

## FACTORS ASSOCIATED WITH INCREASE IN ALCOHOL CONSUMPTION DURING FIRST MONTHS OF COVID-19 PANDEMIC AMONG ONLINE SOCIAL MEDIA USERS IN RUSSIA

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The significant proportion of the Russian population are active online social media users. Changes in alcohol consumption in this target group during the COVID-19 pandemic remain understudied. The aim of this survey was to investigate changes in alcohol consumption and factors associated with the increase in alcohol use among online social media users in Russia during the first months of the COVID-19 pandemic. An online survey was conducted among 1,518 users of online social networking services popular in Russia from June to September 2020. The survey revealed that 35.4% of men and 25.6% of women started drinking more frequently during the first months of the pandemic; 24.9% of men and 17.7% of women increased their usual consumption (volume) of alcohol on a typical drinking occasion, whereas 28.5% of men and 27.9% of women increased the frequency of heavy episodic drinking. Adjusted binary logistic regression analysis revealed a positive association between the increase in the frequency of alcohol consumption and the following factors: age from 18 to 29 years (OR: 1.710; 95% CI: 1.002–2.917), severe restrictions in everyday private life (OR: 3.127; 95% CI: 1.011–9.675) and severe negative professional or financial consequences due to the spread of SARS-CoV-2 (OR: 2.247; 95% CI: 1.131–4.465). The odds of an increase in the frequency of heavy episodic drinking were more than twice higher (OR: 2.329; 95% CI: 1.001–5.428) among those who had experienced severe negative consequences of the pandemic to their professional and financial situation. Higher typical frequency and usual consumption (volume) of alcohol on a typical drinking occasion and higher typical frequency of heavy episodic drinking before the pandemic were positively significantly associated with the increase in these parameters of alcohol consumption during the first months of the pandemic. In times of large-scale epidemics and public health crises, it is advisable to consider the possibility of implementing screening and brief interventions, including via online social media, to prevent problems associated with alcohol use.

**Keywords:** alcohol, COVID-19, coronavirus, pandemic, social media, Facebook, VKontakte, Odnoklassniki, Twitter, Russia

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## ФАКТОРЫ, ВЗАИМОСВЯЗАННЫЕ С РОСТОМ ПОТРЕБЛЕНИЯ АЛКОГОЛЯ В ПЕРВЫЕ МЕСЯЦЫ ПАНДЕМИИ COVID-19 СРЕДИ ПОЛЬЗОВАТЕЛЕЙ СОЦИАЛЬНЫХ ОНЛАЙН-СЕТЕЙ В РОССИИ

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Значительная часть населения активно пользуется социальными онлайн-сетями, однако изменения потребления алкоголя в этой целевой группе в период пандемии COVID-19 малоизучены. Целью исследования было оценить изменения потребления алкоголя и факторов, связанных с ростом его потребления, в первые месяцы пандемии COVID-19 среди пользователей социальных онлайн-сетей в России. В период с июня по сентябрь 2020 г. 1518 пользователей наиболее популярных в России социальных онлайн-сетей прошли опрос в отношении изменений потребления алкоголя в первые месяцы пандемии COVID-19. Выявлено, что в первые месяцы пандемии 35,4% мужчин и 25,6% женщин увеличили частоту употребления алкоголя; 24,9% мужчин и 17,7% женщин увеличили разовый объем потребления алкоголя, и 28,5% мужчин и 27,9% женщин увеличили частоту случаев эпизодического употребления алкоголя в больших разовых количествах. На многофакторном уровне возраст 18–29 лет (ОШ = 1,710; 95% ДИ = 1,002–2,917), очень сильные ограничения в повседневной жизни (3,127; 1,011–9,675) и очень сильные негативные последствия в отношении профессиональной или финансовой ситуации в связи с распространением SARS-CoV-2 (2,247; 1,131–4,465) были положительно взаимосвязаны с ростом частоты потребления алкоголя. Шансы увеличения частоты эпизодического употребления алкоголя в больших разовых количествах были более чем в два раза выше (2,329; 1,001–5,428) среди лиц, испытавших очень сильные негативные последствия в отношении профессиональной или финансовой ситуации. Более высокие привычные частота употребления алкоголя, разовый объем употребляемого алкоголя и частота эпизодического употребления алкоголя в больших разовых количествах до пандемии были положительно статистически значимо связаны с ростом этих параметров потребления алкоголя в первые месяцы пандемии.

**Ключевые слова:** алкоголь, COVID-19, коронавирус, пандемия, социальные сети, Facebook, ВКонтакте, Оdnoklassniki, Twitter, Россия

