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Coping methods among Polish students during Covid-19 pandemic

Alicja Kawalec[1], Krzysztof Maria Wilczyński[2,3], Adrianna Biecka[1], Dominika Krupnik[1], Wojciech Grabowski[1], Małgorzata Janas-Kozik[2,3]

[1] Student Research Group at the Department of Child and Adolescent Psychiatry and Psychotherapy, Medical University of Silesia in Katowice

[2] Department of Child and Adolescent Psychiatry and Psychotherapy, Medical University of Silesia in Katowice

[3] Pediatric Centre in Sosnowiec

Summary

Aim. The COVID-19 pandemic changed daily routines and forced people to develop various coping methods. University students were a social group that suffered due to a drastic change in their daily routine. The analysis of adaptation to chronic stress may help in developing more individualized care for people affected by stress.

Methods. The examination of coping methods and aggression level was conducted using Brief COPE and STAXI-2 questionnaires on a group of 283 participants, extracted from the initial group of 906 subjects participating in the initial phase of the study. The study was conducted between the second and the third wave of pandemic in Poland.

Results. The positive coping methods were dominant among the examined group. The most used were active coping, use of informational support and planning. The negative coping methods were inextricably linked to a higher aggression level, and were more prevalent in the female students.

Conclusions. The first symptoms of maladaptive behaviors may be hidden in presumably usual activities and attitudes. It is important to be aware of them in order to provide support for students and other social groups affected by chronic stress.

Key words: COVID-19, coping methods, aggression

Introduction

The beginning of COVID-19 pandemic in China went unnoticed globally and was considered rather as a phenomenon than a real threat. Everything changed in March 2020, when western countries, such as Italy [1] and the USA [2], had to face an amount of new cases exceeding the resources of local health care.

The global pandemic brought serious changes in daily routine. Social distancing, isolation and financial problems turned out to be a constant element of uncertain future and a source of significant stress which, instead of being reduced with passing time, lasted for many months. Psychological and social burden as well as unpredictability and novelty of the COVID-19 epidemic had wide and dramatic influence on mental health of the world population. As the economic situation suddenly worsened for many, suicide rates surged [3], especially among people with unstable income [4] or suddenly unemployed [5]. Mental strain in work environment translated into the home environment – a rise in cases of domestic violence was noticed [6, 7]. This phenomenon was exacerbated by joint isolation of attackers and their victims, who were deprived of possibility of leaving home and finding help at work or school.

The sudden change of the usual routine led to significant rise in rates of depression, anxiety, sleep problems [8], and general mental distress [9]. Loneliness associated with the necessity of isolation was also troubling [10].

The only social group which had all of everyday duties executed online were students. Unfortunately, it was not indifferent for their health and mental wellbeing. Melegari et al. [11] and Liu et al. [12] observed a relevant rise in aggressive and oppositional behaviors in children and adolescents. Significant worsening of behavior was noticeable in over 50% of children. It was presumably caused by a sudden change of daily routines due to lockdown and isolation. Similar outcomes were noticed among university students. Observed stress not only became a source of fatigue and burnout [13] but also led to worse academic performance, which significantly worsened academic satisfaction [14]. Moreover, mental strain associated with participation in online classes, which had gained its own name as *technostress*, not only translated to higher burnout and lesser commitment but also higher cortisol levels [15]. Prolonged elevation of cortisol level may lead to dysregulation of hypothalamic–pituitary–adrenal axis (HPA axis) and damage of the central nervous system, causing significant deterioration of mental health [16]. In this case, the relevant difference between sexes should be raised, as female students are more prone to suffer from mental disorders than male students [17, 18].

Chronic stress caused by the above reasons required the development of new coping methods. Researchers' view of how individuals cope with stress have evolved based on new studies. The most abundant model of psychological stress response was the one proposed by Lazarus and Folkman [19]. The authors defined the process of coping as constantly changing cognitive and behavioral efforts which are undertaken by an individual in order to deal with demands that are especially challenging and are

probably exceeding individual capacities and resources. They specified three main elements in this process: (1) the source of stress, (2) cognitive assessment with categorizing an event as irrelevant, threatening or positive and available coping resources checking, and (3) coping mechanism. For the latter, the strategies have been commonly dichotomized into contradictory categories:

(1) approach – adaptive strategies of coping, which include direct coping, emotional regulation and self-control;
(2) avoidant – maladaptive strategies of coping, which include rumination, venting, rigid approach to the problem, and active avoidance [20].

