

Use of medicines to alleviate negative emotional states among adolescents attending Special Education Centres

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Keywords

Medicines for negative emotional states • Prevalence • Risk/protective factors • Youth • Special Educational Centres

Summary

Introduction. Substantial research evidence indicates that adolescents commonly use a variety of pharmaceuticals. Studies in this area carried out so far in Poland have focused on youth attending mainstream schools. However, there is a lack of research covering adolescents residing in special education centres (SEC). The purpose of the study was to assess the prevalence of medicine use for negative emotional states (nervousness, difficulties in falling asleep, and depressive mood), and to identify factors associated with the use of the aforementioned medications by SEC youth.

Materials and methods. The study was conducted in 2018 on a random nationwide sample of SEC adolescents aged 12-19 ($N = 1730$). The logistic regression analyses included sociodemographic variables, as well as factors related to the participant's individual characteristics and to their social environment.

Results. Medicine use for negative emotional states was confirmed by about 24%-30% of respondents. The prevalence of these medicine use among SEC youth was significantly higher than among adolescents from mainstream schools. The individual risk factors associated with medicine use were gender (female), current mental and somatic health problems, past suicide attempts and psychoactive substances use while self-control turned out to be protective factor. Among factors related to the respondents' social environment, positive relationships with peers were significant protective factor.

Conclusions. Preventive measures aimed at SEC youth should be focused on improving positive relationships with peers and developing self-control. Educational programs for youth, their parents and SEC staff to develop knowledge and skills regarding safe medicines intake would also be useful.

Introduction

Research on adolescent medicine use has been undertaken for many years, both as part of international projects [1, 2] and studies conducted in individual countries in Europe, Asia, Africa, America and Australia [3]. Data collected to date indicate that significant percentages of young people take a variety of pharmaceuticals, with the most common being analgesics, cough and cold medicines, antiallergics, dermatological products' as well as vitamins and dietary supplements and antibiotics [3, 4]. Less common is the use of medicines to alleviate negative emotional states, like difficulties in falling asleep, nervousness or depressive/bad mood [1, 2, 5].

It is known from the studies conducted to date that specific factors associated with schoolchildren's medicine use taken to relieve negative emotional states are: sociodemographic status [6,7], self-rated mental health [2, 8, 9, 10], somatic complaints [8, 9], psychoactive substances use like tobacco and alcohol [9, 11], and experience of violence [9, 12]. There are also studies indicating an association between medication for mental health problems use and impulsivity [13]. In addition, some studies confirm that the use of medication to alleviate psychological problems is more common among girls [7]. On the other hand, there are also data indicating that there are no significant differences between boys and

girls in the prevalence of medicines taken for difficulties in falling asleep, nervousness, and depressive or bad mood [2, 5]. Young people receive medicines, including those to counteract negative emotional states, primarily from their parents, mainly their mothers [3, 14]. It is also shown that sometimes peers are also the "source" of medicines [15]. It will therefore be interesting to see whether the quality of relationships with parents and friends is related to medicine use among youth.

Studies on medicine use and self-medication have been conducted among adolescents attending mainstream schools and university students [1, 2, 5, 13]. To the best of our knowledge, no research has yet been conducted on this issue among adolescents who, for various reasons, do not attend mainstream educational institutions.

In Poland, young people with elevated level of externalizing problems (e.g., failure to perform school duties, psychoactive substances use, aggression, recurrent conduct problems, antisocial tendencies) and/or internalizing problems (e.g., depressive disorders, anxiety disorders) cannot continue their education in mainstream schools and are usually referred to Special Educational Centres (SEC), i.e. Youth Sociotherapy Centres (YSC) and Youth Correctional Centres (YCC) [16, 17].

YSC are intended for young people who, due to the externalizing and/or internalizing problems mentioned

above, have been deemed at risk of social maladjustment. Young people are placed in YCC at the request of their parents or legal guardians, but a psychological-pedagogical counselling centre's decision on the need for special education is required.

Youth Correctional Centres are designed for socially maladjusted adolescents who require specially arranged learning methods and strategies to re-socialization into society. The basis for placing a teenager in an YCC is a decision issued by the Family and Juvenile Departments of the District Courts [16].