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Decisive action taken to counter COVID-19 in Russia and worldwide during the first months of the pandemic slowed the spread of SARS-CoV-2 infection, but it also had a significant impact on many other aspects of life. During the nationwide Russian lockdown, implemented in the second quarter of 2020, the official unemployment rate grew by 2.1%, reaching 6.4%, and the real disposable income of the population fell by 8.4% in comparison with the same period in 2019 [1]. Income reduction and complete loss of income were reported by 61% and 13.5% of the population, respectively; 9.8% of the Russian population lost their jobs [2]. According to recent studies investigating the impact of COVID-19 restrictions across countries, the rates of depression, anxiety and stress among some population groups, especially among women, young adults and people with chronic diseases, have increased [3, 4]. In times of crisis, some turn to alcohol to cope with psychoemotional stress; this can heighten the risk of adverse short-term and long-term health effects and negative social consequences [5, 6]. Increased substance use following large-scale disasters is often the sign of people adopting a self-medicating strategy to deal with emotional distress [7–9]. Research warns that the COVID-19 pandemic may lead to a medium- and long-term increase in alcohol consumption, especially among men [10]. Early studies into the effects of the pandemic have discovered an association between poor overall mental health and increased alcohol use [11]. According to a study conducted in Canada, stress was the third most common (44%) cause of drinking during the pandemic. In the USA, psychological distress caused by the pandemic was associated with increased frequency of alcohol use in both men and women [12]. Research demonstrates that while some proportion of the adult population are increasing their alcohol consumption during the pandemic, an equal proportion are cutting down on alcohol, and 50–70% of the population are not changing their level of alcohol consumption [11, 13]. Because changes in alcohol consumption during the current pandemic may have serious long-term social and economic implications for individuals, groups of people and society as a whole [14, 15], there is a need to monitor these changes and analyze the contributing factors that come forward during a large-scale crisis.

In Russia, online social networking services are actively used by the significant proportion of the population. This opens up a possibility to rapidly assess alcohol consumption among Russian residents and remotely (i.e., via the Internet) implement brief interventions aimed at preventing health problems and other adverse outcomes associated with alcohol use. The aim of this study was to assess changes in alcohol consumption and the factors associated with the increase in alcohol use in the first months of the COVID-19 pandemic among online social media users in Russia in order to explore the possibility of delivering screening and preventive interventions, including those implemented via the Internet, aimed at identifying and preventing alcohol-related problems during large-scale epidemics and public health crises.

## METHODS

An anonymous online survey was conducted from June 18 to September 30, 2020 among users of online social media popular in Russia (Odnoklassniki, VKontakte, Facebook and Twitter). The following inclusion criteria were applied: age  $\geq 18$  years, being an Internet user with or without a user account in the online social media mentioned above, informed consent to participate in the anonymous confidential online survey. Non-inclusion criteria: permanent residence of the respondent outside Russia. Exclusion criteria: refusal to participate or have one's personal data

processed at any stage of the study, inconsistent contradictory answers to the questions included in the survey. Any participant could refuse to participate at any stage of the study. The link to the survey was posted in the online social media in various groups, on popular pages and in the news feed. The survey was adapted from the pan-European study of alcohol use during the COVID-19 pandemic [10] and modified to assess alcohol consumption behaviors in the 3 months preceding the survey. A few original questions were added to the questionnaire to assess consumption of unrecorded alcohol, such as the homemade alcohol (*samogon*, homemade wine, *braga*), alcohol brought from abroad, falsified and counterfeit alcoholic beverages, alcohol-containing liquids not intended for drinking, and other types of unrecorded alcohol. Changes in alcohol use during the first months of the pandemic were assessed from changes in the amount and frequency of alcohol consumption and the frequency of heavy episodic drinking defined as 6 or more drinks or 60g of pure ethanol on a single occasion. Statistical analysis included calculation of descriptive statistics and estimation of the proportion of respondents stratified by sociodemographic or other characteristics who had reduced or increased the frequency of drinking or the amount of alcohol consumed. We also assessed associations between the increase in drinking frequency / amount of consumed alcohol during the first months of the pandemic (dependent variables) and the sociodemographic factors, typical frequency of drinking, the typical amount of consumed alcohol, and the typical frequency of heavy episodic drinking in the past 12 months preceding the pandemic, the perceived strength of COVID-19-associated restrictions in public and everyday private life, stress, negative impact of the pandemic on professional and financial situation, and other adverse consequences of the pandemic (independent variables). The presence, direction, strength and statistical significance of the associations were assessed using unadjusted and adjusted binary logistic regression analysis. Odds ratios (OR) and 95% confidence intervals (95% CI) were calculated as measures of association. Data processing and statistical analysis were conducted in SPSS v.22 (Chicago, IL; USA).

## RESULTS

Of 1,518 respondents, 57.9% were women and 42.1% were men. The majority of the respondents (87.1%) had had an alcoholic drink at least once in 12 months preceding the study (Table 1). Over half of the respondents (55.9%) were 30–49 years old and almost two-thirds had attended and/or completed higher education (63.8%). More men than women lived in larger settlements ( $p = 0.010$ ) and higher-income households ( $p < 0.001$ ). During the first months of the pandemic, their income had changed or fallen less often than that of women ( $p = 0.014$ ). The usual frequency of drinking, the number of standard drinks consumed on a typical occasion, the frequency of heavy episodic drinking, and the proportion of persons consuming unrecorded alcohol were higher among men than among women ( $p < 0.001$ ). Overall, the male respondents reported they had encountered restrictions in public ( $p = 0.007$ ) and everyday private ( $p = 0.003$ ) life less often than women. However, almost a quarter of men (23.2%) and a third of women (30.8%) said they had encountered severe restrictions in public life, whereas one-fifth of men (19.9%) and a quarter of women (25.4%) reported having faced severe restrictions in their everyday private life during the first months of the pandemic. Men had experienced the negative effects of the pandemic on their professional or financial situation significantly less frequently than women ( $p = 0.005$ ). Only 30.4% of men and 23.5% of women reported they had experienced no negative effects on their professional or financial situation. The pandemic

was a source of stress for 50.4% of men and 69.5% of women ( $p < 0.001$ ). A history of confirmed SARS-CoV-2 infection in a respondent, their family or close friends was reported by 21.9% of the participants, with no significant differences by sex (Table 1). In the first months of the pandemic, 35.4% of men and 25.6% of women had used alcohol more frequently than before the pandemic; 24.9% of men and 17.7% of women had increased usual consumption (volume) of alcohol on a typical drinking occasion; the frequency of heavy episodic drinking had increased in 28.5% of men and 27.9% of women.

