

Perceived stress and pandemic-associated risk factors in high-risk alcohol consumers during the third wave of the COVID-19 pandemic

BACKGROUND

As a severe and prolonged stressor, the COVID-19 pandemic has contributed to development or exacerbation of mental disorders. For substance use disorder, the link between stress and alcohol consumption is well established. However, there have been conflicting findings in the context of the pandemic. The aim of this study was to characterize the group of high-risk alcohol consumers in terms of perceived stress and potential stressors during the third wave of the pandemic.

PARTICIPANTS AND PROCEDURE

Adult Polish men ($N = 295$) from the Tricity metropolitan area participated in the study. They were subdivided into high-risk ($n = 104$) and low-risk ($n = 191$) alcohol consumers based on their self-reported weekly alcohol consumption. A demographic survey (including COVID-19 vaccination status), the Perceived Stress Scale (PSS-10) and an original questionnaire measuring causes of concern were used.

RESULTS

Overall PSS-10 results did not differ significantly between high-risk and low-risk alcohol consumers (18.40, 17.50, respectively, $p = .185$). However, the percentage distribution of perceived stress showed lower incidence of low and high

levels of stress in high-risk than in low-risk alcohol consumers (9.6%, 2.9% vs. 25.7%, 6.8%, $p = .001$). High-risk alcohol consumers reported no pandemic-related worries more often than low-risk consumers (46.2% vs. 5.2%, $p < .001$), but at the same time 67.3% of them named at least one pandemic-related stressor. High-risk alcohol consumers also showed less concern about the situation on the labor market (19.2% vs. 29.3%, $p < .001$). Limited access to medical services and other people's attitudes to the pandemic were common stressors in both groups, with high-risk alcohol consumers showing more indifference to the latter.

CONCLUSIONS

High-risk and low-risk alcohol consumers have been clearly impacted by pandemic-related factors. The protective effect of alcohol is debatable, given the high prevalence of medium and high stress levels among high-risk alcohol consumers. It appears that the pandemic and associated restrictions posed such a significant risk for distress escalation that they remained unrelated to the pattern of alcohol consumption or its alteration.

KEY WORDS

psychiatry; alcohol addiction; COVID-19; social psychiatry; addictions/substance abuse

ORGANIZATION – 1: Division of Developmental Psychiatry, Psychotic and Geriatric Disorders, Department of Psychiatry, Faculty of Medicine, Medical University of Gdansk, Gdansk, Poland · 2: Department of Regional Development, Faculty of Social Science, University of Gdansk, Gdansk, Poland · 3: Institute of Sociology, Faculty of Social Sciences, University of Gdansk, Gdansk, Poland · 4: Adult Psychiatry Scientific Circle, Division of Developmental Psychiatry, Psychotic and Geriatric Disorders, Department of Psychiatry, Faculty of Medicine, Medical University of Gdansk, Gdansk, Poland

AUTHORS' CONTRIBUTIONS – A: Study design · B: Data collection · C: Statistical analysis · D: Data interpretation · E: Manuscript preparation · F: Literature search · G: Funds collection

CORRESPONDING AUTHOR – Aleksandra Brzozowska, Adult Psychiatry Scientific Circle, Division of Developmental Psychiatry, Psychotic and Geriatric Disorders, Department of Psychiatry, Faculty of Medicine, Medical University of Gdansk, 17 Srebrniki Str., 80-282 Gdansk, Poland, e-mail: abrzozowska@gumed.edu.pl

TO CITE THIS ARTICLE – Grabowski, J., Michalski, T., Brosz, M., Brzozowska, A., & Gaba, G. (2024). Perceived stress and pandemic-associated risk factors in high-risk alcohol consumers during the third wave of the COVID-19 pandemic. *Health Psychology Report*. <https://doi.org/10.5114/hpr/191490>

RECEIVED 15.02.2024 · REVIEWED 25.05.2024 · ACCEPTED 22.07.2024 · ONLINE PUBLICATION 28.08.2024



BACKGROUND

The COVID-19 pandemic has had an unprecedented impact on the mental health and behavioral patterns of the entire population. The observed increase in the level of stress is associated not only with a threat to health, but also with implementation of numerous restrictions significantly limiting the day-to-day functioning of a person (Grabowski et al., 2021; Loretto et al., 2021; Michalski et al., 2023). Long-term social isolation, tension, anxiety and the unpredictability of the situation, especially in terms of the economy, have all contributed to an increase in the prevalence of mental disorders such as depression or anxiety disorders (Bidzan-Bluma et al., 2020; Thompson et al., 2022). Social disparities have become even more blatant, which frequently results in discrepancies in how stress and demands are perceived across various study populations (Korolkiewicz et al., 2022; Michalski et al., 2021).

In the context of the pandemic and its psychological burden, the connection between high-risk alcohol use and the level of stress has been extensively researched, leading to ambiguous results (Clay et al., 2023a). There are both publications indicating co-occurrence of increased alcohol consumption and increased levels of stress (Jacob et al., 2021; Koopman et al., 2020; Tudehope et al., 2022) and those stating that the consumption of alcohol has decreased as a result of its limited availability (Kilian et al., 2021). It is suggested that during the pandemic a substantial shift in the pattern of alcohol consumption occurred in Poland. Whereas before 2019 there had been significant growth in sales of beer, during the pandemic people again turned to high-percentage alcohols (e.g. vodka, whisky, rum, gin, tequila), including premium products. Also, the problem of binge drinking intensified (Fal, 2023). The main motives for drinking alcohol are similar in men and women in Poland and include social pressure and pleasure seeking (Malczewski et al., 2023).

