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# Gender identity and symptoms of anxiety and depression and their relationship with sleep disorders among Polish adolescents during the Covid-19 pandemic and the outbreak of war in the Ukraine

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## Abstract

**Introduction** For most people, gender identity is consistent with biological sex and such people are called cisgender. People in whom such a relationship does not occur or occurs to a lesser extent are referred to as gender non-conforming—and these include transgender, non-binary, agender and gender-fluid people. These individuals are usually affected by minority stress, which, combined with the circumstances of the pandemic and Russian aggression against Ukraine, may have led to mental disorders and sleep disorders in this population. The aim of the study was to analyze the symptoms of anxiety, depression and insomnia in a group of Polish youth during the Covid-19 pandemic and the outbreak of the war in Ukraine, taking into consideration gender differences, including non-binary gender.

**Methods** The study involved 1621 secondary school students aged 14 to 19, the average age was  $16.73 \pm 1.35$ , including 857 girls, 690 boys and 74 people who defined their gender as non-binary.

A set of questionnaires for the Diagnosis of Depression in Children (CDI 2), the State-Trait Anxiety Inventory (STAI), the X-1 subscale, The Athens Insomnia Scale (AIS) and an original questionnaire of sociodemographic data were used in research.

**Results** Analyzing the results obtained in the study group, the respondents scored an average of  $17.99 \pm 9.55$  points in the assessment of depressive symptoms. After division into groups taking into account gender, the corresponding score was  $19.69 \pm 9.40$  points for girls,  $15.03 \pm 8.68$  for boys and  $25.86 \pm 9.91$  for non-binary people. The difference was statistically significant ( $p=0.000$ ) in all three study groups. In the anxiety symptoms assessment, the respondents scored an average of  $46.92 \pm 11.67$  points. After division into gender groups, the corresponding score was  $49.21 \pm 11.12$  points for girls,  $43.39 \pm 11.47$  for boys and  $53.39 \pm 10.41$  for non-binary people. The difference was statistically significant ( $p=0.000$ ) in all three study groups. Analyzing the results obtained in The Athens Insomnia Scale (AIS), the average score was  $8.31 \pm 4.58$  points, which allows to evaluate sleep onset as a norm. After dividing into groups, the results were  $8.95 \pm 4.55$  points, respectively for girls,  $7.19 \pm 4.21$  points for boys and  $11.35 \pm 5.43$

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for non-binary people, the difference was significant in terms of comparisons between all statistically tested groups. The analysis of the relationships between the studied variables was presented for each gender separately. Statistically significant positive correlations were found between the results obtained on the scale assessing depressive symptoms (CDI-2) and anxiety symptoms (STAI-X1) and the results obtained on the AIS scale.

**Conclusions** Among the studied group of teenagers, the highest intensity of depressive symptoms is demonstrated by non-binary people, followed by females, and finally by males. Similar results were obtained in the assessment of anxiety symptoms. The non-binary group achieved results indicating sleep disorders, while the cisgender group's results of sleep onset were borderline normal. What's more, the greater the severity of depressive and anxiety disorders, the greater the sleep disorders in all study groups, regardless of gender.

**Keywords** Gender incongruence, Youth, Covid-19, War in Ukraine, Minority stress, Sexuality

## Introduction

Gender identity means a personal sense of own socio-cultural gender, which is most often formed in early childhood, approximately until the age of 3, and finally ends between the ages of 4–6. The process of gender identity formation is still not fully understood, there are many factors that may influence its development [1, 2]. Identity development is not a phenomenon that ends when a person identifies himself as a man or a woman. The development of gender continues throughout an individual's life. Generally speaking, the concept of gender itself is evolving and is now perceived as a spectrum of it, rather than its binary status [3]. For most people, gender identity aligns with biological sex and such people are referred to as cisgender. People in whom such compatibility does not occur or occurs to a lesser extent are referred to as gender non-conforming (ICD-11). Within this group, we distinguish, among others, transgender people. This view still assumes the existence of two genders in the general approach to the subject. Apart from the binary approach, in the group of gender non-conforming people there are people who identify as non-binary—stuck on the gender spectrum, "agender" people who deny the existence of gender and people who feel gender-fluid [1]. When a person's cultural gender characterizes one gender and the body defines the other/the other/both, it is high probability that the individual will struggle with gender dysphoria, i.e. a sense of suffering and discomfort resulting from the discrepancy between the sex assigned at birth and gender identity. These people often struggle with low self-esteem as well as feelings of social isolation much more than cisgender people. They are also at risk of developing depressive and anxiety symptoms. They may also often withdraw from social contacts and display a spectrum of risky behaviors [4]. Additionally, such people often struggle with minority stress, which is associated with social ostracism, exclusion, discrimination and violent behavior affecting people belonging to socially stigmatized groups. The definition of minority stress was presented by Riggs and Treharne and defines it as a phenomenon affecting all

