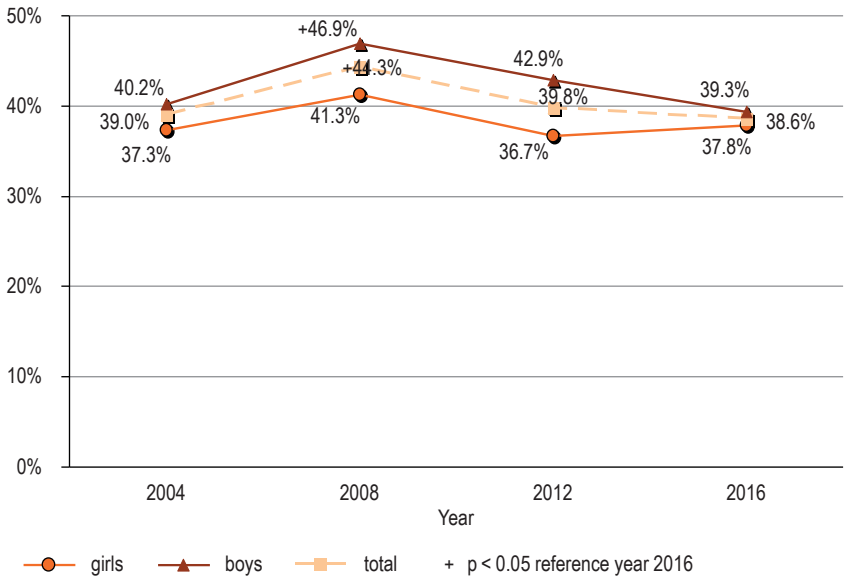


Figure 8. **Gender and delinquent behavior. The Mokotw Study 2004–2016**

decreased by almost 12 percentage points (from 34 to 22%, $\chi^2 = 32.12$; $p < 0.001$) and this change was very similar in the subgroups of girls and boys.

In the case of violence indicator significant decrease was also observed ($\chi^2 = 32.08$; $p < 0.001$). Among girls, the prevalence of this problem decreased by 8 percentage points (to 18.6%, $\chi^2 = 7.60$; $p \leq 0.01$), and among boys the decrease was twice as high, by 16 percentage points (to 28.8%, $\chi^2 = 27.59$; $p < 0.001$).

The index of delinquent behavior was the most stable over the time; this variable did not change significantly between 2004 and 2016. Only short-term fluctuations were found. In 2016, as compared to 2008, the index of delinquent behavior decreased significantly among boys. However, compared to 2004, it was a return to the initial level – about 39%.

## Discussion

According to data from 2016, 42% of the youth showed symptoms of mental health problems. These symptoms were more prevalent among girls (48%) than boys (36%). Internalizing problems were found among 16% of respondents, externalizing – among 18%, while mixed among 8% of students. The mental health problems profile was different among girls and boys. In the case of girls internalizing problems dominated, followed by externalizing and mixed problems. Among boys the externalizing problems were most prevalent.

Initially, between 2004 and 2008, the values of indicators had not been changed significantly. But between 2008 and 2016 the increase in the indicator of internalizing

problems was observed. Growing prevalence of depressive symptoms among girls contributed to this result. At the same time, significant decrease in the prevalence of externalizing problems was observed. It resulted from the reduction in psychoactive substance abuse and violence, both among girls and boys.

It is difficult to identify studies that could be a benchmark for most of the results that were obtained. In available publications, only selected indicators of mental health disorders are taken into account, mainly the prevalence of depression and the use of psychoactive substances. In this area, a lot of population studies among children and youth were conducted by a team from the Jagiellonian University Medical College in Krakow, headed by J. Bomba [9, 10, 12, 13]. Unfortunately, in relation to the Mokotow studies, other age groups were studied, and the research dates were usually very distant in time. Among the Polish publications from the last eight years, an interesting work from 2012 has been found. This article describes research on the prevalence of symptoms of depression in a sample of 800 students from Warsaw and the suburban area [39]. In this study a Polish version of the Children's Depression Inventory by M. Kovacs was used [40]. Results showed that the prevalence of depression in the group of middle school students (grades 1–3) was 9%, and for high school students – 12%. The authors did not present separate results for grade 3. It can be assumed, however, that for this group the depression rate could exceed 10%. In our survey from 2012, the index was only slightly lower and amounted to 8.2%.