As mentioned above, there is a lack of studies on the prevalence and determinants of medicine use among adolescents in special education facilities, although studies are available on other psychoactive substances like alcohol, tobacco and illicit drugs [18-21]. The purpose of this article is to fill this gap.

The specific objectives of the analyses were:

- to estimate the frequency on medicine use to relieve negative emotional states as difficulties in falling asleep, nervousness, depressive or bad mood among youth attending SEC;
- to analyse the associations between these medicine use and selected socio-demographic variables (gender, family structure, type of educational institution), mental and somatic health variables (current mental and somatic health problems, suicide attempts), psychoactive substance use variables (alcohol, nicotine, novel psychoactive substances, NPS), and other psychosocial variables (self-control, peer relationships, experiencing peer violence, and parental monitoring of adolescent behaviour).

Materials and methods

SAMPLE SELECTION AND STUDY IMPLEMENTATION

The study involved youth from randomly selected YSC and YCC. Approximately 40% of the centres operating in Poland were drawn (30 YSC and 35 YCC). Due to the lack of consent from some of the centres (9 directors refused, with the reason being the lack of parental consent in two cases), their pool was supplemented by 10 centres outside the originally drawn sample. In the end, the study included students from 25 YSC and 39 YCC. The surveys were conducted by trained interviewers from outside the SEC, with procedures ensuring the anonymity of individual students, classes and centres. The traditional paper-pencil survey was completed by 2,063 students, accounting for 76% of the drawn sample. The data of 333 participants were excluded from analyses due to significant missing data or responses, drawings or vulgar comments indicating that the study was not taken by them seriously.

MEASUREMENTS

The questionnaire consisted of questions and scales used and psychometrically tested in previous studies conducted among adolescents in Poland [22]. In order to verify the understanding of the design and vocabulary

used in the questions, and to possibly adapt the questionnaire to the language and experiences of SEC students, qualitative and quantitative pilot study was conducted prior to the nationwide study. The aim of this pilot study was also to verify if the questions included in the survey did not violate the sense of security of the participants. Detailed information on the method can be found in an earlier publication [23].

Dependent variable

- Frequency of medicine use. Three questions related to the monthly frequency of medicine use due to: 1) difficulties in falling asleep, 2) nervousness (irritability), 3) depressive/bad mood (sadness). Participants were given a choice of 7 responses ranging from "1" = "I did not use" to "7" = "40 times or more". These questions were adapted from the Health Behaviour in School-aged Children (HBSC) study and modified by the research team [5]. An indicator of frequent medication use was the use of the listed pharmaceuticals at least 1-2 times in the last month.

Independent (explanatory) variables

Youth mental health

- Current mental and somatic health problems: two questions developed by the US Centers for Disease Control and Prevention (CDC) related to: 1) feeling depressed, stressed and experiencing emotional problems (deteriorated mental health); 2) physical illness or injury (deteriorated somatic health). Respondents entered the number of days in the last month that they experienced that kind of problems [24].
- Suicide attempts: A single question about ever having attempted suicide in their lives, with responses ranging from "1" = "no" to "4" = "yes, three or more times" [authors' own elaboration].

The frequency of psychoactive substance use

- Cigarette smoking: one question elaborated in the authors' previous studies on the frequency of current (within the last year) smoking of traditional cigarettes, with answers to choose from "1" = "no" to "5" = "yes, daily." [25].
- Alcohol use: a single question adopted from the European School Survey Project on Alcohol and Other Drugs (ESPAD) on the frequency of alcohol use in the last 30 days before the survey, with answers ranging from "1" = "I didn't drink" to "7" = "40 or more times." [26, 27].
- Cannabis use: a single question taken from ESPAD on smoking marijuana/hashish in the last 30 days before the survey, with responses ranging from "1" = "I have not used" to "7" = "40 or more times." [26, 27].
- Novel psychoactive substance (NPS) use: a single question on so-called "legal highs" use in the last 30 days before the survey, with answers ranging from "1" = "I have not used" to "7" = "40 or

more times” [authors’ own elaboration on ESPAD questionnaire].