Results of unadjusted and adjusted logistic regression analysis are shown in Tables 2–4.

### Factors associated with the increase in the frequency of alcohol consumption during the first months of the pandemic

After adjustment for confounders, positive statistically significant associations between the increase in the frequency of alcohol consumption during the first months of the pandemic and the following factors were identified: age of 18–29 years (OR: 1.710;

95% CI: 1.002–2.917), higher typical frequency of alcohol use before the pandemic (from OR: 3.190, 95% CI: 1.887–5.392 for consumption 2–4 times a month, to OR: 18.727, 95% CI: 9.639–36.383 for consumption more than 2–3 times a month), higher usual consumption (volume) of alcohol on a typical drinking occasion before the pandemic (from OR: 1.941, 95% CI: 1.244–3.029 to OR: 2.234, 95% CI: 1.180–4.233), heavy episodic drinking with a frequency of once a month (OR: 2/061; 95% CI: 1.157–3.671) and once a week before the pandemic (OR: 2.012; 95% CI: 1.081–3.746), severe restrictions in everyday private life due to SARS-CoV-2 containment measures (OR: 3.127; 95% CI: 1.011–9.675) and severe negative consequences of the pandemic to the professional or financial situation (OR: 2.247; 95% CI: 1.131–4.465, Table 2).

### Factors associated with the increase of the usual consumption (volume) of alcohol on a typical drinking occasion during the first months of the pandemic

Positive statistically significant associations were identified between the increase of the usual consumption (volume) of

**Table 1.** Sociodemographic characteristics of the respondents and characteristics related to typical alcohol use and the SARS-CoV-2 pandemic, by sex (%)

Characteristic	Men	Women	Both sexes	$p^*$
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
Age (years)				
18–29	150 (23.5)	172 (19.6)	322 (21.2)	0.159
30–49	351 (54.9)	497 (56.5)	848 (55.9)	
≥ 50	138 (21.6)	210 (23.9)	348 (22.9)	
Education				
Secondary or below	143 (22.4)	161 (18.3)	304 (20.0)	0.108
Primary /vocational school or college	95 (14.9)	151 (17.2)	246 (16.2)	
Higher (complete or incomplete)	401 (62.8)	567 (64.5)	968 (63.8)	
Settlement size				
≤ 50,000 population	111 (17.4)	196 (22.3)	307 (20.2)	0.010
50,000 to 1 million	251 (39.3)	362 (41.2)	613 (40.4)	
Over 1 million	277 (43.3)	321 (36.5)	598 (39.4)	
Income per household member (rubles)				
≤ 9,999	130 (20.3)	221 (25.1)	351 (23.1)	< 0.001
10,000–19,999	157 (24.6)	225 (25.6)	382 (25.2)	
20,000–39,999	136 (21.3)	226 (25.7)	362 (23.8)	
40,000–59,999	116 (18.2)	128 (14.6)	244 (16.1)	
≥ 60,000	100 (15.6)	79 (9.0)	179 (11.8)	
Changes in the average monthly household income since the beginning of the SARS-CoV-2 pandemic				
Did not change or increased	341 (53.4)	402 (45.7)	743 (48.9)	0.014
Slightly fell	124 (19.4)	187 (21.3)	311 (20.5)	
Moderately fell	79 (12.4)	149 (17.0)	228 (15.0)	
Dropped significantly	95 (14.9)	141 (16.0)	236 (15.5)	
Typical frequency of alcohol use in the past 12 months before pandemic				
Never	84 (13.4)	108 (12.6)	192 (12.9)	< 0.001
Once a month or less frequently	121 (19.3)	314 (36.5)	435 (29.3)	
2–4 times a month	183 (29.2)	227 (26.4)	410 (27.6)	
2–3 times a week	118 (18.8)	116 (13.5)	234 (15.7)	
More often than 2–3 times a week	121 (19.3)	95 (11.0)	216 (14.5)	
Number of standard alcoholic drinks consumed on a typical drinking occasion in the past 12 months before pandemic**				
1–2	136 (26.0)	424 (57.1)	560 (44.2)	< 0.001
3–6	256 (48.9)	256 (34.5)	512 (40.4)	
7+	131 (25.0)	63 (8.5)	194 (15.3)	

Table 1 cont.