The literature lacks studies analyzing the coping manners and strategies in society during this extraordinary time. The following analysis was conducted to define dominant stress coping methods, altogether with differential factors among Polish students. This study is trying to slightly fill this gap, as the pandemic is still present, impacting every aspect of life.

The goal of the study

The aim of the study was to collect data on stress and aggression among students during the COVID-19 pandemic. Mutual impact of those factors was analyzed and data about coping mechanisms were gathered.

Material and methods

The study was conducted among Polish students in four different points of time during the COVID-19 pandemic. Differential factors were analyzed, such as sex, studied major, level of aggression, subjective feeling of danger caused by the pandemic and attitude to vaccination against COVID-19.

The test group was recruited from university students due to their specific situation caused by global pandemic – online learning and limitation in possibilities of additional earnings hit this age group in particular. Moreover, quality of education also raised some concerns, especially in majors that demand various practical skills, such as medical or technical ones. Early adulthood is usually associated with making difficult decisions and organizing future life. This is a stressful period of time in conventional circumstances, and global pandemic only aggravate it.

The results were obtained by distributing questionnaires among Polish students using ICT methods. In the first stage, the questionnaire was distributed massively among students belonging to thematic groups in social media. The participation was voluntary. The respondents were asked for an e-mail address, which was later used to send out next rounds of the study. They were sent only to participants who had taken part in the previous ones. Each time there was 7-day period to gather results. Consequent stages of the study were conducted in specific moments of pandemic, starting

from the peak of the wave of infections, next through the decrease in cases up to the stabilization between the subsequent waves of the pandemic:

- The first round of the study was conducted during the peak of the second wave of the pandemic, in November 2020, with monthly median 20,196 of COVID cases per day and monthly median 384 of COVID deaths per day – it was the peak of the second wave of the pandemic in Poland, with the highest number of new cases up to date.
- The second round of the study was conducted during the lowering phase of the second wave of the pandemic, in December 2020, with monthly median 9,824 of COVID cases per day and monthly median 367 of COVID deaths per day – it was the time of weekly decrease in new cases.
- The third round of the study was conducted after the second wave of the pandemic, in February 2021, with monthly median 6,914 of COVID cases per day and monthly median 235 of COVID deaths per day – it was a stabilization period with various restrictions still present.

Using the above-mentioned methods, following groups were obtained:

- the first round – 19.11.2020–26.11.2020, $n = 906$,
- the second round – 26.12.2020–02.01.2021, $n = 415$,
- the third round – 12.02.2021–19.02.2021, $n = 283$.

Finally, the group of participants taking part in three rounds of the study, counting 283 students, was extracted. It allowed authors to examine the partakers' aggression throughout the peak and stabilization of the second wave of the COVID-19 pandemic in Poland, taking place from November 2020 to February 2021. The examination of coping methods was conducted during the third round of the study. This decision was made due to the fact that coping methods are relatively constant and can be considered as a trait whose changes are less dynamic. At the time of the research, the respondents have already been subjected to restrictions for over 4 months and also overwhelmed by a large amount of information provided by the media, which allowed to conduct the analysis of chronic stress. It was a proper decision, as current studies from 2022 show that mental strain and negative coping intensify with time during the pandemic [21].

Characteristic of the examined group

The test group consisted of 283 respondents, of which 81.6% ($n = 231$) were women. The mean age of examined population was 22.16 years. The majority of respondents lived in big cities – most of them in cities with over 500,000 inhabitants (27.92%; $n = 79$) and cities with 200,000–500,000 inhabitants. 14.84% ($n = 42$) of respondents lived in rural areas. 57.50% ($n = 163$) lived with their families and 35.70% ($n = 101$) lived alone, remaining participants lived in dormitory. 18.37% of participants suffered from chronic illnesses. Almost 90% ($n = 251$) of participants

had positive attitude towards vaccinations against COVID-19, and 40% (n = 86) had already received at least one dose of vaccine.