minorities whose functioning differs from the established patterns of behavior typical of a community. The conflict that occurs in this situation leads to the inability to fulfill social roles, a feeling of constant tension and subsequent mental decompensation [5]. A special group of people exposed to gender-related stress factors are adolescents [6]. Adolescence itself is a difficult time, a person begins to separate from parents, create his or her own identity, and wonder about his or her character, temperament, and personality. At this point, the awareness that one is more inclined to a different gender identity, as well as the intense changes in appearance caused by hormones, could cause fear. When there is also a lack of understanding of the child's problems in the family and among peers, serious mental disorders may occur, including suicidal thoughts and a significant risk of their implementation [7]. External stressors related to the events of recent years, such as the Covid 19 pandemic and the outbreak of the war in Ukraine, may have become additionally particularly burdensome for people from minority groups.

The aim of the study was to assess the symptoms of anxiety, depression and sleep disorders in a group of Polish secondary school students during the Covid-19 pandemic and the outbreak of the war in Ukraine, taking into account the division into cisgender people—girls, boys and people defining themselves as non-binary.

## Methods

The study was conducted between March 2022 and June 2022 among 1,621 students of Polish schools aged 14 to 19 years. The average age of the respondents was  $16.73 \pm 1.35$  years, including 857 girls, 690 boys and 74 people who defined their gender as non-binary. The survey was conducted online using Google forms. The form was sent to 145 schools.

All respondents agreed to participate in the project, and the parents of those respondents who were minors also agreed to participate. Before data collection began, schools were sent a written invitation to participate in the

research. The study was conducted in schools throughout Poland that agreed to participate in the project. The socio-demographic characteristics of the study group were presented in Table 1.

The following research questionnaires were used in the study:

1. The Questionnaire for the Diagnosis of Depression in Children (CDI 2). The sheets allow for the identification of children and adolescents suffering from depressive symptoms, and may also help in the diagnosis of clinical depression. As part of the Polish adaptation, standards were developed for people aged 7 to 18 years. The set of questionnaires includes a version intended for children and adolescents (self-assessment sheet), parents and teachers. The full version of the self-assessment sheet includes 28 items regarding the manifestations of depressive symptoms specific to a given developmental stage. Within the raw scores, the following subscales can be distinguished: emotional problems; negative mood; low

self-esteem; problems in functioning; lack of effectiveness and interpersonal problems. Then, the raw results are converted into a ten scale, specifying the category of depressive disorders depending on the age and gender of the respondents. The higher the score—both point and tens, the greater the severity of depressive symptoms. Taking into account the ten scale, low assessment of depressive symptoms was defined as the range of 21–39 points; the average one is around 40–59 points; this increased one 60–64 points; the high one is 65–69 points and the very high one is 70–79 points [8, 9].

2. State-Trait Anxiety Inventory (STAI). The inventory contains 40 statements, half of which assess anxiety as a relatively stable personality trait (X2), and the remaining anxiety as a situationally conditioned state (X1). The obtained results can be normalized using the sten scale. The study used only the subscale assessing the level of situational anxiety (X1) [10].
3. The Athens Insomnia Scale (AIS), it is a short 8-item self-report tool. Each item is assessed using a point scale ranging from 0–3, where 0 points means the absence of a given symptom, and 3 points its significant intensity. The total score on the scale ranges from 0–24 points. Achieving a range of points from 0–5 means the norm, from 6 to 10 points borderline standards, and above 11 points—problems with sleep. This scale allows for quantitative measurement of insomnia according to the ICD-10 criteria [11].
4. The author’s demographic data questionnaire included questions about gender with the following options: female, male, non-binary gender; age; place of residence; type of school; preferred type of education (stationary or remote) and previous and current psychiatric treatment. In addition, the survey included two separate questions about stress experienced in connection with the COVID-19 pandemic and stress related to the outbreak of the war in Ukraine. Respondents could answer on a scale of 0–10 points; where 0—no sense of stress and 10—the greatest stress imaginable.