Correlations between increased alcohol consumption during the pandemic and poorer mental health are evident, especially for sleep disorders (Du et al., 2021), depressive symptoms (Gavurova et al., 2020; Jacob et al., 2021; Radoš Krnel et al., 2022), grief (Hahm et al., 2023) and post-traumatic stress symptoms (Mengin et al., 2022). There are also interactions between alcohol consumption, impulsivity and perceived boredom (Clay et al., 2023a, b). Hazardous drinking is conceived as an attempt to cope with stress (Clay et al., 2023a; Rodriguez et al., 2020), which has led some researchers to further investigate possible stressors and behaviors associated with the development of a hazardous pattern of alcohol consumption. Some of them included lower income, lack of social support and social isolation, with remote

work and distance learning being particularly related to the latter (Acuff et al., 2022; Molsberry et al., 2021; Törrönen et al., 2022; Valente et al., 2021).

It appears that there may be a vicious circle mechanism: alcohol is consumed to cope with isolation, which (in accordance with its physiological effects) further intensifies the symptoms of distress and leads to development or exacerbation of pre-existing mental disorders, thereby promoting continuous increase in alcohol consumption (Becker, 2017; Windle & Windle, 2015). In addition to the obvious health (Marano et al., 2022) and social (Mojica-Perez et al., 2022) damage caused by increased alcohol consumption during the COVID-19 pandemic, studies also indicate an increased risk of hospitalization (Pavarin et al., 2022; Tikaria et al., 2022) and increased alcohol-specific mortality (Kilian et al., 2023), which suggests the seriousness of the problem and the need for immediate action (Boniface et al., 2022).

Although the relationship between increased alcohol consumption and high levels of stress is indisputable, doubts may arise when trying to identify the stressors. Previous publications indicate contradictory results regarding stress related to the pandemic, which, according to some, correlates with increased (McAloney-Kocaman et al., 2022; Mengin et al., 2022) and, according to others, with decreased (Charles et al., 2021; Hahm et al., 2023) alcohol consumption. The characteristics of the study group may hold the key to the interpretation of these results. Resilience is proposed as a protective factor (Tudehope et al., 2022), but other studies suggest that it is a protective factor only against stress and not against the related alcohol abuse (Du et al., 2021).

In this study, an attempt was made to characterize the group of high-risk alcohol consumers in terms of the level of perceived stress and potential stressors during the third wave of the COVID-19 pandemic. Such a characterization would constitute a starting point for identifying the specific needs of people facing alcohol abuse in crisis situations affecting the entire population. In the longer term, it could also help to determine the real impact of alcohol on the mental state of people heavily abusing alcohol, taking into account the distinction between possible action protecting against or exacerbating stress in the short and long term.

PARTICIPANTS AND PROCEDURE

PARTICIPANTS

The study population consisted of adult men of Polish nationality (18 years old and over) living and working in the Tricity area of Poland (the cities of Gdańsk, Sopot and Gdynia). Persons living in the Tricity suburban zone (smaller towns located in the immediate

Jakub Grabowski,
Tomasz Michalski,
Maciej Brosz,
Aleksandra
Brzozowska,
Gursimran Gaba

vicinity of the agglomeration) were also allowed to participate. Only male participants were included in the analysis due to differences in drinking styles between sexes and the specific nature of the respondents' recruitment.

PROCEDURE

The study was conducted using a self-completed environmental survey. The time of implementation of the field phase of the study (January 2022) coincided with the end of the third wave of the COVID-19 pandemic and the related restrictions on movement, gathering and conducting business activity. Due to

the conditions of the study, a short questionnaire was used to collect demographic data on alcohol consumption (consumption of up to 7 drinks per week, 8-14 drinks per week and over 14 drinks per week) and vaccination against COVID-19.

In addition, distress was evaluated using the Perceived Stress Scale (PSS-10) (referring to the previous week; items 4, 5, 7, 8 are reverse-scored). The PSS-10 results are in the range of 0-40 points. It is assumed that a score from 0 to 13 points means a small intensity of stress, from 14 to 26 – moderate, and from 27 to 40 – high levels of perceived stress. Due to the limitations related to the analysis of individual elements of larger scales, no detailed interpretation was undertaken, and only the two-factor Roberti model

High-risk drinking: stress and associated risk factors in the 3rd wave of pandemic

Table 1

PSS test results in the study groups broken down by independent variables

	High-risk alcohol consumers (n = 104)			Low-risk alcohol consumers (n = 191)		
	n (%)	PSS score M ± SD	p	n (%)	PSS score M ± SD	p
Age						
18-24	1 (1)	23.00	.427	26 (13.6)	20.54 ± 5.64	.084
25-34	8 (7.7)	18.00 ± 2.39		45 (23.6)	16.96 ± 6.65	
35-44	16 (15.4)	19.12 ± 6.82		39 (20.4)	17.54 ± 7.06	
45-54	26 (25)	18.54 ± 4.82		37 (19.4)	16.35 ± 5.48	
55-64	33 (31.7)	18.24 ± 3.29		25 (13.1)	15.60 ± 4.87	
65 and more	20 (19.2)	18.00 ± 4.16		19 (9.9)	19.00 ± 6.16	
Number of years of education						
0-9	25 (24)	19.24 ± 3.49	.694	30 (15.7)	16.00 ± 6.49	.111
10-13	54 (51.9)	17.96 ± 5.17		45 (23.6)	16.73 ± 5.89	
14-16	17 (16.3)	18.24 ± 3.33		48 (25.1)	18.85 ± 6.57	
17 and over	8 (7.7)	19.50 ± 3.89		68 (35.6)	17.63 ± 6.05	
Vaccinated against COVID-19						
Yes	63 (60.6)	19.00 ± 4.08	.351	153 (80.1)	17.95 ± 6.15	.124
No	32 (30.8)	17.59 ± 5.39		25 (13.1)	15.36 ± 5.99	
Refused to say	9 (8.7)	17.44 ± 2.35		13 (6.8)	15.85 ± 7.12	

Table 2

Comparison of the level of perceived stress in the study groups

	Low level of stress	Average level of stress	High level of stress	p
High-risk alcohol consumers (n = 104)	9.6%	87.5%	2.9%	.001
Low-risk alcohol consumers (n = 191)	25.7%	67.5%	6.8%	

was used. This takes into account the perceived helplessness (F1) and perceived self-efficacy (F2) coefficients (Table 3).