Table 1. **Characteristic of the examined group**

N of participants	Age (95% CI±)	% of women	N (%) of medical students	N (%) of art students	N (%) of science students
283	22.16 (2.30)	81.6	171 (60)	53 (19)	59 (21)

Questionnaires

The study was based on two validated questionnaires. The first part of the STAXI-2 questionnaire was used to measure the level of aggression [22]. STAXI-2 is a 57-item questionnaire divided into three main parts. Two first parts are used to measure state and trait anger, and the third part measures anger expression and control in relation to aggressive behavior.

The use of the first part of the questionnaire (15 phrases) made it possible to examine the intensity of anger at a given moment and the willingness to express it verbally or physically in response to changing conditions. Respondents answered to each of the statements on a scale from 1 ("definitely not") to 4 ("definitely yes"). The total score possible to obtain was the sum of points scored for each statement (from 15 to 60).

A Polish version of the questionnaire was adapted by W. Bąk [23]. It was validated in four studies, with a number of participants counting 625, all aged between 17 and 30, 90% of them being students. Cronbach's α internal consistency coefficient for the first part was 0.95 [23].

The second questionnaire used in the study was the Brief-COPE – a tool for assessing a broad range of coping responses to stressful life events. Two main kinds of coping include avoidant and approach manners. The questionnaire consists of 28 sentences with answers from 1 – " I haven't been doing this at all" to 4 – "I've been doing this a lot". Possible results range from 28 to 112 points for the whole form and 2 to 8 points for particular categories. Brief–COPE also allows to distinguish between more specific coping styles: self-distraction, active coping, denial, substance use, emotional support, use of information, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, or self-blame [24]. The assignment to particular manners of coping is shown in Table 4. Humor and Religion are regarded as distractors. The possible amount of points to obtain in particular manners ranges from 12 to 48 points.

The questionnaire in the Polish version was validated in a group of 200 participants aged between 25 and 60 years (Guttman's lambda = 0.87) [25].

The feeling of danger caused by the pandemic was evaluated subjectively, by choosing an answer ranging from "Definitely not" to "Definitely yes". Respondents could have assessed their mental strain on a four-point scale, which allowed to stratify the group and further analysis based on this differential factor.

Division into groups according to the level of aggression

After obtaining the results of the STAXI-2 questionnaire in the third round of the study, a decision was made to divide the participants into three groups (Table 2), based on their aggression level. In order to create groups, participants' scores in the STAXI-2 questionnaire were sorted from the lowest to the highest, and after that divided into three parts, consisting of similar number of participants. A particular number of obtained points was referred to only one of the groups, which caused slight differences in sample sizes. It allowed to make more reliable comparison between groups, as distribution based on standard deviation would create inconsiderable groups based on the extremes of the scale. Afterwards, the comparison was made, showing the correlation between the aggression group and the level of both positive and negative coping mechanisms used based on the results of the Brief-COPE questionnaire.

Table 2. **Characteristic of groups formed after the division according to the level of aggression**

No.	Group	N of members	STAXI-2 score range	STAXI-2 mean score (95% CI±)
1	Least aggressive	93	15–19	16.62 (1.63)
2	Moderately aggressive	98	20–27	23.26 (2.26)
3	Most aggressive	92	28–60	34.20 (6.61)

Statistical analysis

The statistical analysis was performed with the use of StatSoft Statistica, version 13. The adopted level of statistical significance was $\alpha = 0.05$. Due to the heterogeneity of the study group and non-parallel subgroups,, it was decided to use non-parametric tests. The Mann-Whitney *U* test and the Wilcoxon pair test were used for the comparisons of two variables, the Kruskall-Wallis test and the Friedman test for multiple comparisons, and the Spearman's rho test for correlation analyzes.

Results

The aggression level

The median score of part one of the STAXI-2questionnaire was 24.64±8.27 (N=283), outcomes with division for each of the anger groups are presented in Table 2.. Statistically significant differences between sexes were observed, with scores 25.14 (n=231, 95%CI±8.44) for women and 22.40 (n=52, 95%CI±7.12) for men ($p<0.05$).