According to data from the SEYLE research project (Saving and Empowering Young Lives in Europe), that covered a group of 12,000 of 14–16-year-olds from 11 European countries and Israel [15, 41], 10.5% of respondents showed symptoms meeting the depression criteria and in this group there were three times more girls than boys. In the population studies of US youth conducted in 2016 [42], 13.9% of 15-year-olds was affected by an episode of major depression in the past year. Among girls this percentage was 21%, and among boys 6.5%. When the additional diagnostic criterion, i.e., a serious impairment of daily activity was taken into account, the percentages were lower and amounted to: overall – 10%, for girls – 14.7%, for boys – 5.2%. In our research, estimates of the prevalence of depression in a similar age group are closer to those of the last quoted values. In addition, the USA study, as well as the Warsaw Study, indicate that the prevalence of depression systematically increased with subsequent years: among girls and in the whole group [14]. Also, as in our research, the increase among boys between consecutive measurements was small and mostly statistically insignificant.

Summing up, we can conclude that the results obtained in the Mokotow Study show a large convergence with other European and American data. The tendencies observed in our study that indicate systematic increase in the high risk of depression are in line with trends observed in other Western countries.

The question arises whether similarities also apply to the prevalence of externalizing problems. This is partially confirmed by data on the prevalence of alcohol and smoking gathered in research conducted in Europe (European School Survey Project on Alcohol and Other Drugs – ESPAD) and in the USA (Monitoring the Future). The ESPAD survey, conducted in 2015 among 15-year-olds from 25 countries, showed

decrease in the prevalence of alcohol use and cigarette smoking in lifetime and in the past 30 days, as well as getting drunk and everyday smoking [43]. In contrast to our research, these trends were observed only between the last two waves of the ESPAD study, i.e., between 2011 and 2015.

In the USA study Monitoring the Future, conducted among tenth grade students (that is equivalent to our third grade of Polish middle school) the long-term declining trends in the prevalence of alcohol and smoking was found. During the last dozen or so years preceding 2016, the percentage of students who drank alcohol in the last year decreased significantly and the percentage of youth who got drunk and smoked in the last 30 days also decreased [44].

The above data suggest that the trends identified in the Mokotow Study, i.e., increase in the prevalence of internalizing problems among young people and decrease in the occurrence of externalizing problems, have a global character and have been present in many other countries. In order to identify the causes of this phenomenon, we should look for factors influencing young people globally, on a macro scale. A hypothesis that the reason for the discussed phenomena are changes in social functioning of young people caused by the dissemination of modern communication and IT technologies in the global youth population, especially the use of such devices as the iPhone or smartphone, could be interesting [45]. In this context, attempts are made to distinguish and describe this generation of young people that is called iGeneration or head-down generation [46, 47]. In this generation, a significant part of natural, direct contact with peers has been limited and replaced by online contacts in cyberspace. It can be assumed that social relationships mediated by new media do not satisfy the emotional and developmental needs of youth to the same extent as face-to-face contacts. The increase in internalizing problems may be the result of these changes. Rare direct contacts with peers may foster an increasing sense of loneliness, which is one of the dimensions of the CES-D scale. On the other hand, peer influences are one of the strongest risk factors associated with youth involvement in risky behavior and experiencing externalizing problems [18, 48]. Reduction of direct contact with peers may weaken the influence of this factor and lead to reduction in the occurrence of externalizing problems among young people.

Of course, other explanations and hypotheses are also possible. For example, the explanation for the increase in the prevalence of depression may be found in the excessive demands that contemporary civilization puts on young people, in a high pace of life or pressure to achieve success, first educational and then professional one.

## Conclusions

Increasing prevalence of internalizing problems, including the risk of depression and other emotional problems among adolescents, suggests an urgent need to develop or adapt effective preventive programs and to broaden the availability of psychological and psychiatric consultations, including 24-hour hotline for children and adolescent in a mental crisis. Due to many other reasons such postulates have been raised for many years [24, 29].

## Study limitations

One of the important disturbances for long-term trends study are macro-social changes, which are beyond the researchers control. In over 30-year history of the Mokotow Study, the most important changes of this type were educational reforms (introduction of middle schools in 1999 and its liquidation in 2016). Therefore, to eliminate at least one of these important factors hindering the comparability of results, we decided in this study to narrow observations to the period when middle schools were part of Polish education system. Narrowing the observation period to the years 2004–2016 gives a greater certainty that the surveyed youth similarly understood the questions, had similar school experiences, lived and learned in a similar social reality.

The limitations of this type of research are also measurement errors resulting from the imperfections of the self-description method used to study mental health problems of young people. The survey questions concerned many 'sensitive' topics: the use of psychoactive substances, breaking the law, violence, and emotional problems. Therefore, some of the students might have been afraid that their answers would be disclosed to teachers or parents. This fear might be a potential source of measurement error. The mechanism of social approval should also be take into account, which makes it difficult to provide reliable answers to survey questions. Therefore, throughout all waves of the Mokotow Study, consistent efforts have been undertaken to minimize unreliable answers. Students were ensured about complete anonymity at individual, group and school levels. The voluntary nature of participation in the study and their confidential nature were also emphasized in oral and written instructions.

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