Other psychosocial variables

- Impulsivity vs self-control: an abbreviated version of the Barratt Impulsivity Scale (BIS-11), consisting of 7 statements related to diligence in task planning, ability to concentrate and deliberate, inconsiderate behaviour and difficulty in concentrating, with responses ranging from “1” = “never or rarely” to “4” = “almost always or always” [28, 29]. The internal consistency of this scale was acceptable (Cronbach’s $\alpha = 0.70$).
- Experiencing violence: a single question taken from The Ontario Student Drug Use and Health Survey (OSDUHS) about experiencing violence in the past 12 months, with responses ranging from “1” = “never” to “4” = “daily or almost daily” [30, 31].
- Experiencing cyberbullying: a single question developed by Pyżalski on experiencing regular and over an extended period of time harassment from classmates using the Internet or a cell phone, respondents were given a choice of answers ranging from “1” = “never happened” to “4” = “happened 4 or more times.” [32].
- Parental monitoring: a scale taken from the Flint Adolescent Study containing 8 statements related to parental monitoring of where the adolescent spends his or her free time, including time spent online and who his (or her) peers are, with responses ranging from “1” = “never” to “5” = “always” [22, 33]. The internal consistency of this scale was high (Cronbach’s $\alpha = 0.91$).
- Positive relationships with peers: a scale developed by the authors in an earlier study consisting of 6 questions related to the relationships with peers and self-efficacy in interactions with classmates, like the ability to persuade or express opinions when others disagree, with responses ranging from “1” = “not at all” to “4” = “definitely yes” [34] (Cronbach’s $\alpha = 0.94$).

STATISTICAL ANALYSES

Differences in the prevalence of medicine use were analysed using the chi-square test, with a commonly accepted significance threshold of $p < 0.05$. The nonparametric Mann-Whitney U test and logistic regression analysis with Wald backward elimination were used to analyse the associations between medicine use and selected variables. For the logistic regression analysis, a dichotomous dependent variable was used, which referred to medicine use for negative emotional states at least 1-2 times in the last month (a combined indicator for medications for falling asleep, nervousness and depressive or bad mood states): 1 = used medicines in the last month, 0 = never happen in the last month.

Sociodemographic factors in the regression model were coded as follows:

- gender (1 = girls, 2 = boys);
- type of centre (1 = YSC, 2 = YCC);
- family composition (1 = both parent family, 2 = single parent family).

The psychosocial variables included in the logistic regression model were quantitative. The exception was the variable related to suicide attempts, which took the value 1 = no suicide attempts vs 2 = yes, one time or more often.

Multivariate regression analysis required a complete data set – missing data were imputed by the multiple imputation (MI) method recommended in the literature for this purpose [35]. The SPSS 17.0 statistical package was used for all analyses.

As noted in the introduction section, there is a lack of research on medicine use among adolescents attending special education institutions. However, it is known that the prevalence of substances like alcohol, tobacco and illegal drugs is significantly higher among these adolescents than among adolescents from mainstream schools [21]. Therefore, it became interesting to see how the prevalence of medicine use among adolescents in SEC differs from the prevalence among of adolescents from “regular” schools. For comparative purposes, we used data from the 2016 Mokotów study, conducted among 15-year-old students from Warsaw schools [36]. The question on medicine use applied in the Mokotów study is almost identical to the question used in the present study. Due to age differences between the participants of the two surveys, only data from younger participants in the SEC surveys, *i.e.*, adolescents aged 12-15, were used for the comparison.

Results

CHARACTERISTICS OF THE STUDY PARTICIPANTS

The study included 1,730 SEC students, the majority of whom (67.2%) were boys, which reflects the actual gender distribution in this type of institutions (Table I). Respondents from YCCs predominated in the survey sample, which is also in line with the actual state, since at the time the project was implemented, there were about 5,000 students in YCC, while about 4,000 students in YSC facilities. Data on the family composition and the parents’ education indicate that the situation of adolescents residing in SEC differs from that of adolescents attending mainstream schools. First of all, the majority of respondents in our study (66.9%) confirmed that they came from single-parent families, with girls giving this answer slightly more often than boys. Data on the families of students from “regular” schools, on the other hand, indicate that the majority of these adolescents (approximately 77%), live with both parents [37].

The data collected in the present study further indicates that the young people in SEC come from families with lower-than-average levels of education. According to our respondents’ knowledge, only about 10% of mothers and 7.5% of fathers had a university degree. Nationwide data, on the other hand, indicate that about 23.5% of adult Poles – including approximately 18% of men and 29% of women – graduated from higher education [38]. It should be noted, however, that due to numerous answers

Tab. I. Descriptive information on the study population.