Coping methods

In the Brief-COPE questionnaire, the mean score for the positive (Approach) manner of coping was 26.99 (*SD* ± 4.61), and for the negative (Avoidant) one it was 34.67 (*SD* ± 5.23) (Figure 1).

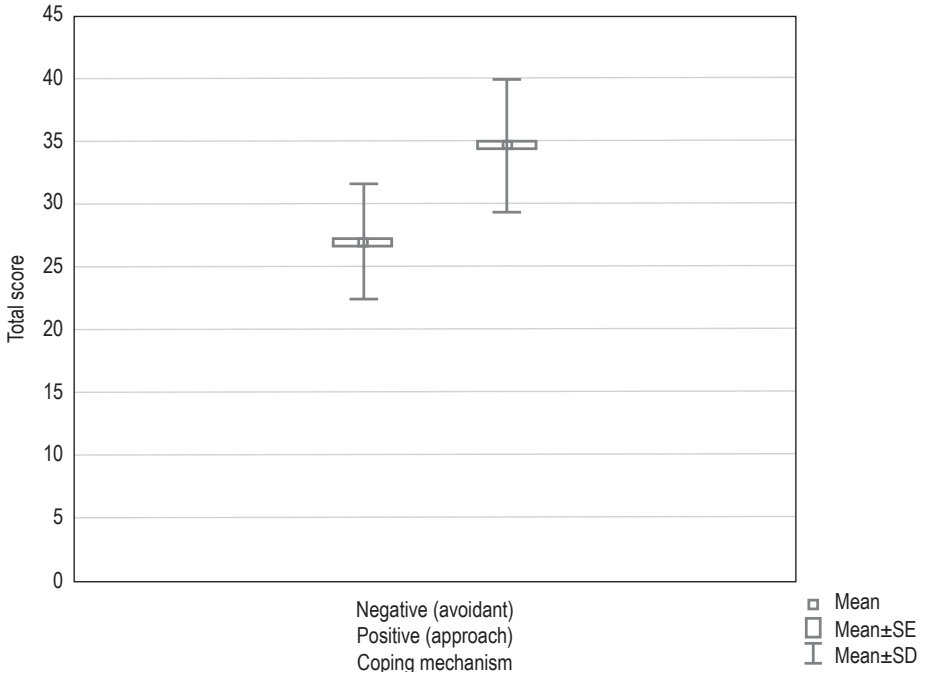

Figure 1. **The comparison of coping methods (p <0.05)**

Positive ways of coping were dominant (p <0.001). There were no significant differences between men and women in the Approach score, however, the Avoidant score was considerably higher in women than in men – 27.25 (n = 231; 95% CI ± 4.72) versus 25.85 (n = 52; 95% CI ± 3.96) (p <0.05).

No differential factors affecting the Approach score were recognized. In the Avoidant score statistically significant were declarative feeling of danger caused by the pandemic (p <0.001), readiness to be vaccinated (p <0.05) and being already vaccinated (p <0.001). The obtained results showed no significant differences between the majors studied by participants. Detailed scores are presented in Table 3.

Table 3. **Scores based on studied major**

Major of studies	Medical studies	Arts studies	Science studies	p-value
N of participants	171	53	59	–
STAXI-2 score (95%CI)	24.55	25.32	24.27	p <0.05
Avoidant score (95%CI)	27.27	26.51	26.61	p >0.05
Approach score (95%CI)	34.68	35.06	34.51	p >0.05

The results for individual elements of the scale of coping with stress (Brief-COPE) are presented in Table 4 and in Figures 2 and 3.