The last stage was to conduct an original questionnaire on the possible causes of worries and/or irritation (Table 4). This tool contained ten questions about the possible stress factors selected by the authors related to the current epidemic situation in the country and in the world, from which the respondents were to choose those that affected them (it was possible to choose more than one answer).

The selection of respondents was purposeful, so it was a type of non-probabilistic selection according to the snowball method. In order to obtain a diverse sample in terms of the pattern of alcohol consumption, the pollsters distributed surveys in premises frequented by men in the Tricity. These were facilities whose business profile was oriented towards alcohol consumption, which distinguishes

them from other entertainment-oriented facilities and those aimed at maintaining social contacts. Some questionnaires were also distributed in semi-legal workers' dormitories operating in the Tricity. Some questionnaires were distributed among men representing various working environments in the Tricity agglomeration.

Men aged 18-64 years drinking more than 14 drinks per week and men over 65 drinking more than 7 drinks per week were qualified as high-risk alcohol consumers according to the criteria of the National Institute on Alcohol Abuse and Addiction (NIAAA) of heavy drinking (NIAAA, 2023). In case of doubt, the answers were verified as far as possible by objective interviews (e.g. bartenders in beer drinking halls). Most of the respondents who drank at risk were regular patrons in beer drinking halls located near transport hubs. According to community interviews, they visited them five days a week

Jakub Grabowski,
Tomasz Michalski,
Maciej Brosz,
Aleksandra
Brzozowska,
Gursimran Gaba

Table 3

Level of stress measured by PSS-10, F1 and F2 in the study groups taking into account COVID-19 vaccination status

Vaccinated	High-risk alcohol consumers			Low-risk alcohol consumers		
	Yes	No	<i>p</i>	Yes	No	<i>p</i>
	<i>M ± SD</i>			<i>M ± SD</i>		
PSS-10	19.00 ± 4.08	17.59 ± 5.39	.563	17.95 ± 6.15	15.36 ± 5.99	.092
F1	12.05 ± 4.21	10.50 ± 5.29	.198	11.89 ± 4.11	10.40 ± 4.31	.214
F2	6.95 ± 2.63	7.09 ± 3.87	.552	6.07 ± 2.89	4.96 ± 2.64	.100

Note. PSS-10 – 10-item Perceived Stress Scale; F1 – perceived helplessness; F2 – perceived self-efficacy.

Table 4

Concerns related to the COVID-19 pandemic in the study groups

Is there anything that worries (or annoys) you about the ongoing pandemic?	High-risk alcohol consumers (<i>n</i> = 104)	Low-risk alcohol consumers (<i>n</i> = 191)	χ^2	<i>p</i>
	%			
My health status	21.2	24.6	0.28	.566
The health of my loved ones	26.9	34.6	1.47	.193
Restrictions imposed by the authorities	28.8	23.0	0.92	.325
Situation on the labor market	19.2	29.3	3.08	.050
Pressure to get vaccinated	20.2	24.6	0.51	.470
Difficulties in access to health services	28.8	39.3	2.75	.077
Other people's attitudes	29.8	48.2	8.60	.003
Media coverage	24.0	29.3	0.70	.344
My worries not related to the pandemic	21.2	23.6	0.11	.666
I don't have any worries	46.2	5.8	66.17	< .001

(Monday-Friday), in the afternoon, after work. Then they drank 2-3 beers with alcohol content between 5.0% and 7.2%.

No diagnostics of alcohol use disorder using DSM-V criteria was conducted.

The total size of the research sample was $N = 295$. Among the respondents, there were 104 high-risk alcohol consumers and 191 men who drank occasionally or did not drink (low-risk alcohol consumers). Most of the respondents were middle-aged men (176 were 35-64 years old) who spent up to 13 years in the education system (154 people).

Quantitative variables were tested for compliance with normal distribution by the Shapiro-Wilk test. Depending on the result of the compliance test, appropriate statistical tests were used for intergroup comparisons. For comparisons of two groups, the Mann-Whitney U test was applied, while for comparisons of multiple groups the Kruskal-Wallis H test was used. The Mann-Whitney U test was applied to compare groups with unequal numbers (Mann & Whitney, 1947). The Cronbach α reliability index for the PSS-10 test in the entire sample was .77 and above .73 in individual subgroups included in the analyses (Table 7). The level of statistical significance adopted in the analyses was $p < .05$. Statistical analyses were conducted using the R (4.0.3) and RStudio (1.4.1103) software.

RESULTS

A comparison of both groups of men – high-risk alcohol consumers and low-risk alcohol consumers – showed that there are far fewer young people (under 35 years of age) among high-risk alcohol consumers than in the general population. In the group of men who heavily consumed alcohol, fewer people with higher levels of education were identified than in the general population. Taking into account the educational attainment rate of 14 years of education or more, this group constituted 24% among high-risk alcohol consumers, while in the general population it was 60.7%. The low level of education of patrons of drinking-oriented facilities can be considered a distinguishing feature of this category of respondents.

The stress index level measured by the PSS-10 test was 17.81 ($SD = 5.68$) for the entire sample. This result did not significantly differ in the surveyed groups of men abusing alcohol and those consuming it occasionally. A comparison of percentages reflecting the groups of respondents experiencing low, medium or high levels of stress showed statistically significant differences (Table 2). Among high-risk alcohol consumers, lower incidence rates of low (9.6%) and high (2.9%) levels of stress were recorded than in the general population (25.7% and 6.8%, respectively). Of the variables included in the study, the level of perceived

stress was not affected by age, level of education, or being vaccinated or not against COVID-19.