	Girls N = 565 (%)	Boys N = 1159 (%)	Total N = 1730 (%)
Age			
12-15 years	233 (41.3)	447 (38.8)	682 (39.6)
16-19 years	331 (58.7)	704 (61.2)	1039 (60.4)
Type of centre			
Youth Sociotherapy Centre (YSC)	197 (34.9)	459 (39.6)	662 (38.3)
Youth Correctional Centre (YCC)	368 (65.1)	700 (60.4)	1068 (61.7)
Family composition			
both parents family	159 (28.3)	407 (35.5)	567 (33.1)
single parent family or step parent family	402 (71.7)	738 (64.5)	1145 (66.9)
Mother education			
primary or vocational education	218 (39.2)	408 (35.9)	630 (37.1)
secondary education	100 (18.0)	243 (21.4)	345 (20.3)
university degree	70 (12.6)	99 (8.7)	169 (10.0)
I do not know or I have no mother	168 (30.2)	385 (33.9)	553 (32.6)
Father education			
primary or vocational education	176 (32.0)	361 (32.1)	539 (32.1)
secondary education	74 (13.5)	158 (14.1)	233 (13.9)
university degree	47 (8.5)	79 (7.0)	126 (7.5)
I do not know or I have no father	253 (46.0)	526 (46.8)	781 (46.5)

Missings ranged from 0.3% to 3.0%

and responses indicating that the study participants have no parents (or have no contact with them), data on the education of respondents' mothers and fathers is not precise.

MEDICINE USE

Medicine use for negative emotional states was confirmed by approximately 25% of respondents, including 25.8% who used medications for difficulties in falling asleep, 29.8% for nervousness and 23.9% for depressive or bad mood. All of the aforementioned pharmaceuticals were used significantly more often by girls than boys (Tab. II).

A summary of medicine use prevalence among SEC youth and participants of the Mokotów study conducted at mainstream schools indicates that the prevalence of all pharmaceuticals is significantly higher among SEC adolescents, with the greatest differences noted for

tranquilizer use among girls (more than 23 percentage points) (Fig. 1).

MEDICINE USE ACCORDING TO VARIABLES INCLUDED IN THE STUDY

Table III presents the comparisons of medicine use for negative emotional states according to sociodemographic variables and dichotomized values of individual and social factors. Of the sociodemographic variables, medicine use was significantly differentiated only by gender, with girls using these medicines more often than boys. Medicine use was also significantly differentiated by individual and social factors – with the exception of cigarette smoking ($p = 0.150$) and parental monitoring of the adolescent's behaviour ($p = 0.953$). Medicines were used more often by SEC students that confirmed medium or high intensity of: current mental and somatic health problems, substance use, experiencing violence

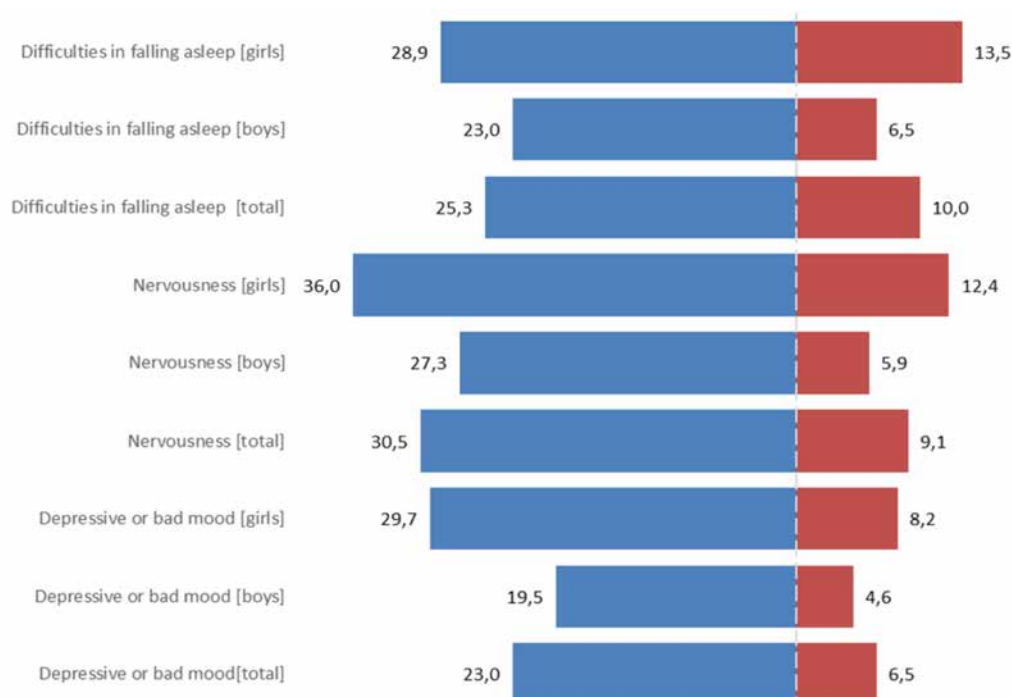
Tab. II. Medicine use for negative emotional states prevalence among SEC youth (use at least 1-2 times in the last 30 days).