Characteristic	Men	Women	Both sexes	p*
	n (%)	n (%)	n (%)	
Typical frequency of heavy episodic drinking (6 or more standard drinks on a single occasion) in the past 12 months before pandemic				
Never	191 (31.3)	446 (52.3)	637 (43.6)	<0.001
Less than once a month	124 (20.3)	176 (20.7)	300 (20.5)	
Once a month	96 (15.7)	102 (12.0)	198 (13.5)	
Once a week	136 (22.3)	96 (11.3)	232 (15.9)	
Every day or almost every day	63 (10.3)	32 (3.8)	95 (6.5)	
Reported consumption of unrecorded alcohol				
Yes	320 (51.3)	359 (41.9)	679 (45.8)	< 0.001
No	304 (48.7)	498 (58.1)	802 (54.2)	
Reported encountering COVID-19-related restrictions in public life in the past 3 months				
No restrictions	61 (9.7)	65 (7.5)	126 (8.4)	0.007
Slight restrictions	222 (35.3)	267 (30.8)	489 (32.7)	
Moderate restrictions	200 (31.8)	267 (30.8)	467 (31.2)	
Severe restrictions	146 (23.2)	267 (30.8)	413 (27.6)	
Reported encountering COVID-19-related restrictions in their everyday private life in the past 3 months				
No restrictions	81 (12.8)	72 (8.3)	153 (10.2)	0.003
Slight restrictions	255 (40.3)	317 (36.6)	572 (38.2)	
Moderate restrictions	171 (27.0)	257 (29.7)	428 (28.6)	
Severe restrictions	126 (19.9)	220 (25.4)	346 (23.1)	
Reported negative consequences of the pandemic to their professional or financial situation in the past 3 months				
No negative consequences	189 (30.4)	203 (23.5)	392 (26.4)	0.005
Slight negative consequences	235 (37.8)	336 (38.9)	571 (38.5)	
Moderate negative consequences	114 (18.4)	163 (18.9)	277 (18.7)	
Severe negative consequences	83 (13.4)	161 (18.7)	244 (16.4)	
Reported confirmed SARS-CoV-2 infection in themselves, their family or close friends in the past 3 months				
Yes	137 (22.1)	186 (21.8)	323 (21.9)	0.949
No	484 (77.9)	667 (78.2)	1151 (78.1)	
Reported stress due to the spread of SARS-CoV-2 in the past 3 months				
Yes	292 (50.4)	574 (69.5)	866 (61.6)	< 0.001
No	287 (49.6)	252 (30.5)	539 (38.4)	

Note: \* — significance of differences between the groups was assessed using  $\chi^2$ -test for heterogeneity; \*\* — among alcohol drinkers (those who consumed alcohol at least once in the past 12 months).

Table 2. Associations of sociodemographic factors, typical frequency and volume of alcohol use, unrecorded alcohol consumption, negative consequences of the COVID-19 pandemic with the increase in the frequency of alcohol consumption in the first months of the COVID-19 pandemic, 2020, (OR, 95% CI)

Variables	Respondents who increased frequency of alcohol consumption		Unadjusted	Adjusted
	n / N	%	OR (95% CI)	OR (95% CI)
Sex				
Male	191/539	35.4	1.511 (1.188–1.921)	0.946 (0.664–1.348)
Female	198/743	26.6	1.0	1.0
Age (years)				
18–29	91/267	34.1	1.559 (1.076–2.257)	1.710 (1.002–2.917)
30–49	228/734	31.1	1.358 (0.994–1.856)	1.082 (0.690–1.698)
≥ 50	70/281	24.9	1.0	1.0
Education				
Secondary or below	69/236	29.2	1.610 (1.027–2.525)	1.514 (0.807–2.839)
Primary /vocational school or college	39/191	20.4	1.0	1.0
Higher (complete or incomplete)	281/855	32.9	1.908 (1.305–2.789)	1.644 (0.952–2.842)
Settlement size				
≤ 50,000 population	54/240	22.5	0.506 (0.356–0.718)	0.952 (0.576–1.574)

Table 2 cont.

