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Chapter

Sex Differences between Young Adults in the Czech and Slovak Republics in the Relationship between Alcohol-Related Consequences and Depression

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Abstract

In general, the Czech and Slovak Republic are among the countries with increased alcohol consumption. It is clear that increased consumption can predict the occurrence of negative consequences that may subsequently be associated with various mental disorders. One of these mental disorders is depression, which is common in young adults and brings difficulties into their lives that can turn into problems in the future. The study examined the relationship between alcohol-related consequences and depressive symptoms in a sample of university students from the Czech and Slovak Republics in order to map the situation in these regions, where this problem is still ignored (n = 2514; CZE = 47.5%). The research included data from standardized questionnaires, namely the Young Adult Alcohol Consequences Questionnaire (YAACQ), which can predict alcohol use problems, and Health Questionnaire of depression (PHQ-9). The data was collected during the COVID-19 pandemic. Regarding sex differences, a higher YAACQ score was found in males and, conversely, a higher PHQ-9 score was identified in females. The results of correlation and regression analyses revealed significant associations between the scores in the individual YAACQ subscales and the PHQ-9 score, while low to moderate correlations were found in most cases. In all cases, positive trajectories were identified, meaning that the increased risk of depressive disorder can be associated with experience in selected dimensions of alcohol-related consequences. Stronger associations occurred in females than in males. In terms of practical implications, high priority was given to prevention programs and counseling. Professionals' efforts to help young people should be sex-oriented, while females were more vulnerable to depression, males were prone to the consequences of alcohol use.

Keywords: alcohol addiction, patterns of unhealthy behavior, depression, youth, sex, mental health inequalities, Czech and Slovak students

1. Introduction

The importance of mental health is irrefutable in the lives of individuals as well as in society. Evidence supports the fact that there is no health without mental

health, as neuropsychiatric disorders such as depression, alcohol and substance use disorders significantly contribute to the global disease burden [1]. Many studies point to a considerable burden of these disorders in all aspects of society, including individuals, their families, workplaces and also the wider economy [2]. On this basis, mental health should not be overlooked, and it is considered important to know its main factors in different population groups. In this sense, depressive disorder and alcohol-related consequences can be considered as two of these risk factors for mental health. Depression is one of the most common mental disorders, and research into alcohol use and its consequences for depressive symptoms can provide useful information to clinicians and professionals. Therefore, the presented research examined the relationship between alcohol-related consequences and perceived depression in the Czech and Slovak young population with sex differentiation.

Alcohol problems at risk of addiction are considered a significant threat and need to be examined in the socio-economic dimension, including education. Sex differences are equally important in examining the community and its inclination to addictive substances. The present time has changed not only the economic but also the legal status of females, thus removing social barriers to their alcohol consumption. As a result, the number of females consuming alcoholic beverages as well as addicted females has significantly increased [3]. There are many reasons to take into account sex differences and specificities in services for addicted females or females at risk of addiction [4], as evidenced by the findings on hospitalizations of males and females in the member states of the European Union (EU) [3]. In any case, it can be considered important to examine this problem, it can also contribute to knowledge in the diagnostic issues of addiction.

There are many international studies examining the variables predicting alcohol use problems in young adults, while depression and sex differentiation have also played an important role in their research [5]. According to their findings, university students often reported depressed mood and alcohol problems. Attention should be paid to any signal that may be related to the problematic drinking and mental disorder of young people. In any case, Slovak and Czech students are no exception to this problem. The knowledge of this issue enables the implementation of active prevention programs that would eliminate the level of addiction in suffering people, or help prevent the emergence of others. The earlier the addiction is treated, the higher the chance of successful abstinence of the individual.

2. Alcohol-related consequences and depressive disorder as risk factors in the lives of young adults

The presented study focused on alcohol-related consequences predicting alcohol use problems, which can lead to a depressed mood in university students. The purpose of the study was to present the alcohol-depression topic in specific geographical regions, to map the situation in these regions and to emphasize the problem at a professional and practical level.