**Table 1** Socio-demographic characteristics of the group (n = 1621)

	Men (n = 690)	Women (n = 857)	Non-binary (n = 74)
	f (rf)	f (rf)	f (rf)
<b>Place of residence</b>			
Urban	372 (53.9%)	462 (53.9%)	42 (57.7%)
Rural	318 (46.1%)	395 (46.1%)	32 (42.3%)
<b>Marital status</b>			
Single	526 (76.2%)	590 (68.8%)	38 (51.4%)
In a relationship	164 (23.8%)	267 (31.2%)	36 (48.6%)
<b>Smoking cigarettes/other form of nicotine</b>			
Yes	142 (20.6%)	164 (19.9%)	27 (36.5%)
No	548 (79.4%)	693 (80.1%)	47 (63.5%)
<b>Drinking alcohol</b>			
Yes	285 (41.3%)	316 (36.9%)	38 (51.4%)
No	405 (58.7%)	541 (63.1%)	36 (48.6%)
<b>Chronic diseases</b>			
Yes	100 (14.5%)	159 (18.6%)	27 (36.5%)
No	590 (85.5%)	698 (81.4%)	47 (63.5%)
<b>Psychiatric treatment history before pandemic</b>			
Yes	62 (9%)	108 (12.7%)	24 (32.5%)
No	628 (91%)	749 (87.3%)	50 (67.5%)
<b>Starting psychiatric treatment during the pandemic</b>			
Yes	52 (7.5%)	118 (13.8%)	23 (31.1%)
No	638 (92.5%)	739 (86.2%)	51 (68.9%)
<b>Form of preferential study</b>			
Stationary	378 (54.8%)	497 (58%)	28 (37.8%)
Online	312 (45.2%)	360 (42%)	46 (62.2%)

Standard statistical procedures were used in the analyses. The Kolmogorov–Smirnov test was used to assess the normality of distributions. The Kruskal–Wallis test, the Mann–Whitney U test and Dunn–Bonferroni test post-hoc were used to assess the significance of differences between the study groups. In order to assess the relationships between the data, Spearman’s rank correlation coefficient was used. The significance level of  $\alpha < 0.05$  was assumed as statistically significant. Calculations were performed in Statistica version 13.3.

**Results**

**Description of the study group**

In the boys’ group, the average COVID-19 stress score was 2.56 points; while the average stress level result related to the outbreak of the war in Ukraine was assessed by the respondents as 3.51 points. The surveyed girls obtained similarly: 4.34 points and 5.38 points. Non-binary people surveyed scored 4.02 points and 4.87 points, respectively. Both girls and non-binary people obtained statistically significantly worse results compared to the group of boys ( $p=0.000$ ) (Figs. 1 and 2). Before the pandemic, 9% (62) of surveyed boys, 12.7% (108) of girls and 32.5% (24) of non-binary people were undergoing psychiatric treatment. During the COVID-19 pandemic, 7.5% (52) of surveyed boys, 13.8% (118) girls and 31.1% (23) non-binary people started psychiatric treatment (Table 1).

**CDI-2 depressive symptoms assessment scale**

In the assessment of depressive symptoms, the respondents scored an average of  $17.99 \pm 9.55$  points. After division into gender groups, the corresponding score was  $19.69 \pm 9.40$  points for girls (ten 61, occurrence of depressive symptoms at an increased level),  $15.03 \pm 8.68$  for boys (ten 57, occurrence of depressive symptoms at an average level) and  $25.86 \pm 9.91$  points for non-binary people (ten 66, high level of depressive symptoms). The difference