Variables	Respondents who increased frequency of alcohol consumption		Unadjusted	Adjusted
	n / N	%	OR (95% CI)	OR (95% CI)
50,000 to 1 million	141/510	27.6	0.666 (0.512–0.865)	1.272 (0.871–1.858)
Over 1 million	194/532	36.5	1.0	1.0
Income per household member (rubles)				
≤ 9,999	73/276	26.4	0.622 (0.409–0.944)	1.048 (0.561–1.957)
10,000–19,999	83/305	27.2	0.646 (0.430–0.972)	1.009 (0.569–1.791)
20,000–39,999	101/321	31.5	0.794 (0.533–1.181)	1.222 (0.705–2.117)
40,000–59,999	73/219	33.3	0.864 (0.564–0.324)	0.934 (0.528–1.650)
≥ 60,000	59/161	36.6	1.0	1.0
Changes in the average monthly household income since the beginning of the SARS-CoV-2 pandemic				
Did not change or increased	166/628	26.4	1.0	1.0
Slightly fell	84/258	32.6	1.344 (0.980–1.841)	1.074 (0.687–1.680)
Moderately fell	58/194	29.9	1.187 (0.832–1.693)	0.822 (0.485–1.393)
Dropped significantly	81/202	40.1	1.863 (1.336–2.598)	1.432 (0.803–2.552)
Typical frequency of alcohol use in the past 12 months before pandemic				
Once a month or less frequently	32/430	7.4	1.0	1.0
2–4 times a month	110/404	27.2	4.653 (3.053–7.093)	3.190 (1.887–5.392)
2–3 times a week	115/233	49.4	12.121 (7.788–18.865)	7.017 (3.898–12.632)
More often than 2–3 times a week	132/215	61.4	19.780 (12.576–31.110)	18.727 (9.639–36.383)
Number of standard alcoholic drinks consumed on a typical drinking occasion in the past 12 months before pandemic				
1–2	84/517	16.2	1.0	1.0
3–6	198/505	39.2	3.325 (2.477–4.461)	1.941 (1.244–3.029)
7+	91/186	48.9	4.938 (3.409–7.152)	2.234 (1.180–4.233)
Typical frequency of heavy episodic drinking (6 or more standard drinks on a single occasion) in the past 12 months before pandemic				
Never	61/441	13.8	1.0	1.0
Less than once a month	69/289	23.9	1.954 (1.333–2.864)	1.184 (0.712–1.969)
Once a month	77/192	40.1	4.171 (2.809–6.194)	2.061 (1.157–3.671)
Once a week	119/229	52.0	6.739 (4.634–9.801)	2.012 (1.081–3.746)
Every day or almost every day	51/92	55.4	7.749 (4.738–12.674)	1.094 (0.444–2.695)
Reported consumption of unrecorded alcohol				
Yes	221/642	34.4	1.498 (1.174–1.912)	1.246 (0.897–1.730)
No	158/609	25.9	1.0	1.0
Reported encountering COVID-19-related restrictions in public life in the past 3 months				
No restrictions	17/87	19.5	1.0	1.0
Slight restrictions	84/407	20.6	1.071 (0.598–1.916)	0.703 (0.250–1.977)
Moderate restrictions	133/413	32.2	1.956 (1.108–3.454)	1.068 (0.349–3.270)
Severe restrictions	151/363	41.6	2.933 (1.659–5.184)	1.020 (0.315–3.299)
Reported encountering COVID-19-related restrictions in their everyday private life in the past 3 months				
No restrictions	18/111	16.2	1.0	1.0
Slight restrictions	101/470	21.5	1.414 (0.815–2.453)	1.636 (0.622–4.304)
Moderate restrictions	133/385	34.5	2.727 (1.579–4.711)	2.594 (0.890–7.564)
Severe restrictions	134/304	44.1	4.073 (2.342–7.081)	3.127 (1.011–9.675)
Reported negative consequences of the pandemic to their professional or financial situation in the past 3 months				
No negative consequences	65/318	20.4	1.0	1.0
Slight negative consequences	142/492	28.9	1.579 (1.129–2.208)	1.240 (0.772–1.990)
Moderate negative consequences	87/239	36.4	2.228 (1.525–3.255)	1.524 (0.848–2.739)
Severe negative consequences	89/211	42.2	2.839 (1.930–4.177)	2.247 (1.131–4.465)
Reported confirmed SARS-CoV-2 infection in themselves, their family or close friends in the past 3 months				
Yes	82/278	29.5	0.956 (0.714–1.280)	0.846 (0.575–1.245)
No	295/969	30.4	1.0	1.0
Reported stress due to the spread of SARS-CoV-2				
Yes	254/746	34.0	1.587 (1.218–2.068)	1.306 (0.892–1.911)
No	108/440	24.5	1.0	1.0



alcohol on a typical drinking occasion during the pandemic and the following factors: drinking alcohol 2 times a week and more often before the pandemic (from OR: 2.587; 95% CI: 1.360–4.918 to OR: 12.021; 95% CI: 5.712–25.300), consuming 3 or more alcoholic drinks on a typical drinking

occasion before the pandemic (for 3–6 drinks OR: 2.145; 95% CI: 1.270–3.623; for 7 or more drinks OR: 2.922; 95% CI: 1.448–5.894) and increased frequency (once a week) of heavy episodic drinking (OR: 2.380; 95% CI: 1.180–4.800) (Table 3).

**Table 3.** Associations of sociodemographic factors, typical frequency and volume of alcohol use, consumption of unrecorded alcohol, negative consequences of the COVID-19 pandemic with the increase in the usual consumption (volume) of alcohol on a typical drinking occasion in the first months of the COVID-19 pandemic, 2020, (OR, 95% CI)