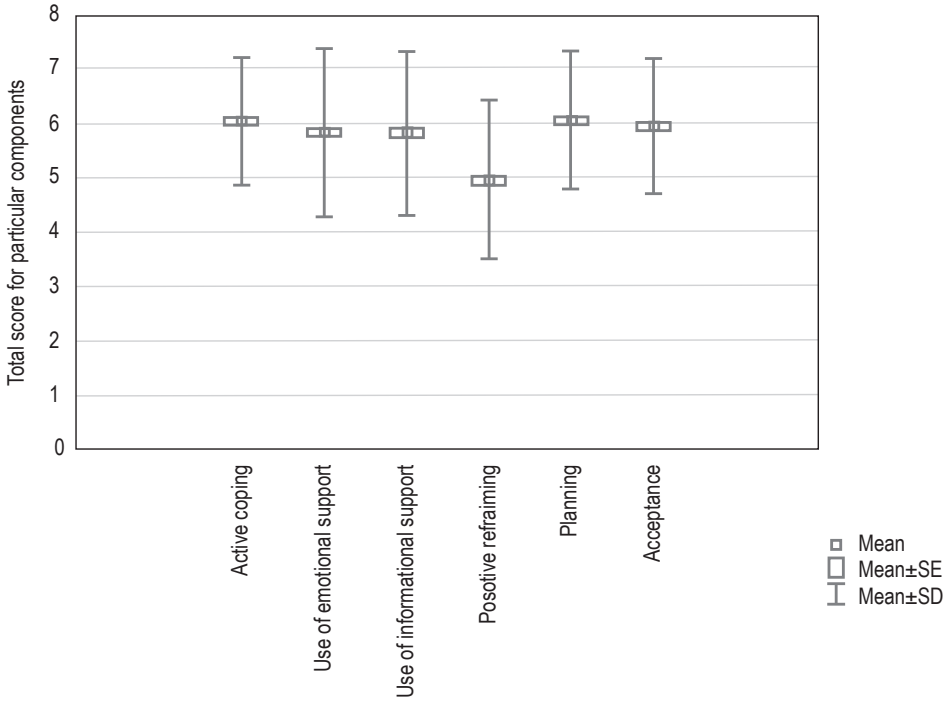

Figure 2. **Comparison of total score for particular components of positive coping methods (p <0.001)**

Table 4. **Approach and Avoidant methods scores divided into categories**

Approach item	Score(95%CI±)	Avoidant manner	Score (95% CI±)
Active coping	6.03 (1.18)	Self-distraction	5.70 (1.26)

table continued on the next page

Emotional support	5.84 (1.54)	Denial	3.45 (1.26)
Use of informational support	5.82 (1.50)	Substance use	2.96 (1.40)
Positive reframing	4.97 (1.46)	Behavioral disengagement	3.79 (1,35)
Planning	6.06 (1.28)	Venting	5.38 (1.19)
Acceptance	5.95 (1.24)	Self-blame	5.71 (1.65)

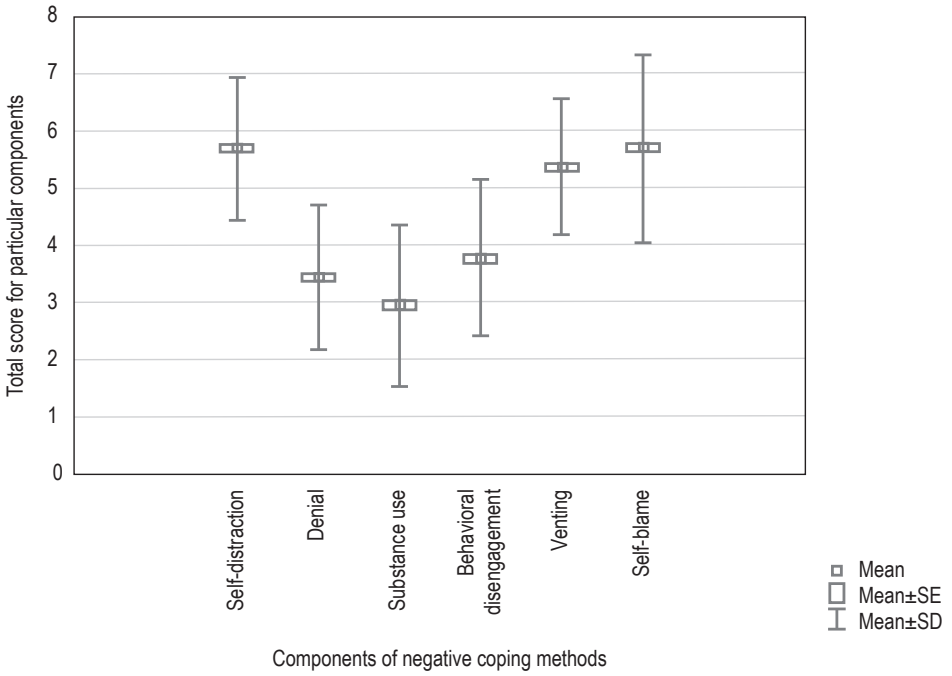

Figure 3. **Comparison of total score for particular components of negative coping methods (p <0.001)**

The analysis of correlation between causal factors

The highest correlation with general Brief-COPE score showed overall Approach score (rho = 0.64; p <0.05), followed by overall Avoidant score (rho = 0.47; p <0.05). Out of the particular items, self-distraction (rho = 0.37; p <0.05) and planning (rho = 0.34; p <0.05) played the biggest role.

