Original Article

Psychologic Welfare and Burnout of Medical Students after COVID-19 Pandemic Lockdown in Poland

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Abstract

Objectives: In this study, we intended to examine the psychological welfare, burnout, and stress-related coping mechanisms of medical students at the Medical University of Gdańsk, Gdańsk, Poland. Under the hypothesis that depressive symptoms and screening for problem alcohol drinking would predict the risk of burnout, we intended to study the relationship between selected variables (e.g., demographic and socioeconomic) and burnout risk and the effects of abandonment of social isolation restrictions related to the COVID-19 pandemic lockdown. **Methods:** Medical students completed an online survey assessing general mental health and stress coping mechanisms. We used copies of the Patient Health Questionnaire 9-item (PHQ-9); Cut-down, Annoyed, Guilty, and Eye-opener (CAGE) questionnaire; and the Oldenburg Burnout Inventory (OLBI), to quantify depressive symptoms, screen for problematic alcohol drinking, and assess the risk of burnout. **Results:** The mean total OLBI score ± standard deviation was 44.6 ± 7.3 ($N = 700$), with 91.1% of participants scoring ≥ 35 points. Female students had significantly higher total and exhaustion domain OLBI scores than their male counterparts ($p < 0.05$). About 76% of all respondents reported high levels of studies-related stress and 44% of survey participants agreed/strongly agreed that they considered dropping out of university courses due to the stress. The suicidal/self-harm ideations were found in 33.6% of students. Most students (64.4%) were screened positively for moderate-to-severe depressive symptoms, and 19% of them for risky alcohol use. Students with OLBI scores ≥ 35 achieved notably higher PHQ-9 and CAGE results. The results of multivariate regression analysis showed that PHQ-9 ($p < 0.05$) and CAGE ($p < 0.05$) questionnaire significantly predicted the OLBI score. **Conclusion:** Medical students are a vulnerable group at risk of developing mental health problems. A great number of survey participants screened positively for the presence of depressive symptoms, risky alcohol use, and burnout. The PHQ-9, and CAGE results, was significant predictor of OLBI outcomes. The improvement of COVID-19 pandemic-related social isolation restrictions did not produce a marked improvement in somatic/mental health-related quantifiers as compared to the time of strict social restrictions.

Key words: alcohol use, cut-down, annoyed, guilty, and eye-opener cut-down questionnaire, depression, Oldenburg burnout inventory
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Introduction

Today's medical students will become the workforce and the health-care leaders of tomorrow. In 2023, more than 6,300 students continue their education at the Medical University of Gdańsk (MUG), Gdańsk, Poland, with international undergraduates making up more than 15% of the MUG student population.

Despite high demand, medical educational opportunities are limited in number, and the studies are recognized as some of the most academically and psychologically demanding courses [1]. The students often show features of diminished psychological welfare [2-5], depressive symptoms, anxiety, and educational burnout [6].

Burnout results from chronic workplace stress that has not been successfully managed [7] and is characterized by feelings of energy depletion, exhaustion, increased mental distance

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from one's job, feelings of negativism or cynicism related to one's occupation, or to reduced professional efficiency. Burnout negatively affects academic performance, exacerbates mental health issues, leads to the misuse of pharmacologic substances [2, 8, 9], academic dishonesty [10], and diminished levels of empathy [11].

A pilot study done in a large cohort at MUG has shown a remarkable level of psychologic distress and morbidity, with 56.5% of the total number of participants are screening positive for moderate-to-severe depressive symptoms and 26.3% showing suicidal ideations. In addition, as many as, 37.4% of medical students have seriously considered to drop out of the university due to studies-related stress [12].

In contrast to the pilot survey done at the time of strict social isolation restrictions imposed to curb COVID-19 (severe acute respiratory syndrome coronavirus 2) spread (January–September 2020), the current study was done when most of the limitations were diminished or even abandoned. Thus, COVID-19 has imposed social isolation as well as increased levels of depression, anxiety, and stress among university students in Poland [13, 14].

To better quantify and describe the apparent psychological ill health among MUG students, we hypothesized that depressive symptoms and screening for potential problematic alcohol consumption would be correlated positively with the increased risk of burnout. Under this hypothesis, we intended in this study to characterize whether a positive correlation between selected demographic, socioeconomic, and health-related variables, the perception of studies-related stress intensity, and burnout could be pinpointed. We also studied whether lifting some of the strict social isolation restrictions could improve students' psychological welfare and mental health.