Variables	Respondents who increased the usual consumption (volume) of alcohol on a typical drinking occasion		Unadjusted	Adjusted
	n / N	%	OR (95% CI)	OR (95% CI)
Sex				
Male	129/519	24.9	1.537 (1.166–2.026)	0.875 (0.592–1.295)
Female	127/717	17.7	1.0	1.0
Age (years)				
18–29	55/261	21.1	1.353 (0.872–2.100)	1.609 (0.875–2.961)
30–49	157/708	22.2	1.444 (0.999–2.088)	1.396 (0.838–2.325)
≥ 50	44/267	16.5	1.0	1.0
Education				
Secondary or below	49/244	21.9	1.680 (0.990–2.851)	1.810 (0.884–3.703)
Primary /vocational school or college	25/175	14.3	1.0	1.0
Higher (complete or incomplete)	182/837	21.7	1.667 (1.059–2.625)	1.797 (0.950–3.398)
Settlement size				
≤ 50,000 population	39/232	16.8	0.614 (0.412–0.915)	0.986 (0.568–1.709)
50,000 to 1 million	90/491	18.3	0.682 (0.503–0.925)	1.017 (0.664–1.558)
Over 1 million	127/513	24.8	1.0	1.0
Income per household member (rubles)				
≤ 9,999	54/259	20.8	0.926 (0.573–1.497)	1.300 (0.647–2.609)
10,000–19,999	60/295	20.3	0.897 (0.561–1.436)	1.434 (0.755–2.723)
20,000–39,999	66/310	21.3	0.951 (0.598–1.511)	1.473 (0.794–2.734)
40,000–59,999	41/214	19.2	0.833 (0.502–1.383)	0.887 (0.460–1.710)
≥ 60,000	35/158	22.2	1.0	1.0
Changes in the average monthly household income since the beginning of the SARS-CoV-2 pandemic				
Did not change or increased	102/603	16.9	1.0	1.0
Slightly fell	50/255	19.6	0.417 (0.288–0.603)	0.917 (0.550–1.528)
Moderately fell	41/186	22.0	0.499 (0.324–0.769)	0.990 (0.559–1.753)
Dropped significantly	63/192	32.8	0.579 (0.366–0.916)	1.686 (0.915–3.104)
Typical frequency of alcohol use in the past 12 months before pandemic				
Once a month or less frequently	21/421	5.0	1.0	1.0
2–4 times a month	66/386	17.1	3.929 (2.353–6.559)	2.587 (1.360–4.918)
2–3 times a week	70/225	31.1	8.602 (5.105–14.494)	4.617 (2.309–9.233)
More often than 2–3 times a week	99/204	48.5	17.959 (10.703–30.136)	12.021 (5.712–25.300)
Number of standard alcoholic drinks consumed on a typical drinking occasion in the past 12 months before pandemic				
1–2	44/509	8.6	1.0	1.0
3–6	132/492	26.8	3.875 (2.682–5.598)	2.145 (1.270–3.623)
7+	76/186	40.9	7.302 (4.771–11.174)	2.922 (1.448–5.894)
Typical frequency of heavy episodic drinking (6 or more drinks on a single occasion) in the past 12 months before pandemic				
Never	32/440	7.3	1.0	1.0
Less than once a month	45/284	15.8	2.401 (1.485–3.882)	1.434 (0.781–2.632)
Once a month	43/192	22.4	3.680 (2.244–6.034)	1.876 (0.956–3.681)
Once a week	90/228	39.5	8.315 (5.317–13.004)	2.380 (1.180–4.800)
Every day or almost every day	46/92	50.0	12.750 (7.397–21.978)	2.376 (0.905–6.240)
Reported consumption of unrecorded alcohol				
Yes	145/620	23.4	1.385 (1.046–1.834)	0.906 (0.628–1.308)
No	106/587	18.1	1.0	1.0

Table 3 cont.

Variables	Respondents who increased the usual consumption (volume) of alcohol on a typical drinking occasion		Unadjusted	Adjusted
	n / N	%	OR (95% CI)	OR (95% CI)
Reported encountering COVID-19-related restrictions in public life in the past 3 months				
No restrictions	13/84	15.5	1.0	1.0
Slight restrictions	49/378	13.0	0.813 (0.419–1.579)	1.092 (0.341–3.497)
Moderate restrictions	88/408	21.6	1.502 (0.795–2.839)	1.472 (0.409–5.298)
Severe restrictions	104/357	29.1	2.245 (1.191–4.231)	1.539 (0.407–5.820)
Reported encountering COVID-19-related restrictions in their everyday private life in the past 3 months				
No restrictions	16/108	14.8	1.0	1.0
Slight restrictions	55/449	12.2	0.803 (0.440–1.464)	0.809 (0.282–2.318)
Moderate restrictions	93/374	24.9	1.903 (1.065–3.400)	1.767 (0.550–5.681)
Severe restrictions	91/296	30.7	2.552 (1.421–4.584)	1.737 (0.509–5.931)
Reported negative consequences of the pandemic to their professional or financial situation in the past 3 months				
No negative consequences	42/308	13.6	1.0	1.0
Slight negative consequences	83/472	17.6	1.351 (0.903–2.021)	0.976 (0.566–1.683)
Moderate negative consequences	60/232	25.9	2.209 (1.425–3.425)	1.453 (0.761–2.776)
Severe negative consequences	67/205	32.7	3.075 (1.986–4.761)	2.072 (0.983–4.369)
Reported confirmed SARS-CoV-2 infection in themselves, their family or close friends in the past 3 months				
Yes	47/270	17.4	0.772 (0.544–1.098)	0.686 (0.442–1.064)
No	200/933	21.4	1.0	1.0
Reported stress due to the spread of SARS-CoV-2				
Yes	168/726	23.1	1.523 (1.116–2.077)	1.265 (0.819–1.952)
No	69/418	16.5	1.0	1.0

**Table 4.** Associations of sociodemographic factors, typical frequency and volume of alcohol use, consumption of unrecorded alcohol, negative consequences of the COVID-19 pandemic with the increase in the frequency of heavy episodic drinking in the first months of the COVID-19 pandemic, 2020, (OR, 95% CI)\*