The study participants were asked to indicate what worried or irritated them in connection with the COVID-19 pandemic ongoing at the time of the study. Of the nine options, respondents answered differently in the case of “Situation on the labor market,” “Other people’s attitudes,” and, in the case of the additional, tenth option, “I don’t have any worries.” Men from the general population, representing various patterns of alcohol consumption, were more often (29.3%) worried about the situation on the labor market than respondents abusing alcohol (19.2%). Low-risk alcohol consumers (48.2%) were also more likely than high-risk alcohol consumers (29.8%) to be concerned or angry about other people’s attitudes towards the pandemic or vaccination. On the other hand, a lack of worries was more often reported by high-risk alcohol consumers (46.2%) than by low-risk alcohol consumers (5.8%). At least one stressor associated with the pandemic was identified by 67.3% of high-risk alcohol consumers and 94.8% of low-risk alcohol consumers ($\chi^2 = 37.87, p < .001$).

In both studied groups, the relationship between being vaccinated against COVID-19 and the causes of annoyance or worry in the context of the pandemic was also verified. Among men abusing alcohol and consuming on the premises, the vaccination status differentiated the distribution in the case of responses regarding one’s own health status and the pressure to have a vaccination. Thus, those who had been vaccinated were concerned about their own health more often (28.6%) than those who had not been vaccinated (9.4%). On the other hand, unvaccinated men (31.2%) were more worried or angry about the pressure to have a vaccination than the vaccinated ones (12.7%). Among men from the general population, the vaccination status was statistically significantly correlated with all categories of responses, with the exception of difficulties in access to health services, other people’s attitudes and the lack of worries related to the ongoing pandemic.

An overview of the results recorded in the study including intergroup comparisons is presented in Table 1.

DISCUSSION

While numerous studies have been conducted so far to assess variables related to the impact of the pandemic on mental health, to our knowledge, this is the first or one of very few studies on experiencing stress related to the COVID-19 pandemic among people with an alcohol problem.

The obtained results indicate a similar level of stress in high-risk alcohol consumers and the general population in terms of the total PSS-10 score

High-risk drinking: stress and associated risk factors in the 3rd wave of pandemic

(18.40 vs. 17.50, $p = .185$). Slightly higher PSS-10 results among high-risk alcohol consumers were observed regardless of age, education or COVID-19 vaccination status (Tables 1 and 3), although they did not reach the level of statistical significance. Significant differences were noted according to assignment of the respondents to groups with different levels of perceived stress, indicating much higher levels of stress among high-risk alcohol consumers.

This difference can be observed despite the significantly higher F2 factor (perceived self-efficacy) in high-risk alcohol consumers (Table 6). In the context of the latter finding, the much higher number of “I don’t have any worries” answers among high-risk alcohol consumers in relation to the general popula-

tion (46.2% vs. 5.8%, $p < .001$, Table 4) is also puzzling. Considering the inconsistency of these variables with the overall results of PSS-10 (46.2% of high-risk alcohol consumers said that they had no worries, and at the same time 90.4% reported average or high levels of stress), one might wonder whether the mechanism of illusion and denial, frequent in alcohol abusers, translates into other spheres of life. Another possible explanation may be that most of the worries result from non-pandemic factors, although only three respondents indicated that. This is not fully confirmed by the high percentage of mixed responses either. Approximately 40% of the respondents gave the answer “I don’t have any worries” and simultaneously listed at least one other worry (in some cases even

Jakub Grabowski,
Tomasz Michalski,
Maciej Brosz,
Aleksandra
Brzozowska,
Gursimran Gaba

Table 5

Concerns related to the pandemic in the study groups taking into account COVID-19 vaccination status

Is there anything that worries (or annoys) you about the ongoing epidemic?	High-risk alcohol consumers (n = 104)				Low-risk alcohol consumers (n = 191)				p-value between groups
	Yes (%)	No (%)	χ^2	p	Yes (%)	No (%)	χ^2	p	
Vaccinated									
My health status	28.6	9.4	3.50	.038	30.7	–	8.91	< .001	.001
The health of my loved ones	31.7	18.8	1.21	.227	39.2	16.0	4.07	.026	.030
Restrictions imposed by the authorities	27.0	34.4	0.26	.482	14.4	64.0	28.63	< .001	< .001
Situation on the labor market	14.3	25.0	1.01	.258	34.0	4.0	7.86	.002	.001
Pressure to get vaccinated	12.7	31.2	3.62	.050	11.8	80.0	55.59	< .001	< .001
Difficulties in access to health services	31.7	25.0	0.20	.635	41.8	28.0	1.19	.271	.164
Other people’s attitudes	34.9	25.0	0.56	.360	48.4	44.0	0.04	.830	.053
Media coverage	22.2	31.2	0.50	.454	24.2	56.0	9.14	.003	.007
My worries not related to the pandemic	20.6	28.1	0.31	.447	25.5	8.0	2.79	.071	.224
I don’t have any worries	41.3	53.1	0.77	.286	4.6	12.0	1.05	.150	< .001

Table 6

Descriptive statistics of PSS-10, F1 and F2

PSS-10 item	High-risk alcohol consumers (n = 104)	Low-risk alcohol consumers (n = 191)	Mann-Whitney U test	p
	<i>M ± SD</i>		<i>U</i>	
PSS-10	18.4 ± 4.44	17.5 ± 6.24	10857	.185
F1	11.3 ± 4.57	11.6 ± 4.29	9370	.421
F2	7.09 ± 3.01	5.86 ± 2.82	12334	< .001

Note. PSS-10 – 10-item Perceived Stress Scale; F1 – perceived helplessness; F2 – perceived self-efficacy.

3 or more). However, it is possible, as mentioned below in the limitations of the study, that the results are inconsistent due to the state of alcohol intoxication in some respondents.

Older and less educated people dominated among high-risk alcohol consumers, which contrasts with some other studies (Killgore et al., 2021; McAloney-Kocaman, 2022; Radoš Krnel et al., 2022), but may result from the specific selection of the study group.