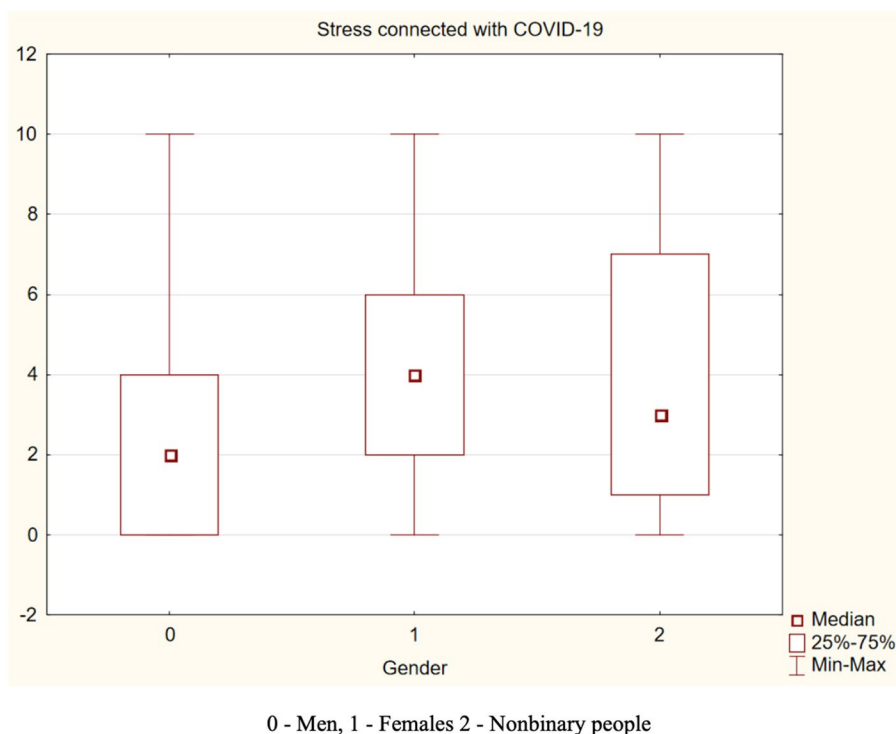
was statistically significant ( $p=0.000$ ) in all three study groups (Fig. 3).

**STAI-1 anxiety symptom inventory**

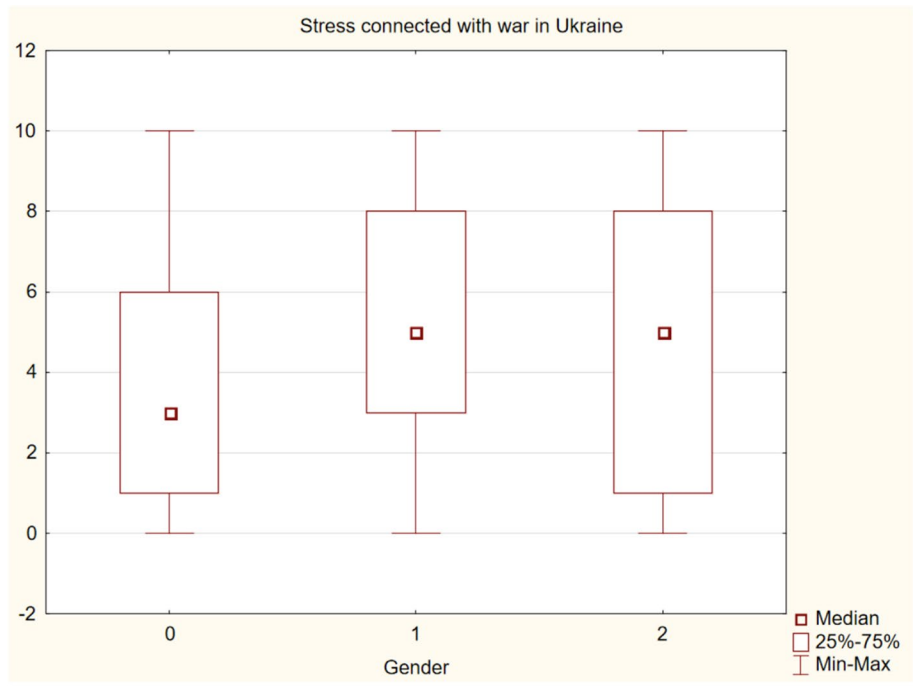
In the anxiety assessment, the respondents scored an average of  $46.92 \pm 11.67$  points. After division into groups taking into account gender, the corresponding score was  $49.21 \pm 11.12$  points for girls (sten 8—high intensity of anxiety symptoms),  $43.39 \pm 11.47$  points for boys (sten 7—moderate anxiety symptoms) and  $53.39 \pm 10.41$  points for non-binary people (no Sten scale, based on the norms one can assume, sten—9—high intensity of anxiety symptoms). The difference was statistically significant ( $p=0.000$ ) in all three study groups (Fig. 4).