Variable	Respondents who increased the frequency of heavy episodic drinking		Unadjusted	Adjusted
	n / N	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sex				
Male	117/411	28.5	1.028 (0.755–1.400)	0.759 (0.497–1.159)
Female	108/387	27.9	1.0	1.0
Age (years)				
18–29	50/173	28.9	1.370 (0.831–2.260)	1.732 (0.867–3.462)
30–49	140/472	29.7	1.422 (0.929–2.176)	1.363 (0.762–2.437)
≥ 50	35/153	22.9	1.0	1.0
Education				
Secondary or below	47/171	27.5	1.401 (0.792–2.477)	1.487 (0.700–3.157)
Primary /vocational school or college	23/108	21.3	1.0	1.0
Higher (complete or incomplete)	155/519	29.9	1.574 (0.957–2.588)	1.476 (0.753–2.894)
Settlement size				
≤ 50,000 population	36/153	23.5	0.698 (0.451–1.080)	1.043 (0.567–1.918)
50,000 to 1 million	81/292	27.7	0.871 (0.619–1.226)	1.534 (0.944–2.493)
Over 1 million	108/353	30.6	1.0	1.0
Income per household member (rubles)				
≤ 9,999	53/177	29.9	1.187 (0.688–2.047)	1.458 (0.680–3.130)
10,000–19,999	48/184	26.1	0.980 (0.566–1.698)	1.210 (0.589–2.488)
20,000–39,999	57/195	29.2	1.147 (0.670–1.964)	1.299 (0.650–2.596)
40,000–59,999	40/140	28.6	1.111 (0.627–1.970)	1.218 (0.593–2.501)
≥ 60,000	27/102	26.5	1.0	1.0

Table 4 cont.

Changes in the average monthly household income since the beginning of the SARS-CoV-2 pandemic				
Did not change or increased	90/380	23.7	1.0	1.0
Slightly fell	43/167	25.7	1.117 (0.734–1.700)	1.087 (0.618–1.914)
Moderately fell	41/130	31.5	1.484 (0.957–2.303)	1.246 (0.664–2.337)
Dropped significantly	51/121	42.1	2.348 (1.525–3.614)	1.624 (0.812–3.246)
Typical frequency of alcohol use in the past 12 months before pandemic				
Once a month or less frequently	13/142	9.2	1.0	1.0
2–4 times a month	56/277	20.2	2.514 (1.324–4.775)	1.315 (0.566–3.056)
2–3 times a week	64/192	33.3	4.962 (2.605–9.451)	2.756 (1.137–6.679)
More often than 2–3 times a week	92/187	49.2	9.610 (5.076–18.194)	6.581 (2.585–16.749)
Number of standard alcoholic drinks consumed on a typical drinking occasion in the past 12 months before pandemic				
1–2	21/171	12.3	1.0	1.0
3–6	122/403	30.3	3.101 (1.874–5.132)	1.583 (0.836–2.999)
7+	78/184	42.4	5.256 (3.056–9.040)	2.202 (1.014–4.779)
Typical frequency of heavy episodic drinking (6 or more drinks on a single occasion) in the past 12 months before pandemic				
Never	38/288	13.2	1.0	1.0
Less than once a month	46/190	24.2	2.102 (1.306–3.383)	2.561 (1.341–4.893)
Once a month	94/228	41.2	4.615 (2.998–7.104)	3.411 (1.746–6.665)
Once a week	47/92	51.1	6.871 (4.034–11.703)	2.647 (1.030–6.803)
Reported consumption of unrecorded alcohol				
Yes	127/430	29.5	1.166 (0.851–1.599)	0.897 (0.596–1.349)
No			1.0	1.0
Reported encountering COVID-19-related restrictions in public life in the past 3 months				
No restrictions	12/62	19.4	1.0	1.0
Slight restrictions	48/266	18.0	0.917 (0.454–1.854)	0.943 (0.263–3.379)
Moderate restrictions	79/239	33.1	2.057 (1.037–4.082)	1.553 (0.381–6.329)
Severe restrictions	81/224	36.2	2.360 (1.188–4.689)	0.820 (0.187–3.599)
Reported encountering COVID-19-related restrictions in their everyday private life in the past 3 months				
No restrictions	12/83	14.5	1.0	1.0
Slight restrictions	57/295	19.3	1.417 (0.720–2.787)	1.513 (0.467–4.899)
Moderate restrictions	78/222	35.1	3.205 (1.638–6.269)	2.690 (0.720–10.055)
Severe restrictions	75/191	39.3	3.825 (1.944–7.530)	3.889 (0.969–15.608)
Reported negative consequences of the pandemic to their professional or financial situation in the past 3 months				
No negative consequences	40/195	20.5	1.0	1.0
Slight negative consequences	72/306	23.5	1.192 (0.771–1.845)	0.699 (0.383–1.275)
Moderate negative consequences	54/153	35.3	2.114 (1.307–3.417)	1.280 (0.625–2.621)
Severe negative consequences	57/132	43.2	2.945 (1.805–4.804)	2.329 (1.001–5.428)
Reported confirmed SARS-CoV-2 infection in themselves, their family or friends in the past 3 months				
Yes	48/171	28.1	0.986 (0.676–1.438)	0.893 (0.554–1.439)
No	171/603	28.4	1.0	1.0
Reported stress due to the spread of SARS-CoV-2				
Yes	140/423	33.1	1.749 (1.251–2.466)	1.004 (0.628–1.606)
No	69/313	22.0	1.0	1.0

Note: \* — respondents who had never drunk 6 or more alcoholic drinks on a single occasion in the past 12 months were excluded from the analysis.