Methods

Overview of the survey and participants

This online survey study was approved by the Bioethics Committee of the MUG (protocol number = NKBBN/433/2020 and date of approval = September 9, 2020) with the stipulation that the study participants would agree to check whether they were willing to participate in this study.

A link to a one-off copy of a questionnaire survey created in the Google Forms platform was distributed to all undergraduate medical sciences students through the MUG Intranet mailing service and popular social media platforms (e.g., Facebook®). Seven hundred respondents completed the survey from December 3, 2021, to December 31, 2021.

The survey was anonymous and voluntary. Before responding to any question, the students were encouraged to reflect upon their life and mental health, and they were reminded of the availability of mental health-care services for MUG students.

Tools and copies of demographic questionnaire

- Demographics: gender, age group (≤ 18–20, 21–25, ≥ 26 years), degree type/faculty, and academic year of studies.
- Socioeconomic features: work status included the number of work hours per week (< 8 h; 8–20 h; > 20 h) and the primary reasons for undertaking work.
- General somatic/mental health-related issues included personal situation: lifestyle and habit change dynamics since studies initiation, effects of interactions with friends/peers on one's well-being, thoughts about dropping out of the university during the course due to stress, and suicidal/self-harm ideations.
- Studies-related stress level is a Likert scale (1-no perceived stress to 10-over-beating stress), stress aggravating factors (money, housing situation, studies, relationship, government or legal issues, peers, concerns about future, and physical or psychological bullying/harassment), changes in coping mechanisms to decrease studies-related stress since studies initiation (physical exercise, meditation, religion/belief/cultural rituals, social interactions with one's friends/peers, and pharmacologic substance consumptions). In the case of stress-aggravating factors and pharmacological substance misuse, multiple answers were possible.
- Validated instruments are to quantify the level of burnout and depressive symptoms and problematic drinking: Oldenburg Burnout Inventory (OLBI), Patient Health Questionnaire 9-item (PHQ-9), as well as Cut-down, Annoyed, Guilty, and Eye-opener (CAGE) questionnaire [15], respectively. In this study, some predefined scores were used to indicate "caseness" for copies of PHQ-9, OLBI, and CAGE questionnaire used in the online survey.
- PHQ-9 total score of 0–4, 5–9, 10–14, and ≥ 15 indicates minimal/no depression, mild, moderate, and severe depressive symptoms, respectively. PHQ-9 is one of the most widely evaluated tools for depression screening in primary health-care settings, with Cronbach alpha values ranging from 0.56 to 0.94 [16].
- The OLBI is to assess two core dimensions of burnout: exhaustion and disengagement [17]. The higher the total OLBI score indicates a higher possibility of burnout [18]. A score of ≥ 35 points indicates an increased risk for burnout [19]. Students with total OLBI scores ≤ 34 points and ≥ 35 are referred to in the text of the manuscript as having lower and higher OLBI scores, respectively. Total OLBI gives a high scale reliability (Cronbach's alpha = 0.63) as well as on its subscales, exhaustion (Cronbach's alpha = 0.87), and disengagement (Cronbach's alpha = 0.81) [20].
- A score of ≥ 2 in the CAGE questionnaire indicates a possible problem with alcohol usage [21]. Cronbach's alpha for the CAGE questionnaire studied in similar populations varied from 0.61 to 0.62 [22, 23].

Statistical analysis

We used both descriptive statistics and formal statistical testing to analyze and interpret the current study data. Categorical variables, presented with absolute values and/or percentages, were analyzed using the Chi-square test of independence to determine key differences. For continuous variables, presented with means with standard deviations were analyzed with *t*-test.

We also used univariate and, subsequently, multivariate regression analyses to test if PHQ-9 and CAGE scores could significantly predict the risk of burnout expressed as total OLBI score. The normality of data distribution was examined using the Shapiro–Wilk test.

We used GraphPad Prism statistical software version 10.0 for MasOS (GraphPad Software Inc., Boston, Massachusetts, USA). The differences between the two groups were considered significant if two-tailed *p*-values were less than 0.05.

Results

As shown in Table 1, 700 students completed the survey, with the majority being 18–25-year-old female medical students. The number of respondents was the highest during the first three years of schooling and declined afterward. International students made up 22% of the population. Mean total OLBI, OLBI disengagement, and exhaustion domain scores were 44.6 ± 7.3, 21.0 ± 4.0, and 24.0 ± 4.1, respectively. Most of the students including all those who reported their gender as nonbinary or other, belonged to the subpopulation of MUG students with a total OLBI score of ≥ 35 points. In addition, there were significantly more female than male study participants, scoring ≥ 35 points ($p < 0.05$) (Table 1). Female students showed significantly higher mean OLBI exhaustion results in comparison to their male colleagues ($p < 0$ .05). About 38% of all students worked while studying. The time spent at work amounted usually between 8 and 20 hours a week and the most prevalent motivation to get a job was to obtain additional, disposable income.