Factors related to the pandemic seem to clearly affect both groups of respondents. At least one stressor was identified by 2/3 of high-risk alcohol consumers and almost all low-risk alcohol consumers. Persons from the general population were clearly more worried about the situation on the labor market and other people's attitudes. The explanation here may be that, as mentioned above, most of the polled high-risk alcohol consumers were probably professionally active, while in the general population the unemployment rate may have been higher. In addition, the majority of the studied drinkers were from working-class environments and the demand for simple manual labor (e.g. construction work, logistics and municipal services) during the pandemic did not decrease, unlike other sectors (e.g. retail, entertainment and food services) (GUS, 2021). Indifference to other people's attitudes towards the COVID-19 pandemic, slightly higher among high-risk alcohol consumers, may be a derivative of this self-confidence, and also associated with the observed high values of perceived self-efficacy (Bantounou, 2023). Other people's approach towards the pandemic may involve both excessive compliance with the recommendations (in the opinion of the respondents ignoring the restrictions) and the opposite situation – ignoring the recommendations (in the opinion of those worried about their own health and that of loved ones). These attitudes remain the most frequently indicated stress factor affecting the respondents. The attitude towards COVID-19 vaccinations seems to be a more distinctive factor than alcohol consumption itself as far as perception of the external situation related to the pandemic as stressful is concerned. Vaccinated people more often pointed to stress factors directly related to their own and their loved ones' health and to the access to medical services. This may be due to greater awareness of the threats caused by the COVID-19 pandemic, which also motivated them to get the vaccination. On the other hand, unvaccinated people clearly more often indicated social situations as stressful factors related to the pandemic: pressure to get vaccinated, restrictions imposed by the authorities (inevitably affecting unvaccinated persons more), or media coverage (in Poland clearly encouraging vaccination regardless of the political aspect).

Although the results obtained in the unvaccinated group are not surprising, consideration of these factors in the context of the overall relatively high

Table 7

Reliability analysis of PSS-10, F1 and F2

	High-risk alcohol consumers (n = 104)	Low-risk alcohol consumers (n = 191)
F1	.88	.77
F2	.84	.73
PSS-10	.75	.82

Note. PSS-10 – 10-item Perceived Stress Scale; F1 – perceived helplessness; F2 – perceived self-efficacy.

High-risk drinking: stress and associated risk factors in the 3rd wave of pandemic

level of stress makes it necessary to take into consideration the potential costs of social pressure on vaccinations. Despite undeniable benefits for the population, maintaining a large group of people under increased stress has its costs as well, including for the health care system (distress translating into an increase in the incidence of somatic and mental diseases). Nevertheless, the level of stress among non-vaccinated individuals appears to be slightly lower than among vaccinated persons. These results were not statistically significant, but the relatively high percentage of people who refused to answer the question about the vaccination status is worth noting (Table 1).

A similar percentage of vaccinated and unvaccinated persons, regardless of their alcohol consumption, indicated the limited access to medical services (at that time the closure of many clinics and the introduction of teleconsultations on a large scale) and other people's attitudes towards the pandemic (probably perceived differently by each group), as well as those unrelated to the pandemic, as the main stress factors. It is worth noting that high-risk non-vaccinated alcohol consumers reported stress factors associated with the pandemic significantly less often than low-risk alcohol consumers. However, it is difficult to resolve whether alcohol has any protective role in the context of the overall results of PSS-10, especially since stress factors unrelated to the pandemic were quoted much more often in this case (28.1% vs. 8.0%, Table 5). Similar results, indicating that stress related to the COVID-19 pandemic is generally a predictor of lower alcohol consumption, have also been reported in other studies (Hahm et al., 2023). The pandemic and the related restrictions seem to be such a strong risk factor for the intensification of distress and the development of mental disorders that it is independent of the pattern of alcohol consumption or its change (Wittenberg et al., 2022). Killgore et al. (2021) argue that high-risk drinking correlates with being under lockdown (i.e. being in close contact with other family members), which presents yet another perspective on the problem of pandemic constraints and drinking patterns.

LIMITATIONS

This study has numerous limitations. First of all, the cross-sectional nature prevents any inference about the nature of the observed correlations. Limiting the study group to male respondents and a relatively small number of responses prevents generalization of the obtained data.

The specific nature of the selected recruitment method meant that some respondents could provide their answers while under the influence of alcohol; however, their sobriety was not checked. This puts their credibility into question and reduces data quality. It is also crucial in terms of alcohol's potential relaxant effects. On the other hand, despite this risk, people manifesting hazardous alcohol use were definitely more likely to be assigned to the group of people with moderate or high stress than people who drank in a non-hazardous way.

The difficulties in focusing attention in a noisy environment and the time pressure expected at the planning stage and observed during the pilot period of the study resulted in limiting the number of questions to the absolute minimum. This translated into obtaining insufficient demographic data, including regarding the employment status, although it can be assumed that the vast majority of drinkers were employed (they consumed alcohol in premises mainly catering to workers, during the afternoon rush hours).

In the pilot part, screening with use of the CAGE questionnaire was conducted. The provided answers were disproportionate to the data obtained objectively; hence, this part of the survey was abandoned. Consequently, no other way of estimating alcohol use disorder has been implemented than consumption of specific quantities of alcohol per week. Using a screening tool (e.g. AUDIT) in further research could make the results more credible and beneficial in terms of problem comprehension.

The study did not attempt to estimate the respondents' somatic state or to assess their comorbidities (both mental and somatic) or their family, financial and personal situation. Therefore, knowledge about the real factors that may affect the respondents' stress level is lacking.

Also, it should be noted that the assessment of risk related to heavy alcohol drinking is very complicated and the number of drinks consumed per week is not an accurate measurement, but rather a simplification.

There is also not enough similar research that could be a reference point for this work.