**The Athens Insomnia Scale (AIS)**

Analyzing the results obtained in the study group, the average AIS score was  $8.31 \pm 4.58$  points, which allows for the assessment of sleep disturbances bordering on the norm. After dividing into groups of girls and boys and non-binary people, the results were  $8.95 \pm 4.55$  points respectively for girls and  $7.19 \pm 4.21$  points for boys and  $11.35 \pm 5.43$  for non-binary people, the difference was significant in terms of comparisons between all statistically tested groups (Fig. 5).

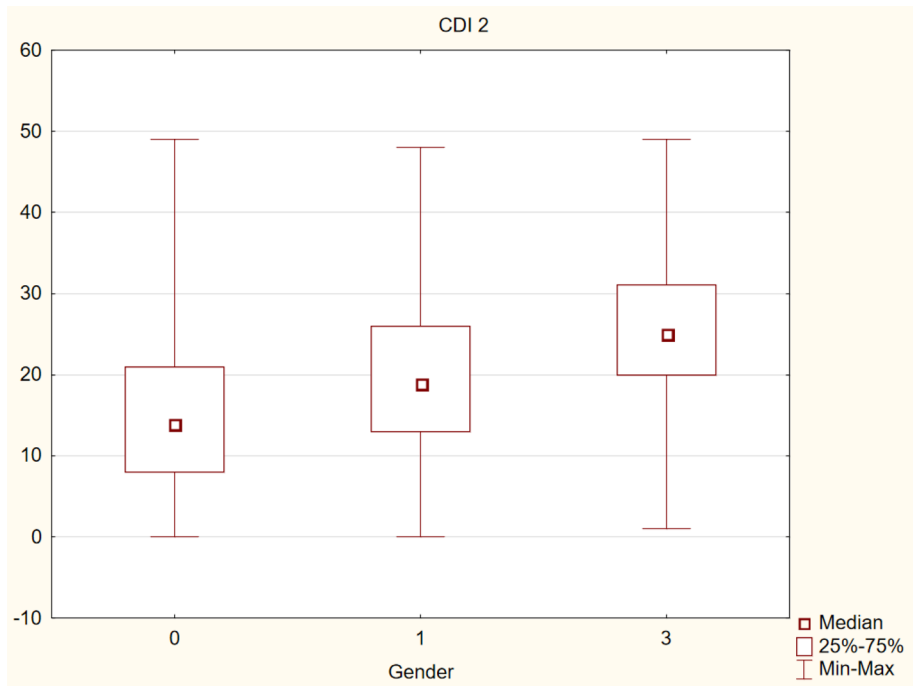


**Fig. 1** Stress connected with COVID-19



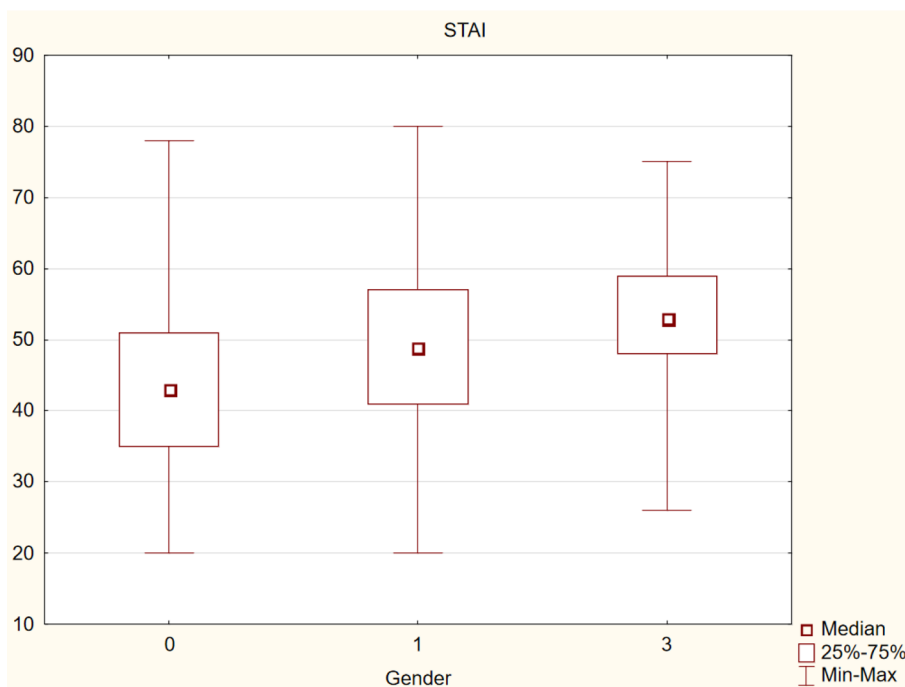
0 - Men, 1 - Females 2 - Nonbinary people