As shown in Table 2, the presence of somatic and/or mental conditions was self-reported of 27.4% of the population. Almost 44% of all respondents agreed or strongly agreed that they considered dropping out of university courses due to studies-related stress. Similarly, 33.6% of students agreed or strongly agreed that during their studies, they experienced suicidal/self-harm ideations. No significant differences in the health-related and personal situation characteristics existed between students with lower and higher total OLBI scores. Most students (92.4%) agreed or strongly agreed that their lifestyle/habits had changed since the beginning of their university education, with 51.0% claiming a change for the worse and 41.4% for better. When asked to assess their studies-related stress on a Likert scale, the mean study population score amounted to 7.3 ± 1.6, with 75.8% of students reporting stress levels in ranges from 7 to 10 points. The overall mean stress intensity was similar for participants with lower and higher total OLBI scores, namely 7.1 ± 1.5 and 7.4 ± 1.7, respectively. The most frequent stress-aggravating factors for all students alike included: studies (93.1%), government or legal issues (40.1%), monetary problems (33.6%), peers (22.3%), housing (21.7%), and relationships (20.1%). Most of the respondents reported the co-existence of multiple stress-aggravating factors.

Almost 80% of all survey participants declared that social interactions with their friends/peers affected their well-being positively or very positively. Over half of the total number of students (57.0%) do not practice any form of religion, beliefs, or cultural rituals to cope with studies-related stress. Most of

Table 1. Demographic characteristics of the Medical University of Gdańs students' survey population ($N = 700$)

	Total OLBI score < 35 points ($n = 62$; 8.9%), *n* (%)	Total OLBI score ≥ 35 points ($n = 638$; 91.1%), *n* (%)
Gender		
Male	26 (41.9)	150 (23.5)
Female	36 (58.1)	480 (75.2)*
Age (years)		
≤ 18–20	25 (40.3)	225 (35.3)
21–25	33 (53.2)	372 (58.3)
≥ 26	4 (6.5)	41 (6.4)
Faculty (college)		
Medicine	48 (77.4)	375 (58.8)
Dentistry	3 (4.8)	28 (4.4)
Nursing	2 (3.2)	43 (6.7)
Pharmacy	3 (4.8)	58 (9.1)
Other	6 (9.7)	134 (21)
Level of academic year		
1	20 (32.3)	157 (24.6)
2	14 (22.6)	132 (20.7)
3	11 (17.7)	126 (19.7)
4	8 (12.9)	89 (13.9)
5	5 (8.1)	84 (13.2)
6	4 (6.5)	50 (7.8)

$p < 0.05$, tested using Chi-square test
No significant differences were found tested using *t*-test between the two groups in age, faculty, and level of academic years.
Some numbers were rounded up.
n (%), absolute number (percentage)
OLBI, Oldenburg Burnout Inventory

those who continue to practice beliefs reduced the time devoted to practicing, even though 29.4% of all respondents answered that religion, beliefs, or cultural rituals help to diminish studies-related stress.

The most popular pharmacologic group of substances used to decrease studies-related stress were ethyl alcohol (48.0%), nicotine (35.4%), hypnotics/anxiolytics (19.7%), antidepressants (16%), and cannabis (13.6%). There were no marked differences between lower and high OLBI scores cohorts when the stress-coping mechanisms were examined.

The mean PHQ-9 score for all participants amounted to 12.1 ± 6.0 and most (64.4%) screened positively for moderate-to-severe depressive symptoms. CAGE screening questionnaire results pointed toward problematic alcohol drinking in about 19% of all students. In general, the distribution of the CAGE scores [15] showed a similar magnitude for years 1–3 and tends to decrease in years 4–6.

As shown in Table 3, the presence of moderate-to-severe depressive symptoms and the increased risk of problematic alcohol use were reported more frequently by students with OLBI scores ≥ 35. For the simple linear regression analysis, the fitted regression equations were y = 0.6079x + 44.11 for CAGE and y = 0.7305x + 35.67 for the PHQ-9 questionnaire, respectively. The overall regressions were statistically significant (R^2 = 0.006947 and 0.3604, $p < 0.05$). Therefore, it was found that CAGE and PHQ-9 results significantly predicted the OLBI outcome. Subsequently, a multiple linear regression was used to test whether both CAGE and PHQ-9 results predicted OLBI results. The overall regression was statistically significant (R^2 = 0.36, $p < 0.05$). It was found that PHQ-9, in contrast to CAGE questionnaire results, was a significant predictor of OLBI score (*p*-values lower and higher than 0.05, respectively). The Shapiro–Wilk test showed a normal distribution of results ($p < 0.05$).