CONCLUSIONS

This study is one of the few attempts to describe the level of stress and possible stressors among the group of people who abused alcohol during the

COVID-19 pandemic, with a particular emphasis on its acute period (the third wave). The obtained results indicate a more frequent occurrence of medium and high levels of stress in the group of high-risk alcohol consumers. This is in spite of higher perceived self-efficacy in this group and frequently stating a lack of any worries. This may suggest extension of the mechanism of illusion and denial to aspects of life other than alcohol abuse. The most common stressors for both surveyed groups were other people's attitudes towards the COVID-19 pandemic, restrictions on access to medical services and media coverage. No effect of vaccination on the reduction of stress levels was observed.

The obtained results indicate that a high level of distress is mainly related to other people's behaviors and attitudes. Therefore, in case of similar crises in the future the risk of developing many somatic and mental disorders could potentially be reduced to a significant extent by appropriate actions being taken by those responsible (toning down the media message, mitigating antagonism, educating the population). Particular attention should be paid to people with substance use disorders, because their apparent efficiency and underestimation of issues might not accurately reflect the degree of perceived suffering. Some authors have already pointed out that the pandemic has changed access to substance use services to such a degree that a totally new philosophy is needed in the area of harm reduction (Kouimtsidis et al., 2021).

Further research in this direction should focus on eliminating the limitations of this study, deepening the diagnosis of alcohol use disorder, examining other substance use disorders, establishing the correlation between alcohol consumption and stress factors, and estimating the change in alcohol use when a crisis affects the entire population. Incorporation of qualitative data should also be considered as it could provide valuable data and help better understand the respondents.

DISCLOSURES

This research received no external funding. The study was approved by the Bioethics Committee of the Medical University of Gdansk (Approval No. NKBBN/144-6/2022 dated 11.01.2022 – on the basis of decision No. NKBBN/144/2021 dated 05.03.2021). The authors declare no conflict of interest.

REFERENCES

Acuff, S. F., Strickland, J. C., Tucker, J. A., & Murphy, J. G. (2022). Changes in alcohol use during COVID-19 and associations with contextual and

Jakub Grabowski,
Tomasz Michalski,
Maciej Brosz,
Aleksandra
Brzozowska,
Gursimran Gaba

- individual difference variables: a systematic review and meta-analysis. *Psychology of Addictive Behaviors*, 36, 1–19. <https://doi.org/10.1037/adb0000796>
- Bantounou, M. A. (2023). A narrative review of the use of alcohol during the COVID-19 pandemic; effects and implications. *Journal of Addictive Diseases*, 41, 30–40. <https://doi.org/10.1080/10550887.2022.2058852>
- Becker, H. C. (2017). Influence of stress associated with chronic alcohol exposure on drinking. *Neuropharmacology*, 122, 115–126. <https://doi.org/10.1016/j.neuropharm.2017.04.028>
- Bidzan-Bluma, I., Bidzan, M., Jurek, P., Bidzan, L., Knietzsch, J., Stueck, M., & Bidzan, M. (2020). A Polish and German population study of quality of life, well-being, and life satisfaction in older adults during the COVID-19 pandemic. *Frontiers in Psychiatry*, 11, 585813. <https://doi.org/10.3389/fpsy.2020.585813>
- Boniface, S., Card-Gowers, J., & Webber, L. (2022). The COVID-19 hangover: Why we need to take harm caused by alcohol seriously as an indirect effect of the pandemic. *British Journal of Hospital Medicine*, 83, 1–3. <https://doi.org/10.12968/hmed.2022.0384>
- Charles, N. E., Strong, S. J., Burns, L. C., Bullerjahn, M. R., & Serafine, K. M. (2021). Increased mood disorder symptoms, perceived stress, and alcohol use among college students during the COVID-19 pandemic. *Psychiatry Research*, 296, 113706. <https://doi.org/10.1016/j.psychres.2021.113706>
- Clay, J. M., Fontana, B. D., Proserpio, C., Fernandez, E. J., Pagliarini, E., Lopes, F., López-Moreno, J. A., Canales, J. J., Loyant, L., Doron, R., Stafford, L. D., & Parker, M. O. (2023a). Drinking during social isolation: investigating associations between stress, inhibitory control, boredom, drinking motives, and alcohol use. *Addiction Research and Theory*, 31, 16–28. <https://doi.org/10.1080/16066359.2022.2099543>
- Clay, J. M., Stafford, L. D., & Parker, M. O. (2023b). Associations between self-reported inhibitory control, stress, and alcohol (mis)use during the first wave of the COVID-19 pandemic in the UK: a national cross-sectional study utilising data from four birth cohorts. *International Journal of Mental Health and Addiction*, 21, 350–371. <https://doi.org/10.1007/s11469-021-00599-8>
- Du, C., Zan, M. C. H., Cho, M. J., Fenton, J. I., Hsiao, P. Y., Hsiao, R., Keaver, L., Lai, C. C., Lee, H., Ludy, M. J., Shen, W., Swee, W. C. S., Thivikraman, J., Tseng, K. W., Tseng, W. C., Doak, S., Folk, S. Y. L., & Tucker, R. M. (2021). The effects of sleep quality and resilience on perceived stress, dietary behaviors, and alcohol misuse: a mediation-moderation analysis of higher education students from Asia, Europe, and North America during the COVID-19 pandemic. *Nutrients*, 13, 442. <https://doi.org/10.3390/nu13020442>
- Fal, A. M. (2023). *Zwrot w modelach konsumpcji. Alkohol w Polsce* (2. edycja) [Turnaround in consumption patterns. Alcohol in Poland (2nd edition)]. Pracodawcy Rzeczypospolitej Polskiej.
- Gavurova, B., Ivankova, V., & Rigelsky, M. (2020). Relationships between perceived stress, depression and alcohol use disorders in university students during the COVID-19 pandemic: a socio-economic dimension. *International Journal of Environmental Research and Public Health*, 17, 1–25. <https://doi.org/10.3390/ijerph17238853>
- Grabowski, J., Stepien, J., Waszak, P., Michalski, T., Meloni, R., Grabkowska, M., Macul, A., Rojek, J., Sagan, I., & Bidzan, L. (2021). Social isolation during COVID-19 pandemic. Perceived stress and containment measures compliance among Polish and Italian residents. *Frontiers in Psychology*, 12, 673514. <https://doi.org/10.3389/fpsyg.2021.673514>
- Główny Urząd Statystyczny [GUS] (2021). *Wybrane aspekty rynku pracy w Polsce. Aktywność ekonomiczna ludności przed i w czasie pandemii COVID-19* [Selected aspects of the labor market in Poland. Economic activity of the population before and during the COVID-19 pandemic]. Retrieved from <https://stat.gov.pl/obszary-tematyczne/rynek-pracy/zasady-metodyczne-rocznik-pracy/wybrane-aspekty-rynku-pracy-w-polsce-aktywnosc-ekonomiczna-ludnosci-przed-i-w-czasie-pandemii-covid-19,11,1.html>
- Hahm, H. C., Hsu, K. C., Hyun, S., Kane, K., & Liu, C. H. (2023). Psychological distress and heavy alcohol consumption among U.S. young women during the COVID-19 pandemic. *Women's Health Issues*, 33, 17–24. <https://doi.org/10.1016/j.whi.2022.09.002>
- Jacob, L., Smith, L., Armstrong, N. C., Yakkundi, A., Barnett, Y., Butler, L., McDermott, D. T., Koyanagi, A., Shin, J. I., Meyer, J., Firth, J., Remes, O., López-Sánchez, G. F., & Tully, M. A. (2021). Alcohol use and mental health during COVID-19 lockdown: A cross-sectional study in a sample of UK adults. *Drug and Alcohol Dependence*, 219, 108488. <https://doi.org/10.1016/j.drugalcdep.2020.108488>
- Kilian, C., Carr, S., Schulte, B., & Manthey, J. (2023). Increased alcohol-specific mortality in Germany during COVID-19: State-level trends from 2010 to 2020. *Drug and Alcohol Review*, 42, 633–640. <https://doi.org/10.1111/dar.13573>
- Kilian, C., Rehm, J., Allebeck, P., Braddick, F., Gual, A., Barták, M., Bloomfield, K., Gil, A., Neufeld, M., O'Donnell, A., Petruželka, B., Rogalewicz, V., Schulte, B., & Manthey, J. (2021). Alcohol consumption during the COVID-19 pandemic in Europe: a large-scale cross-sectional study in 21 countries. *Addiction*, 116, 3369–3380. <https://doi.org/10.1111/add.15530>
- Killgore, W. D. S., Cloonan, S. A., Taylor, E. C., Lucas, D. A., & Dailey, N. S. (2021). Alcohol dependence during COVID-19 lockdowns. *Psychiatry*