		YSC N = 662 (%)	YCC N = 1068 (%)	Total N = 1730 (%)
Difficulties in falling asleep	Girls	65 (33.3)	104 (28.5)	169 (30.2)
	Boys	99 (22.0)	170 (24.7)	269 (23.6)*
	Total	167 (25.6)	274 (26.0)	441 (25.8)
Nervousness	Girls	76 (39.2)	124 (34.7)	200 (36.3)
	Boys	123 (27.6)	176 (25.7)	299 (26.4)**
	Total	203 (31.4)	300 (28.8)	503 (29.8)
Depressive or bad mood	Girls	63 (32.1)	110 (30.3)	173 (30.9)
	Boys	97 (21.7)	136 (19.7)	233 (20.4)**
	Total	162 (24.9)	246 (23.3)	408 (23.9)

* $p < 0.05$; ** $p < 0.01$ (comparison between girls and boys).

Missings ranged from 0.9% to 3.0%

Fig. 1. Summary of the medicine use prevalence among SEC students (younger group 12-15-year olds) and among the 2016 Mokotów Study respondents (medicine use at least 1-2 times in the last 30 days, in percents).



and cyberbullying, and having a history of suicide attempts. Higher (average or above average) intensity of self-control and positive relationships with peers were associated with less frequent medicine use.

ANALYSIS OF THE RELATIONSHIP BETWEEN MEDICINE USE AND SELECTED VARIABLES

Logistic regression analyses identified factors that increase the risk of medicine use after controlling for sociodemographic variables (gender, the type of facility and the family composition) (Table IV).

All analysed variables related to the participants' health turned out to be risk factors for medicine for negative emotional states use, *i.e.*, experiencing current mental health problems (OR 1.02; 95% CI: 1.00-1.03), somatic health problems (OR 1.02; 95% CI 1.01-1.04) and past suicide attempts (OR 1.57; 95% CI: 1.24-2.00). The use of other psychoactive substances, including drinking alcohol (OR 1.11; 95% CI: 1.04-1.18) and NPS use (OR 1.15; 95% CI: 1.03-1.28), were also associated with medicine use. In contrast, the factor that protects against medicine use was self-control (OR 0.75; 95% CI: 0.61-0.93). Of the factors related to the respondents' social environment only positive relationships with peers appeared to be significant and protective (OR 0.71; 95% CI 0.60-0.83).

Discussion

Taking medicines for negative emotional states is much

more prevalent among girls and boys residing in SEC facilities than among adolescents attending mainstream schools. This is evidenced by summary the data collected as a part of this project with the results of the Mokotów study conducted in 2016 among Warsaw 15-year-old students [36]. Compared to participants of this study, the percentages of SEC students that confirmed frequent (at least 1-2 times in the last month) medicine user due to difficulties in falling asleep, nervousness, depressive or bad mood were several times higher.

The prevalence of the medicines in question was slightly higher among girls than among boys at SEC facilities. Differences by gender, however, were found to be insignificant in logistic regression analyses. This indicates that, as in the general population of adolescents, gender is not a predictor of taking medication due to negative emotional states [2, 5]. It can be hypothesized that this is related to the mental health problems severity. Studies among adults indicate that although women are more likely than men to use psychotropic drugs, among those diagnosed with severe mental health problems, there are no differences in the percentages of men and women using such medicines [39]. One of the reasons why young people are referred to SEC facilities are mental health problems, hence the lack of significant differences between girls and boys in the prevalence of medications taken due to negative emotional states.