The Approach score had the strongest correlation with the total Brief-COPE score, and the next most significant items were active coping (rho = 0.61; p <0.05), use of informational support (rho = 0.50; p <0.05), planning (rho = 0.44; p <0.05), emotional

support (rho = 0.43, p <0.05), and positive reframing (rho = 0.42; p <0.05). The most negatively correlated item was behavioral disengagement (rho = – 0.26; p <0.05).

In the Avoidant score, apart from the general score, the most significant factors were self-distraction (rho = 0.41; p <0.05). The STAXI-2 score (rho=0.31; p<0.05) was also significantly low correlated with pathological methods (rho = 0.31; p <0.05). The most negatively correlated items were active coping (rho = – 0.22; p <0.05) and emotional support (rho = – 0.13; p <0.05).

Both Avoidant and Approach scores correlated negatively and weakly with each other (rho = – 0.24; p <0.05). Among the particular items, the highest positive correlation was observed between emotional support and use of informational support (rho = 0.72; p <0.05), and the highest negative correlation was observed between planning and behavioral disengagement (rho = – 0.43; p <0.05). The methods also included two distractors: religion and a sense of humor. Religion (rho = 0.22; p <0.05) and humor (rho = 0.22; p < 0.05) correlated the highest with active coping.

Analysis of correlation between aggression level and coping methods

After comparing the results between the aggression groups, positive ways of coping presented similarly in all of them (Figure 4).

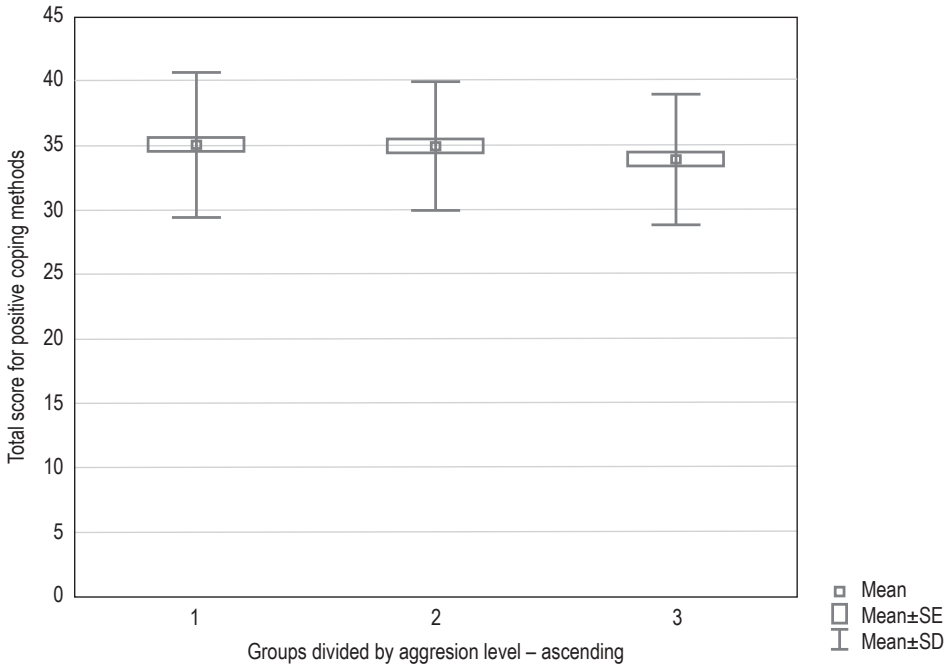

Figure 4. **Comparison of positive coping methods in groups divided by aggression level (p < 0.145)**

Meanwhile, negative ways showed growing numbers in each group of increasing aggression, as shown below (p <0.001) (Figure 5):

- The least aggressive group = 25.03 (SD ± 4.31),
- The moderately aggressive group = 27.15 (SD ± 4.45),
- The most aggressive group = 28.78 (SD ± 4.35).