High-risk drinking: stress and associated risk factors in the 3rd wave of pandemic

Research, 296, 113676. <https://doi.org/10.1016/j.psychres.2020.113676>

- Koopmann, A., Georgiadou, E., Kiefer, F., & Hillema-cher, T. (2020). Did the general population in Ger- many drink more alcohol during the COVID-19 pandemic lockdown? *Alcohol and Alcoholism*, 55, 698–699. <https://doi.org/10.1093/alcalc/agaa058>
- Korolkiewicz, P. K., Skrzypkowska, P., Ali, S., & Gra- bowski, J. (2022). A descriptive study of welfare and mental health issues among health-related sciences undergraduate students at the Medi- cal University of Gdansk. *International Journal of Social Psychiatry*, 68, 1184–1191. <https://doi.org/10.1177/00207640211068982>
- Kouimtsidis, C., Pauly, B., Parkes, T., Stockwell, T., & Baldacchino, A. M. (2021). COVID-19 social res- trictions: an opportunity to re-visit the concept of harm reduction in the treatment of alcohol depen- dence. A position paper. *Frontiers in Psychiatry*, 12, 623649. <https://doi.org/10.3389/fpsy.2021.623649>
- Loretto, L., Mastrangelo, G., Stepien, J., Grabowski, J., Meloni, R., Piu, D., Michalski, T., Waszak, P. M., Bellizzi, S., & Cegolon, L. (2021). Attitudes and per- ceptions of health protection measures against the spread of COVID-19 in Italy and Poland. *Frontiers in Psychology*, 12, 805790. <https://doi.org/10.3389/fpsyg.2021.805790>
- Malczewski, A., Jabłoński, P., Szmidt, J., Bajerow- ska, B., Borkowska, M., Bukowska, B., Chojec- ki, D., Dalmata, M., Frączek, R., Kidawa, M., Łu- kowska, K., Michalska, K., Muszyńska, D., Siedlec- ka, A., Słodownik-Przybyłek, L., & Zin-Sędek, M. (2023). *Raport 2023: Uzależnienia w Polsce* [Report 2023: Addictions in Poland]. Krajowe Centrum Przeciwdziałania Uzależnieniom.
- Mann, H. B., & Whitney, D. R. (1947). On a test of whether one of two random variables is stochasti- cally larger than the other. *Annals of Mathematical Statistics*, 18, 50–60. <https://doi.org/10.1214/aoms/1177730491>
- Marano, G., Traversi, G., Gaetani, E., Pola, R., Claro, A. E., & Mazza, M. (2022). Alcohol use disorder and liver injury related to the COVID-19 pan- demic. *World Journal of Hepatology*, 14, 1875–1883. <https://doi.org/10.4254/wjh.v14.i10.1875>
- McAloney-Kocaman, K., McPherson, K. E., Mc- Glinchey, E., & Armour, C. (2022). Factors associ- ated with changing alcohol consumption during the first UK lockdown. *European Journal of Public Health*, 32, 766–772. <https://doi.org/10.1093/eur- pub/ckac124>
- Mengin, A. C., Rolling, J., Porche, C., Durpoix, A., & Lalanne, L. (2022). The intertwining of posttrau- matic stress symptoms, alcohol, tobacco or nico- tine use, and the COVID-19 pandemic: a system- atic review. *International Journal of Environmental Research and Public Health*, 19, 14546. <https://doi.org/10.3390/ijerph192114546>
- Michalski, T., Brosz, M., Kiniorska, I., Matviyishyn, Y., Grabowski, J., Strzałkowska, A., & Anisiewicz, R. (2023). Samoocena poziomu stresu mieszkań- ców Trójmiasta, Kielc i Lwowa podczas pande- mii COVID-19 [Self-assessment of the stress level of residents of Tricity, Kielce and Lviv during the COVID-19 pandemic]. *Czasopismo Geograficzne*, 94, 327–338. <https://doi.org/10.12657/czageo-94-14>
- Michalski, T., Brosz, M., Stepien, J., Biernacka, K., Blaszczyk, M., & Grabowski, J. (2021). Perceived stress levels among Ukrainian migrant and LGBT+ minorities in Poland during the COVID-19 pan- demic. *International Journal of Environmental Re- search and Public Health*, 18, 12838. <https://doi.org/10.3390/ijerph182312838>
- Mojica-Perez, Y., Livingston, M., Pennay, A., & Call- inan, S. (2022). Examining the relationship between alcohol consumption, psychological distress and COVID-19 related circumstances: an Australian longitudinal study in the first year of the pan- demic. *Addictive Behaviors*, 135, 107439. <https://doi.org/10.1016/j.addbeh.2022.107439>