Regression analyses showed that factors favouring the medicine use to alleviate negative emotional states was the experience of currents somatic health problems. Associations between medicine use in question and

Tab. III. Medicine use for negative emotional states among SEC youth according to the dichotomous values of the study variables.

Study variables		N Mean (SD)	Mean range	Medicine use in the past 30 days	
				U Mann-Whitney significance	
Gender	Boys	1159	1.67 (1.22)	829.96	0.000
	Girls	565	2.05 (1.64)	929.24	
Centre type	MOS	662	1.88 (1.45)	884.19	0.167
	MOW	1068	1.74 (1.33)	853.92	
Family composition	Both parent family	567	1.72 (1.25)	856.30	0.989
	Single parent family	1145	1.83 (1.44)	856.60	
Self-control	Low intensity	930	1.92 (1.49)	908.63	0.000
	Medium or high intensity	800	1.65 (1.23)	815.36	
Current mental health problems	No or low intensity	1250	1.65 (1.20)	827.48	0.000
	Medium or high intensity	480	2.18 (1.71)	964.52	
Suicide attempts	No	1046	1.53 (1.04)	794.90	0.000
	At least one attempt	684	2.20 (1.70)	973.46	
Current somatic health problems	No or low intensity	1539	1.72 (1.30)	845.88	0.000
	Medium or high intensity	191	2.38 (1.81)	1023.60	
Cigarette smoking	No or low intensity	563	1.76 (1.34)	843.44	0.150
	Medium or high intensity	1167	1.81 (1.40)	876.14	
Alcohol use in the last 30 days	No or low intensity	1076	1.68 (1.26)	831.98	0.000
	Medium or high intensity	654	2.00 (1.53)	920.65	
Marihuana use in the last 30 days	No or low intensity	1221	1.72 (1.30)	842.95	0.001
	Medium or high intensity	509	1.98 (1.53)	919.59	
NPS use in the last 30 days	No or low intensity	1504	1.73 (1.32)	841.49	0.000
	Medium or high intensity	226	2.27 (1.64)	1025.27	
Experiencing violence	No or low intensity	1202	1.69 (1.24)	841.28	0.001
	Medium or high intensity	528	2.04 (1.62)	920.65	
Experiencing cyberviolence	No or low intensity	1204	1.68 (1.28)	833.56	0.000
	Medium or high intensity	526	2.05 (1.56)	938.61	
Parental monitoring	No or low intensity	869	1.81 (1.41)	864.88	0.953
	Medium or high intensity	861	1.78 (1.35)	866.13	
Positive relationships with peers	No or low intensity	642	1.98 (1.50)	932.11	0.000
	Medium or high intensity	1088	1.69 (1.29)	826.19	

somatic health have also been documented in other studies among adolescents [8, 9]. Also consistent with expectations is the result indicating that experiencing current mental health problems is a risk factor for medicine use for negative emotional states. This association is also confirmed in other studies among adolescents [2, 5, 8].

However, the strongest association appeared to be between the medicine use and the past suicide attempts. Authors of the studies on hospitalizations of young people in Poland due to poisoning indicate that medicines (next to alcohol) are the most common substances used in intentional poisoning of adolescents [40-42]. Among the pharmaceuticals used for that purpose the following are listed: antidepressants, anticonvulsants, antianxiety, antipsychotics, sleeping pills and tranquilizers, but also anti-inflammatory, analgesic and cough medicines – including medications containing dextromethorphan [40-42].

Hospitalizations of adolescents for multi-medicine poisoning or combining pharmaceuticals with alcohol or illegal drugs are also reported [42]. It is also known

that adolescents use medications to take their own lives-psychological and/or psychiatric consultations conducted as part of hospitalizations at one children's hospital found that almost half of intentional poisonings (most of which were poisonings caused by medicines) were suicide attempts [40]. In this context, our results indicating an association between medicine use and suicide attempts by the study participants are particularly of sever concern. It is also worth noting that approximately 60% of girls attending SEC facilities confirmed suicide attempts [43], and it is known from other studies that girls are more likely than boys to use medicines for suicidal purposes [44].