### Factors associated with the increase in the frequency of heavy episodic drinking during the first months of the pandemic

Positive statistically significant associations were identified between the increase in the frequency of heavy episodic drinking during the pandemic and the following factors: drinking alcohol 2–3 times a week (OR: 2.756; 95% CI: 1.137–6.679) or more often before the pandemic (OR: 6.581; 95% CI: 2.585–

16.749), having 7 or more drinks on a typical drinking occasion before the pandemic (OR: 2.202; 95% CI: 1.014–4.779) and heavy episodic drinking once a month or more often before the pandemic (from OR: 2.561; 95% CI: 1.341–4.893 to OR: 2.647; 95% CI: 1.030–6.803) (Table 4). The odds of increase in the frequency of heavy episodic drinking were significantly more than two times higher among persons who reported severe negative consequences of the pandemic to their financial or professional situation (OR: 2.329; 95% CI: 1.001–5.428).



## DISCUSSION

The associations revealed in our study are corroborated by other research works conducted in various countries during the first months of the pandemic. Specifically, in an Israeli study male sex was associated with increased consumption of beer and strong liquors [16], whereas in another study conducted in Canada male sex, stress, the feelings of isolation and hopelessness were associated with increased frequency of alcohol use in the first months of the pandemic [17]. In a UK study, stress caused by the pandemic was associated with the rise in hazardous drinking [18]. High levels of anxiety and stress caused by the pandemic led to the increase in alcohol use in Australia, France and Canada [17, 19, 20].

A few studies investigated changes in alcohol consumption in the general population unstratified by pandemic-related factors. Thus, a French publication reported an increase in total alcohol consumption during the lockdown [20]; by contrast, alcohol use in Greece and Spain during the lockdown was declining [21, 22]. However, in Greece and Spain the decline was less pronounced among stressed individuals and those with low or middle income. Compared to the prepandemic level, alcohol was purchased in larger quantities during the lockdown by Russian [23, 24] and UK households [25]. During the first months of the pandemic, retail alcohol sales were on the rise in the US [26]. A global study investigating changes in the availability and use of psychoactive drugs and alcohol during the pandemic reported a 71% increase in alcohol consumption across the world [27]. However, according to another large-scale study, alcohol consumption in the general population decreased in most European countries, including Russia, during the first months of the pandemic, mostly due to the reduction in the frequency of heavy episodic drinking [22].

Our study discovered a significant increase in 3 key parameters of alcohol consumption during the first months of the pandemic among those individuals who initially had consumed alcohol in larger quantities and more frequently. These key parameters include the frequency of drinking, the usual consumption (volume) of alcohol on a typical drinking occasion and the frequency of heavy episodic drinking. These findings suggest polarization of alcohol use, i.e. a situation when alcohol consumption grows among those who drink more at baseline and declines among those who typically drink less. This is consistent with the results of another online survey conducted in the general adult population of Russia [28]. The associations established in our study between the increase in the frequency of alcohol use/heavy episodic drinking and such COVID-19-related factors

as severe restrictions of everyday private life and the negative consequences of the pandemic to professional or financial situation uncover a new aspect or mechanism associated with stress which drives changes in drinking behaviors during the pandemic. Our findings go in line with the stress-associated patterns reported by the studies mentioned above and are consistent with previously reported changes in drinking behavior among Russians determined by certain sociodemographic characteristics, environmental factors and stress in times of socioeconomic and public health crises [29].

A potential limitation of this study might be the insufficient representativeness of the surveyed sample of online social media users in Russia. However, the size of this selection bias is likely small, because the survey was conducted among the users of social networking services highly popular in Russia and because the sociodemographic characteristics of the respondents were generally the same as those of the vast majority of online social media users in Russia. Besides, the consistency of the established patterns and associations with the results of other studies suggests that the probability of our results not being the consequence of selection bias is high. Another limitation of this study is that changes in alcohol consumption were assessed without differentiating between recorded and unrecorded alcohol. Therefore, additional analysis is needed to investigate changes in the consumption of unrecorded alcohol [30], considering its fairly high availability in Russia during the COVID-19 pandemic [31].

## CONCLUSIONS

During the first months of the COVID-19 pandemic, over one-third of male and quarter of female online social media users in Russia increased the frequency of drinking. One in four men and one in five women increased their usual consumption (volume) of alcohol on a typical drinking occasion, and about one-third of men and women engaged in heavy episodic drinking more frequently than before the pandemic. Increased alcohol consumption during the first months of the pandemic was associated with male sex, younger age, severe restrictions imposed on everyday private life and severe negative consequences of the pandemic to the professional or financial situation. Further research is needed to investigate the possibility of implementing screening and brief interventions via online social media to prevent problems associated with alcohol use during large-scale epidemics and public health crises.

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