- Molsberry, R., Maskaly, J., & Reingle Gonzalez, J. M. (2021). Disentangling the root causes of COVID-19 related increases in alcohol consumption. *The American Journal of Drug and Alcohol Abuse*, 47, 1–4. <https://doi.org/10.1080/00952990.2021.1881532>
- National Institute on Alcohol Abuse and Addic- tion (2023). *Drinking levels defined*. Retrieved from [https://www.niaaa.nih.gov/alcohol-health/ overview-alcohol-consumption/moderate-binge- drinking](https://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/moderate-binge- drinking)
- Pavarin, R. M., Fabbri, C., & de Ronchi, D. (2022). COVID-19 hospitalization rates in individuals with substance or alcohol use disorders. *Psychia- try Research*, 311, 114521. <https://doi.org/10.1016/j.psychres.2022.114521>
- Radoš Krnel, S., Roškar, M., Hovnik Keršmanc, M., Reh- berger, M., Levičnik, G., & Hočevar Grom, A. (2022). Changes in alcohol consumption among different population groups during the SARS-CoV-2 pan- demic: Outcomes of the Slovenian cross-sectional national survey (SI-PANDA). *International Journal of Environmental Research and Public Health*, 19, 13576. <https://doi.org/10.3390/ijerph192013576>
- Rodriguez, L. M., Litt, D. M., & Stewart, S. H. (2020). Drinking to cope with the pandemic: The unique associations of COVID-19-related perceived threat and psychological distress to drinking behaviors in American men and women. *Addictive Behav- iors*, 110, 106532. <https://doi.org/10.1016/j.addbeh.2020.106532>
- Thompson, R., Hagen, B. N. M., Lumley, M. N., Win- der, C. B., Gohar, B., & Jones-Bitton, A. (2022). Mental health and substance use of farmers in Canada during COVID-19. *International Journal of Environmental Research and Public Health*, 19, 13566. <https://doi.org/10.3390/ijerph192013566>

Jakub Grabowski,
Tomasz Michalski,
Maciej Brosz,
Aleksandra
Brzozowska,
Gursimran Gaba

- Tikaria, R., Khan, M. A., Wang, L., Olomu, A., Rayamajhi, S., & Basnet, N. (2022). Alcohol use disorder admissions during the COVID-19 pandemic: Findings from a tertiary community hospital. *Cureus*, *14*, e29711. <https://doi.org/10.7759/cureus.29711>
- Törrönen, J., Månsson, J., Samuelsson, E., Roumeliotis, F., Svensson, J., Kraus, L., & Room, R. (2022). How COVID-19 restrictions affected young people's well-being and drinking practices: Analyzing interviews with a socio-material approach. *International Journal of Drug Policy*, *110*, 103895. <https://doi.org/10.1016/j.drugpo.2022.103895>
- Tudehope, L., Lee, P., Wiseman, N., Dwirahmadi, F., & Sofija, E. (2022). The effect of resilience on the relationship between perceived stress and change in alcohol consumption during the COVID-19 pandemic in Queensland, Australia. *Journal of Health Psychology*, *27*, 2696–2713. <https://doi.org/10.1177/13591053211062351>
- Valente, J. Y., Sohi, I., Garcia-Cerde, R., Monteiro, M. G., & Sanchez, Z. M. (2021). What is associated with the increased frequency of heavy episodic drinking during the COVID-19 pandemic? Data from the PAHO regional web-based survey. *Drug and Alcohol Dependence*, *221*, 108621. <https://doi.org/10.1016/j.drugalcdep.2021.108621>
- Windle, M., & Windle, R. C. (2015). A prospective study of stressful events, coping motives for drinking, and alcohol use among middle-aged adults. *Journal of Studies on Alcohol and Drugs*, *76*, 465–473. <https://doi.org/10.15288/jsad.2015.76.465>
- Wittenberg, E., Labutte, C., Thornburg, B., Gebreslassie, A., Barbosa, C., & Bray, J. W. (2022). Alcohol consumption and health-related quality of life in the US during the COVID-19 pandemic: a US national survey. *Journal of Patient-Reported Outcomes*, *6*, 106. <https://doi.org/10.1186/s41687-022-00516-0>

High-risk drinking: stress and associated risk factors in the 3rd wave of pandemic