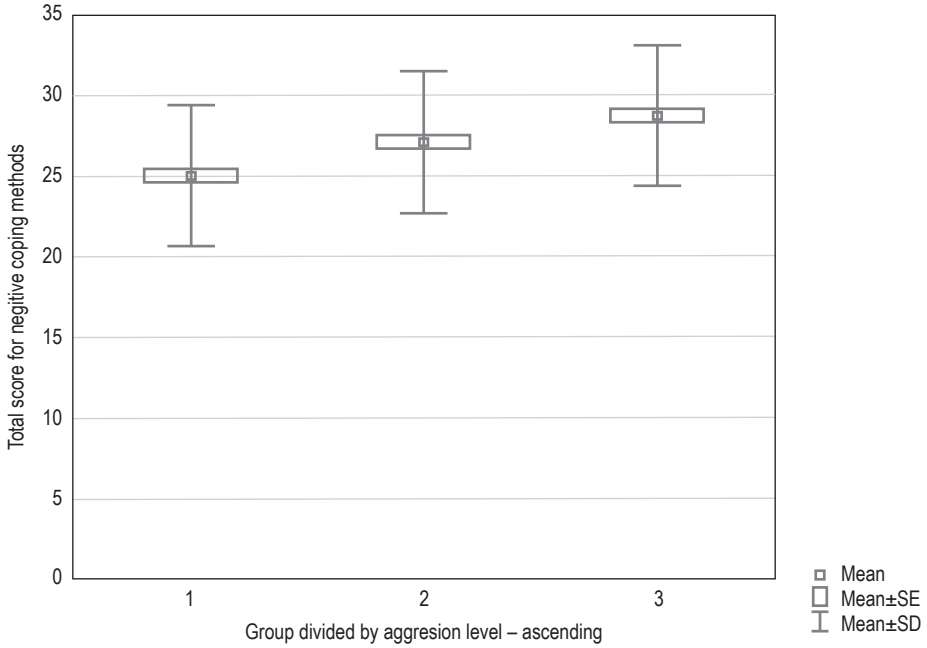

Figure 5. Comparison of negative coping methods in groups divided by aggression level (p <0.5)

Based on the aggression groups, it can be concluded that the correlation between the STAXI-2 and Brief-COPE scores was statistically significant only in the most aggressive group. Correlation was positive between the STAXI-2 score and Avoidant score (rho = 0.23; p <0.05) and negative between the STAXI-2 score and Approach score (rho = – 0.30; p <0.05). Moreover, correlation between the Avoidant and Approach score was also significant in this group (rho = – 0.33; p <0.05).

Discussion

The obtained outcomes show that in the group of examined students positive coping methods outweigh the negative ones. The biggest contributors to this factor are active coping and planning. On the other side, negative coping methods are linked with higher aggression level, and both of them were higher among female students.

Negative coping manners were more common among participants who were eager to get a vaccination and declared subjectively high level of mental burden caused by the pandemic.

The results of the study seem to be promising, as significant predominance of positive coping manners is beneficial in the context of reaction to global pandemic. This trend was noticed also in other studies, both Polish [26] and those conducted among students from other ethnicities [27, 28]. Factors with the highest correlation with this result are active coping, the use of informational support and planning. Those traits are common in resilient and well-adapted populations [29]. Additionally, as seen above, humor is associated with acceptance, but also with cognitive reappraisal [30]. The obtained results seem to be coherent with global trends. Positive attitude, common in students, may have a source in intensive search for contact with and support from other people. Students significantly based on their social networks [28], which was possible during the pandemic, as online communication is as valuable as personal one in this age group and might have been a beneficial substitute. Good relationship with close ones was another element relevant for positive adaptation to stress [31]. It should be highlighted that obtaining higher educational level and planning for future corresponds with parental education level [32], so it is possible that for many students family is the source of mental support as well as the financial one.