Our study does not provide an answer to the question of what specific medications are taken by SEC youth. The Mokotów study cited earlier indicates that among the pharmaceuticals mentioned as medicines used for negative emotional states, respondents most often indicate herbal sedatives and sleeping pills available without a doctor's recommendation – medicines available only by prescription are mentioned sporadically [36]. Unfortunately, we do not have data

Tab. IV. The last step in logistic regression analysis with backward elimination of variables irrelevant to the model (Wald), an explained variable: medicine use for negative emotional states among SEC youth, N = 1706

Variables/category	Wald coefficient	Odds ratio	95.0% Confidence interval		Significance
			Lower	Upper	
Sociodemographic factors (reference group)					
Gender (boys)	0.078	1.035	0.812	1.320	0.780
Centre type (YSC)	0.380	0.933	0.750	1.162	0.538
Family composition (both parent family)	0.087	0.966	0.769	1.213	0.768
Individual factors					
Self-control	7.168	0.753	0.612	0.927	0.007
Current mental health problems	6.315	1.015	1.003	1.028	0.012
Suicide attempts	14.220	1.571	1.242	1.987	0.000
Current somatic health problems	8.647	1.022	1.007	1.037	0.003
Alcohol use in the last 30 days	9.517	1.107	1.038	1.181	0.002
NPS use in the last 30 days	6.181	1.147	1.030	1.279	0.013
Social factors					
Experiencing cyberviolence	3.042	1.120	0.986	1.273	0.081
Positive relationships with peers	18.073	0.706	0.601	0.829	0.000
Constant	0.868	0.668			0.352

on the type of tranquilizers, sleeping pills or anti-depression medications taken by youth attending SEC facilities. However, it can be assumed that the much higher prevalence of mental health problems is reflected by more frequent medicine use available on a doctor's recommendation among SEC youth than among the adolescents in general population.

The questions about medicine use applied in the Mokotów study and the SEC survey are phrased in such a way as to evoke coping with mental health problems. Medicines, however, are also used sometimes for intoxication, but the previous analysis indicate that the percentages of SEC students using various pharmaceuticals for this reason are lower than the percentages of those that use medicines for self-medication. The questionnaire completed by study participants included a question on the narcotics use, among which "psychotropic, sedative, tranquilizers and sleep-inducing medicines" were listed in addition to substances like cannabis, NPS and amphetamines. Taking that kind of medicines (presumably to intoxicate) in the last year before the study was confirmed by 18.5% of younger (12-15 years old) respondents and approximately 24% of older ones (16-19-year-olds) [21].

The question on narcotic substances refers to the last year, while the questions on medicine use refers to the last month. Thus, the result showing that approximately 26% of SEC students used medicines in the last month due to difficulties in falling asleep, while approximately 30% used medicines due to nervousness may indicate that the leading motive to reach for sleeping and sedative medications is the need to cope with negative emotional states.

The association between impulsivity/self-control and medicines for negative emotional states use – namely, the higher the score on the self-control scale, the lower the tendency to use such medications – is confirmed in the

other studies. Indeed, in Canadian study carried out among university students, an association was found between impulsivity and the sedative/tranquilizer, painkillers (opioids), and medications with stimulant effects misuse, while the cited study included only medications available on a doctor's recommendation [13]. According to the authors of that study, the tendency of impulsive people to turn to medications with a variety of effects is a result of the difficulties of controlling behaviours that can bring immediate reward – in this case, relief from psychological ailments [13].

A risk factor for medications use for negative emotional states was also alcohol. Thus, it is possible, as some authors have suggested, to consider medicine use as a symptom of unhealthy lifestyle habits [45]. An element of that kind of style may be use a variety of substances, including combining different drugs and – which is particularly risky – mixing pharmaceuticals with alcohol, which, as mentioned above, can become a cause of serious intoxication [40].

The results concerning NPS are in particular interesting as it turned out that these substance use is associated with medicine to alleviate negative emotional states use. As can be surmised, this is related to the properties of sedatives and sleeping pills, which, due to their psychoactive effects – like NPS – are sometimes used for intoxication.