Fig. 2 Stress connected with war in Ukraine



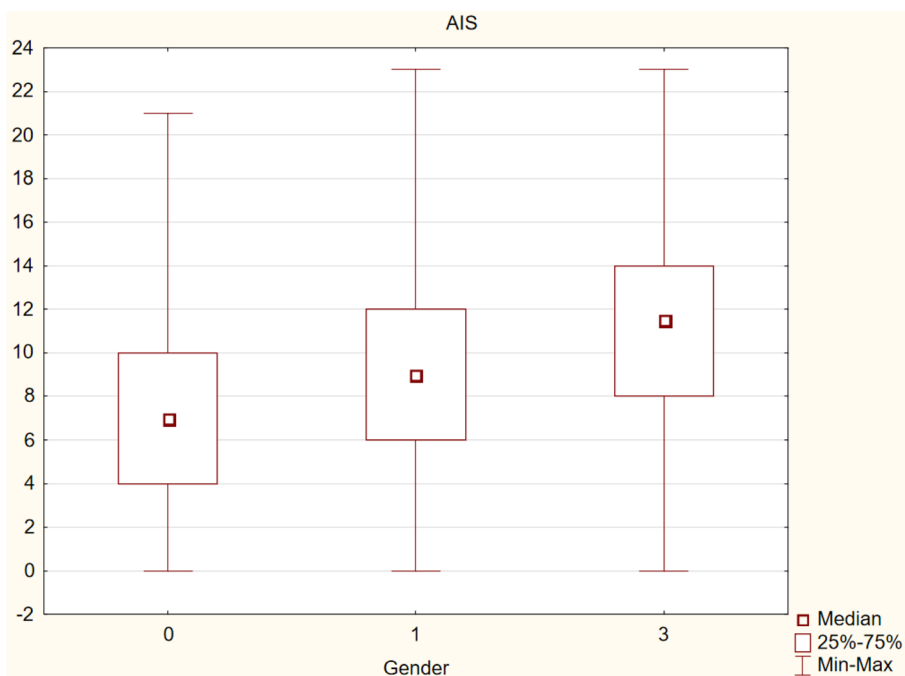
0- Men 1- Females 3 - Nonbinary people

Fig. 3 CDI-2 results



0 - Men 1 - Females 3 - Nonbinary people

Fig. 4 STAI-X1 results



0 - Men 1 - Females 3 - Nonbinary people

Fig. 5 AIS results

**Table 2** Correlations between examined parameters—without gender differences

<i>n</i> = 1621	CDI-2	STAI-X1	AIS
CDI-2	1.000	<b>0.764*</b>	<b>0.232*</b>
STAI-X1		1.000	<b>0.637*</b>
AIS			1.000

CDI-2 Children’s Depression Inventory 2, STAI-X1 The State-Trait Anxiety Inventory, AIS Athens Insomnia Scale

\* statistically significant with  $p < 0.05$

**Table 3** Correlations between examined parameters—Boys

<i>n</i> = 690	CDI-2	STAI-X1	AIS
CDI-2	1.000	<b>0.737*</b>	<b>0.693*</b>
STAI-X1		1.000	<b>0.593*</b>
AIS			1.000

CDI-2 Children’s Depression Inventory 2, STAI-X1 The State-Trait Anxiety Inventory, AIS Athens Insomnia Scale

\* statistically significant with  $p < 0.05$

**Table 4** Correlations between examined parameters—Girls

<i>n</i> = 857	CDI-2	STAI-X1	AIS
CDI-2	1.000	<b>0.752*</b>	<b>0.707*</b>
STAI-X1		1.000	<b>0.588*</b>
AIS			1.000

CDI-2 Children’s Depression Inventory 2, STAI-X1 The State-Trait Anxiety Inventory, AIS Athens Insomnia Scale