The link between aggression level and negative coping methods shall be highlighted, as they have immense impact on each other. In the presented study, the most aggressive group was also the one with the biggest share of negative coping methods. It is possible that there is a particular point of scale over which aggression and pathologic behaviors become synergic. The newest studies present many connections between mental strain and the occurrence of risky behaviors [33]. They vary in intensity, from the ones that are irrational, but not dangerous in short term, as to cease to work out even at home [34], to drastically more dangerous, such as increase of harmful alcohol consumption and tobacco consumption in general [35, 36]. Physical activity is directly related to higher stress resistance [37], so that it is possible that the reluctance for regular exercise could emerge from worse mental condition of the respondents. In the test group, substance use was the least used coping method, but some part of them still chose it. As the most common negative coping method was self-distraction, it shall be considered that some of the respondents may have chosen this answer instead of substance use in order to avoid possible negative judgement from the researchers.

The last raised issue is the difference between the sexes in the level of aggression, as well as higher share of maladaptive coping behaviors, which was initially unexpected. However, many studies conducted during the pandemic confirm the obtained results. Women were prone to present increased incidence of aggression, anger and negative behaviors compared to men [38], and the female students more often present avoidant coping methods [39]. It is most likely the resultant of many elements. Young adults are disproportionately affected by the pandemic, and women in this age group

are also prone to mood swings, also enhanced by cyclical hormone changes related to menstruation and pregnancy. Research carried out in Austria also shows that a disproportionate amount of new household duties related to the pandemic is performed by women working, in our case academically, from home [40]. This relationship shall be highlighted, as the female students should not be excluded from the conditions of their home environment because most of the respondents in the study spent the time of the lockdown at home, with their family. Interestingly, literature presents data confirming greater approval of the restrictions and compliance with them in female students than in male students [41]. It may be associated with the fact that people who are more afraid of the possible infection agree more easily to limitations and are more likely to adjust to them [42]. This is probably an adaptive mechanism, which in the above study is represented by a greater willingness to be vaccinated in the group displaying negative stress coping methods. There are no studies yet on the effect of vaccination on the reduction of anxiety levels in the general population, but in the healthcare workers, vaccination lowered the initial level of anxiety, which was also much higher in women at baseline [43].

Nevertheless, this study has its limitations – the examined group was relatively young and healthy. Additionally, they were students, mostly of medical studies, so they may have better knowledge about the illness. It should be noted that participation in a questionnaire study that is distributed using social media is inherently associated with some level of auto selection, but it is typical bias present in all of the questionnaire studies. In order to be more relatable and extensible, study should have more diverse range of participants in terms of age, education level and place of residence.

Conclusions

1. The examined group reported predominantly positive coping methods. It is quite reassuring because young adults seem to be the high risk category for mental health problems during the pandemic [44] due to excessive instability, distinctive for this stage of life.
2. The study presents an evident link between the level of aggression and the level of negative coping methods. It is presumably the first study to connect those elements; so far negative coping was associated with posttraumatic stress disorder [45], depression and poor sleep quality [46].
3. Both aggression and maladaptive coping strategies are more common in women. It is stated that even though fatality rate of COVID-19 is higher in men, the pandemic generally affected women more [47].

Recapitulation

This study may introduce some new remarks, as only ten published studies researched coping methods using the Brief-COPE questionnaire among students and

most of them were related only to the medical field. Very few to none studies in general compare coping methods with aggression level. The analysis was conducted to search for the possible causes of maladaptive functioning during the pandemic. Discussing the causes and processes leading to worsening the mental health is the first step to construct an individualized help and care.

The COVID-19 pandemic does not seem to end soon. In this case, more and more people may be affected by the current reality, and the adaptation to the new experiences can happen diversely. It should be remembered that students were particularly exposed to its effects, both due to the unusual form of education and the unstable situation on the labor market. The recommended procedure is to provide a wide range of psychological and psychiatric help at universities, as well as to check the well-being of people who present the first subtle warning signs, such as absence from classes or deterioration of academic performance.

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Address: Alicja Kawalec
Medical University of Silesia in Katowice
Student Research Group
at the Department of Child and Adolescent Psychiatry and Psychotherapy
e-mail: alicja.d.kawalec@gmail.com