Table 2. Health-related issues and personal situation features of the Medical University of Gdańs students' survey population (N = 700)

	Total OLBI score < 35 points (n = 62; 8.9%), n (%)	Total OLBI score ≥ 35 points (n = 638; 91.1%), n (%)
Do you suffer from any somatic and/or psychiatric condition?		
Somatic and psychiatric conditions	6 (9.7)	39 (6.1)
Psychiatric only	6 (9.7)	61 (9.6)
Somatic only	6 (9.7)	74 (11.6)
Neither	44 (71)	464 (72.7)
Have you had suicidal/self-harm ideations during your medical studies?		
Agree/strongly agree	24 (38.7)	211 (33.1)
Neutral	4 (6.5)	61 (9.6)
Disagree/strongly disagree	34 (54.8)	366 (57.4)
Have you seriously thought about dropping out of university due to stress during your medical studies so far?		
Agree/strongly agree	27 (43.5)	248 (38.9)
Neutral	6 (9.7)	60 (9.4)
Disagree/strongly disagree	29 (46.8)	330 (51.7)

No significant differences between two groups were found in those three questions.
n (%), absolute numbers (percentage)
OLBI, Oldenburg Burnout Inventory

Table 3. Screening for depressive symptoms and problematic alcohol drinking using Patient Health Questionnaire 9-item and Cut down, Annoyed, Guilty, and Eye opener [15] questionnaires (N = 700)

	Total OLBI score < 35 points (n = 62; 8.9%), n (%)	Total OLBI score ≥ 35 points (n = 638; 91.1%), n (%)
Depressive symptoms stratification by PHQ-9 score*		
Minimal (0–4 points)	26 (41.9)	51 (8)
Mild (5–9 points)	25 (40.3)	147 (23)
Moderate (10–14 points)	10 (16.1)	212 (33.2)
Moderately severe (15–19 points)	1 (1.6)	146 (22.9)
Severe (20–27 points)	0	82 (12.9)
CAGE Questionnaire*		
Students with CAGE score ≥ 2	9 (14.5)	121 (19)

*$p < 0.05$, significantly differently between the two groups using t-test or Chi-square test when appropriate.
Some numbers were rounded up.
n (%), absolute numbers (percentage)
PHQ-9, Patient Health Questionnaire 9-item; CAGE, Cut-down, Annoyed, Guilty, and Eye-opener

Discussion

The most important findings of our study were that the self-reported presence and severity of depressive symptoms and not the results for screening of risky alcohol intake significantly predicted the risk of burnout. As shown in Table 1, female students reported significantly higher total and exhaustion domain OLBI scores than their male colleagues ($p < 0.05$). In comparison to the pilot experiment, the total OLBI score increased 1.18 points and the participant scored higher in PHQ-9. Both results may suggest that the gradual reduction of social isolation restrictions related to the COVID-19 pandemic did not mean markedly to the improvement of the studied somatic/mental health-related parameters. The outcomes of the current study confirmed the pilot experiment findings that mental health issues are grave in the surveyed population [12].

About 11.1% and 16.3% of the total number of international and Polish students at MUG took part in the survey (data not shown). The numbers remain in the amount of numbers published by other surveys [24], showing that the sample can be perceived as a reasonable representation of MUG students.

A significant preponderance of female medical students ($p < 0.05$) was present among responders (Table 1). This study finding is similar to those in studies done in medical schools of Brazil, Canada, and Morocco. In contrast to our study result, the gender proportions are more balanced in Hong Kong, Nepal, and Jordan [25-30].

In the current study, 91.1% of the entire cohort and 75.2% of females scored ≥ 35 points in the OLBI questionnaire (Table 1). The latter observation is not a MUG-specific phenomenon as similar results are seen in studies among Brazilian and Hong Kong medical students [25, 31].

The percentage of students, who reported the presence of somatic and/or mental conditions, was similar for both lower and higher OLBI score cohorts (Table 2). But the findings need to be critically appraised as it is a self-reported phenomenon, which is not supported by a professional face-to-face interview leading to a diagnosis.

Most participants were full-time students and only about 38% worked to obtain additional income (data not shown). It is almost a universal observation that most medical students do not have a job to support themselves [26, 29, 30]. Their economic dependence on guardians makes them probably more likely to seek help should health issues be suspected and/or diagnosed. If indeed true, this bias was potentially limit the generalizability of our results.