\* statistically significant with  $p < 0.05$

**Table 5** Correlations between examined parameters—Nonbinary

<i>n</i> = 74	CDI-2	STAI-X1	AIS
CDI-2	1.000	<b>0.690*</b>	<b>0.703*</b>
STAI-X1		1.000	<b>0.542*</b>
AIS			1.000

CDI-2 Children’s Depression Inventory 2, STAI-X1 The State-Trait Anxiety Inventory, AIS Athens Insomnia Scale

\* statistically significant with  $p < 0.05$

**Analysis of the relationships between STAI-1, CDI-2 and AIS**

The analysis of the relationships between the studied variables was presented separately for all groups. Statistically significant positive correlations were found between the results obtained on the scale assessing depressive symptoms (CDI-2) and anxiety symptoms (STAI-X1) with the results obtained on the AIS scale in all study groups (Tables 2, 3, 4 and 5).

**Discussion**

The concept of gender has evolved over the years, and recently the changes in the approach to gender have been particularly intense. Human sexuality is no longer exclusively binary, which raises a lot of social controversy in many countries, including Poland. The problem seems to be particularly important when it concerns minors [12]. Usually, the gender identity becomes one of the more important aspects of the developing personality. During adolescence, some people experience a clear discrepancy between the gender they identify with and the gender assigned to them at birth. This situation may involve experiencing very strong stress that impairs everyday functioning. In addition to the discomfort resulting from the lack of acceptance of their own biological gender, these people are also often subject to various forms of social exclusion [13]. Strong stress related to the above-mentioned factors and recent events that have seriously shaken global security may contribute to the deterioration of the mental condition of such people, especially if they are in a difficult period of adolescence. The topic of teenagers’ gender identity is still being explored by scientists. In our study, it turned out that non-binary people present higher level of depressive symptoms than the cisgender group examined. In the cisgender group, girls received more points in this area than boys. Similar results were presented in many other studies, including Black and Rofey [14]. Another study assessing the severity of depressive symptoms in non-cisgender people was conducted by Tordoff et al. Researchers additionally emphasized in their work the fact that in people who underwent early hormonal interventions had lower level of depressive symptoms than group without intervention [15]. However, not every non-binary person feels the need for such treatment, some people accept their "gender otherness", but the intensity of depressive symptoms in this group of people is high [16]. Green et al. reached similar conclusions. [17]. Olson et al. adds, however, transgender/non-binary people who function in society in accordance with their gender perception have lower levels of depressive symptoms. Living in accordance with one’s beliefs is important for a sense of mental comfort, it also requires a lot of courage, but at the same time it may expose these people to open criticism from environment [18]. In a Finnish study, as many as 64% of respondents showed signs of depression [19], similar results were obtained by Azeem (63.5%) [20]. However, in the American study, Spack et al. this result was around 34% [21]. Different results were obtained by Newcomb et al., who reported the severity of depressive symptoms as "mild" [22]. This study was published in 2019, before the outbreak of the COVID-19 pandemic. Our analysis was conducted in the post-pandemic period (COVID-19)

and—perhaps more importantly—in the outbreak of the war in Ukraine. These factors could have been additionally important in the context of assessing depressive or anxiety disorders in this study group, and not only minority stress. Typically, people showing symptoms of anxiety and depression are more exposed to strong external stressors and are at risk of intensifying existing symptoms and developing additional mental disorders [23]. In the assessment of anxiety symptoms, girls scored higher than boys. Similar results in the cisgender group were obtained in the previously mentioned study by Black et al. [14]. In our study, on the anxiety assessment scale, the group of non-binary probands presented more symptoms of anxiety than the cisgender group. Living under the pressure of the risk of social rejection or even aggressive behavior, or building a false self-image in order to maintain a desired social position, may lead to difficulties in establishing interpersonal relationships and generate anxiety. According to research, almost 80% of transsexual/non-binary people have experienced at least one aggressive behavior [19]. Difficulties in social relationships accompany almost every non-binary person [24]. Hoy-Ellis in their research showed that in the group of non-binary people the highest level of anxiety assessment was achieved in the field of social anxiety. However, the study itself was conducted on adults [25]. One of the large studies that—similarly to our results—showed a higher severity of depressive and anxiety disorders in the group of non-binary and cis-gender females was the study by Wathlet et al. [26]. In our analysis, we also assessed sleep disorders and their relationship with depressive and anxiety disorders. Sleep plays a very important role in the functioning of the body, it ensures proper emotional reactivity to surrounding stimuli, takes part in the consolidation of emotions, and also determines the proper development of cognitive functions in adolescence [27, 28]. During the post-pandemic period, problems with insomnia have become a very common healthcare challenge. Many patients suffered from sleep disorders caused by isolation, fear for their life and the life of their loved ones, as well as the consequences of being infected with the SARS-COV-2 virus [29]. Sleep problems also affected the adolescent population [30]. Teenagers are in one of the most sensitive stages of human life—during adolescence, fluctuations in hormone levels generate tension, immaturity of defense mechanisms and strong external stressors may contribute to the occurrence of sleep disorders [31, 32]. In our study, the group of non-binary people achieved results indicating sleep disorders, while the results of the cisgender group turned out to be at borderline normal. The study also showed a positive correlation between the occurrence of depressive and anxiety disorders and the presence of