Positive relationships with peers was the only one of the analysed factors related to the participants' social environment that was associated with medicine use – the higher the respondents rated the quality of their relationships with peers, the less likely they were to confirm those pharmaceuticals use. This is an interesting result given previous analyses of SEC data indicating the positive association between good peer relationships and alcohol use and abuse [46]. It is important, however, to remember that adolescent alcohol use is a social

behaviour and is linked to having more friends and higher position among peers [47]. Taking medicines to cope with various psychological problems is an individual experience, although it is known from the previous studies that adolescents share medicines with their peers and colleagues are sometimes perceived as an authority on that matter [15].

The prevalence of medicine use among SEC youth is significantly higher than among adolescents studying in mainstream schools. This can be explained to some extent by the socioeconomic status of SEC youth. Data on the education of the parents of those students indicate that they are less than averagely educated. It is known from the Mokotów study that parental education is a factor associated with adolescent medicine use. Namely, participants in these studies who responded in a questionnaire that their parents had university degree were less likely to endorse medicine for negative emotional states use [5].

Similarly, a Danish study conducted as part of the HBSC project (it is worth remind that the questions about medicine use in the present study were developed based on questions from that project) found that adolescents from families with lower socioeconomic status, which was assessed based on information about their parents' occupation, were more likely to use medicines than their peers from higher-status families [6].

Previous studies do not provide a clear answer to the question of the relationship between families' socioeconomic status and adolescents' medicine use, due to differences in methodology, including different measures of socioeconomic status and medication use. Research evidence suggests, however, that social inequalities in health may not become apparent until adulthood or develop throughout life, hence the inconclusive results of studies conducted among adolescents [6].

Limitations Of The Study

The data presented in this article come from the first nationwide project on the prevalence and determinants of risky behaviour among students from randomly selected SEC institutions which congregate youth that has difficulties in getting education in regular schools. However, the limitations of this project should also be mentioned. The data obtained in the cross-sectional study do not provide a basis for concluding that the relationships found are of a cause-and-effect nature. The use of a questionnaire in which the respondent describes his/her own behaviour and his/her perception of himself/herself and their social environment is, in turn, prone to measurement error due to the imperfections of that research method. Some of the survey questions were related to "sensitive" issues, like substance abuse or mental health problems. Thus, it was to be expected that some students were concerned about the possibility of revealing their answers to SEC staff. To limit this risk, students were assured

that their participation was voluntary, and the survey was conducted with procedures in place to guarantee respondents' anonymity and the confidentiality of the obtained information.

Finally, the summary of data on medicine use among SEC youth with data from the Mokotów study should also be treated with some caution due to differences in sample selection (nationwide vs local), the different age of respondents (12-15 vs 15) and the two-year difference between the measurements (2018 vs 2016).

Conclusions

The study presented here allowed us to conclude that factors associated with medicine by SEC youth are mental health problems, suicide attempts, deteriorated somatic health, as well as the psychoactive substance use, including NPS. Self-control turned out to be protective factor. This indicates that improving knowledge on safe medication use and personal skills of SEC youth, which allow for proper care of somatic and mental health, should be the part of activities in the field of health promotion and prevention. Given that positive relationships with peers were protective factor against medicine use preventive measures at SEC should also be focused on strengthening social relationships.

Very disturbing is the result indicating an association between medicine use and suicide attempts. This proves the need for therapeutic measures aimed at addressing suicide behaviours and other mental health problems among adolescents attending SEC facilities.

Medicine use may also be fostered by adult behaviour – parents and caregivers are the most frequently mentioned in the previous studies as persons who provide medicines to children and adolescents. Therefore, it would be useful to educate parents and SEC staff regarding the administration of various pharmaceuticals and the risks associated with medicine use by children and adolescents without medical supervision.

As already mentioned, the study presented here is part of a project focused on the risk behaviour among SEC youth, the medicine use was measured using single questions about the frequency of taking medications for negative emotional states. Thus, we do not have information on what specific pharmaceuticals our respondents take, whether these are medications they reach for on their own, whether they receive them from adult caregivers or on a doctor's recommendation. The issue of medication use by adolescents residing in SEC facilities therefore requires further research.

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Ethical approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Bioethics Committee of the Institute of Psychiatry and Neurology in Warsaw (Poland), Resolution No. 34/2017 of 26 October 2017.

Conflicts of interest

The authors have no relevant financial or non-financial interests to disclose.

Authors' contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Agnieszka Pisarska and Krzysztof Ostaszewski. The first draft of the manuscript was written by Agnieszka Pisarska, all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript

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