We confirmed high levels of psychiatric morbidity, potential alcohol problems, psychological distress, and burnout in MUG students (Tables 1-3). This is not surprising as medical students carry with them several stress factors, which could be potentiated by the intellectual demands of the studies and the challenging expectations. In addition, medical students in Poland start university education usually in late adolescence, a period when they are especially prone to developing mental health issues. The number of MUG students screening positive on the PHQ-9 for moderate-to-severe depression was about by 7.9% in comparison to the pilot study.

The proportion of CAGE-positive students was decreased from 21.6% to 18.6% in both our studies [12]. This observation was unexpected as one would intuitively await that relaxing social isolation rules would stimulate social interactions and alcohol use. The significance of this observation is unknown, and it remains to be noted that the number of participants was about 23% bigger in the pilot survey. As shown in Table 3, students with higher OLBI scores had significantly to have more points in copies of PHQ-9 ($p < 0.05$) and CAGE ($p < 0.05$) [15] questionnaire.

Overall, the percentage of CAGE-positive MUG students remains well within the ballpark figures published for Poland [32]. The most popular pharmacologic substances to relieve studies-related stress were ethyl alcohol and nicotine (data not shown). The reported use of alcohol, tobacco, and cannabis is substance use among medical students globally [33]. One should bear in mind that substance misuse remains a taboo subject in Poland and might have legal and professional consequences on future practice. Despite survey anonymity, underreporting for fear of having their identities revealed resulted in lower self-reported user numbers.

In this study, most students agreed that their lifestyle/habits changed for worse since the beginning of their studies and about 76% of them reported levels of studies-related stress in the range between seven and ten points on a Likert scale. High levels of psychological distress are common in medical students in all over the world, especially in the millennial generation [34, 35]. Monetary and housing situations and relationship problems can negatively impact students' academic and performance, increase university drop-out rates, and contribute to the deterioration of mental health and substance misuse [36, 37].

Despite overwhelming acknowledgment of the positive effects of social interactions on their well-being and the conviction that spirituality may be useful to relieve studies-related distress, most students do not practice any form of religion, beliefs, cultural rituals, or remarkably reduced their practice. Thus, these interventions remain untapped, easily applicable free coping resources as it has been proven that spirituality and social support give medical students more resilience to stress [38, 39].

The negative tendencies in PHQ-9 and OLBI scores in two surveys were reflected by the increased numbers of respondents who contemplated dropping out of their university course due to studies-related stress or had suicidal/self-harm ideations. The indices rose from 26.3% to 33.5% and 37.4% to 39.3% in the current versus the pilot study, respectively [12]. The increase in suicidal/self-harm ideation over about one year is alarming because the numbers are much higher than those published in the literature [40]. Furthermore, our data correlate with a 77% increase of suicidal behaviors in youth in Poland observed between the years 2020 and 2021 as reported by a Polish foundation (Raport_za_lata_2012-2021_zachowania_samobojcze_mlodziezy_2). In concordance with

global trends, suicidal/self-harm behaviors are likely to be a major problem in medical students.

Study limitations

The readers are warned not to overinterpret the study results because our study has five limitations related to our study methodology:

- A convenience sampling method and the use of social media platforms, such as Facebook® might have produced a snowball sampling effect. Online surveys include self-selected participants, and one could assume that students experiencing health issues might have volunteered more readily for the study.
- Despite the re-assurances and guarantees of anonymity and confidentiality, the surveyed might have expressed self-imposed reluctance to answer for the fear of having sensitive information exposed.
- The study was done in a heterogeneous population of health-care sciences students in contrast to other researchers who studied medical and/or pharmacy students only.
- The English language might not be the mother tongue for some international students in the examined sample.
- Interpreting the findings should be done in the context of the evolving COVID-19 pandemic and compared with the results of studies, which will be done over a longer time period.

Summary

Most of MUG students screened positively for the presence of depressive symptoms (PHQ-9), potential risky alcohol drinking (CAGE), and the risk of burnout (OLBI). Studies, government or legal issues and monetary problems were the most widely frequently encountered stress-aggravating factors.

Medical students are a vulnerable group at high risk of developing mental health issues. A failure to tackle problems early on would likely lead to increased psychological distress and psychiatric morbidity with detrimental effects on students' careers and personal lives.

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Data Availability Statement

The data are available upon reasonable request to the corresponding author.

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Conflicts of Interest

The authors declare no conflicts of interest in writing this report.

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