sleep disorders in all study groups. According to a literature review, up to half of people affected by anxiety disorders experience sleep problems—both problems with falling asleep, maintaining sleep, and generally defined insomnia [33]. This relationship seems to be bidirectional—sleep disorders may also lead to the occurrence of anxiety and depressive disorders [34, 35]. Sleep disorders in the group of non-binary people will most likely be related to minority stress, but a pandemic or war-related factor in Ukraine cannot be ruled out as an intensifier of the disorders. In the study by Belloir et al. a direct positive relationship was demonstrated between the degree of discrimination (assessed on the Everyday Discrimination Scale) and sleep disorders in the group of non-binary people. Interestingly, this study showed less sleep disorders in this group of people using cannabinoids [36]. The problem of the impact of discrimination on sleep quality was also addressed by Eom in a Korean study, obtaining similar results [37]. Hershner et al. referred to the theory of the impact of minority stress on sleep quality, citing the reasons as; experienced violence, misgendering, problems at school or uncertainty about their professional future [38]. Most studies on insomnia problems were conducted during the pandemic period, hence the intensification of minority stress due to factors such as isolation or other pandemic restrictions and fear related to the outbreak of war in Ukraine can be suspected. In our work, respondents will determine their stress related to the pandemic and the outbreak of war in Ukraine. Girls and non-binary people showed greater stress related to both world crises compared to the group of boys. A similar assessment of the relationship between the occurrence of anxiety disorders and the COVID-19 pandemic was made in other works, i.e. the analysis of Qi et al. and Thepar et al. [39, 40]. The importance of the aspect of war in the context of growing stress and anxiety was very carefully emphasized in the study by Burgin et al. [41] and Slone and Blackmore [42, 43]. An important aspect is the fact that the co-occurrence of depressive, anxiety and sleep disorders may increase the risk of suicide in most people, regardless of gender. The group of teenagers is particularly exposed to the risk of suicidal behavior due to lower reflectivity, difficulty in inhibiting impulsive behavior and poor ability to predict the consequences of their decisions. This group, especially people who have problems with accepting their own gender identity, should be provided with special care by psychologists, educators and psychiatrists to monitor symptoms of anxiety, depression and sleep disorders.

#### **Study limitations**

The presented study, like any study in which results were collected using the Internet, has certain



limitations. First of all, collecting data via an online form makes it impossible to control how the questionnaires are completed. The sociodemographic data questionnaire containing questions about variables that may be related to sleep disorders was based on the subjective assessment of the respondents. Another limitation of the work is the collection of research material only in the field of secondary schools, without creating comparison groups from other teaching units in the same age group.

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#### Authors' contributions

PG, KBB, PD, DT: Conceptualization, methodology, writing original draft preparation, project administration, supervision. KBB, PG: writing review and editing. KBB, PG, PD: formal analysis, writing review and editing, supervision. All authors read and approved the final manuscript.

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#### Data availability

No datasets were generated or analysed during the current study.

#### Declarations

##### Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki. The Bioethics Committee of the Medical University of Silesia approved the study (PCN/CBN/0052/KB1/48/22). The patients or their guardians provided their written informed consent to participate in this study.

##### Consent for publication

Not applicable.

##### Competing interests

The authors declare no competing interests.

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