The intensity of alcohol consumption in individual countries is often conditioned by several aspects, while it still remains true that the Slovak Republic is at the forefront of alcohol consumption among OECD countries and alcohol consumption in the Czech Republic is more moderate [6]. Alcohol consumption does not necessarily indicate directly the consequences of drinking, at least in the short term. At this point, it should be noted that the relationship between alcohol use and alcohol-related consequences is not entirely trivial. In this regard, there is evidence of a similar likelihood of reporting negative alcohol-related consequences at both low

and higher levels of alcohol consumption [7]. There are many factors that can play an important role in drinking patterns with consequences. As stated by Rehm and Room [8], the cultural aspect is a determinant of alcohol consumption, while it is possible to speak of differences in the perception of acceptable level of alcohol consumption, up to the level of severity of negative alcohol-related behavior. This study focuses on the consequences of alcohol drinking in young adults, as they are a vulnerable group that may have very noticeable consequences. Several authors [9] attribute to this group an inclination to various types of risky behavior (consequences) associated with alcohol use, from reduced academic performance, through unprotected sex to violent and aggressive behavior. Alcohol consumption alone does not capture these important aspects that are part of problem drinking with the risk of addiction. On the other hand, it was supported that the instrument capturing the consequences of drinking (YAACQ) is also able to predict drinking patterns [10] and to assess the level of drinking risk in university students [11]. This is evidenced by the associations between the YAACQ outcomes and drinking outcomes [12]. These facts offer new opportunities for research into alcohol addiction across the population. The consequences of alcohol use can be a concomitant phenomenon of problem drinking and, at the same time, can indicate addictive behavior.

University students are not just young adults, they are a population group that is the expected driving force of the economy in the future, and they represent potential current and future health care, criminal justice, and social burdens as well. Therefore, it is important to pay special attention to them. In the context of drinking patterns, many university students drink a lot of alcohol and tend to drink more and more heavily than their non-university peers, which has countless negative consequences [13]. These habits of young people can be reflected in various aspects of their lives. Tembo et al. [14] revealed that high levels of alcohol consumption among university students are significantly associated with poor mental health outcomes. In addition, other risky behaviors, use of other addictive substances, psychological symptoms (depression, distress), or low interest in academic activities may prevail among university students with problem drinking at risk of addiction [15]. For all these reasons, many authors call for drinking prevention strategies and interventions in the university environment [16]. The importance of active counseling at universities was emphasized and social support represented a very important aspect [17]. The key factors were also participation in university activities, public discussions on the consequences of excessive alcohol consumption, motivation for healthy behaviors through academic and career success [18]. In other words, evidence from other geographical regions clearly supported effective prevention programs, which, however, have been implemented to a small extent in the Czech and Slovak Republics. Thus, it is essential that research efforts focus on this issue and its implications for the university student population.

It is not difficult to expect various negative alcohol-related problems in the lives of young people [19], while drinking motives play an important role in this issue [20]. The alcohol-related consequences include various negative experiences, such as embarrassing situations, problems with friends and family, problems at school or work, indecent (rude) and risky behavior, excessive drinking, physical symptoms, bad feelings, but also unpleasant sexual situations, physical attacks and blackouts [21]. In the university environment, one of the most appropriate measures to capture alcohol-related consequences is the 48-item Young Adult Alcohol Consequences Questionnaire (YAACQ), the great advantage of which is its subscales providing a method of aggregating the consequences of alcohol use that may be clinically useful [10, 21]. Moreover, its subscales show significant associations with other indices of alcohol involvement (such as drinking frequency or binge drinking frequency) [10], which is also considered important in the issue of alcohol addiction.

In terms of sex, Lemley et al. [22] revealed that the negative consequences of alcohol use differed between male students and female students, while males tended to acquire a higher YAACQ score. This is consistent with the results of Geisner et al. [23], who found more alcohol-related consequences for male students. In this regard, Merrill et al. [20] confirmed significant sex differences in the two dimensions of YAACQ, namely risky behaviors (RISK) and academic/occupational consequences (AC-OCC).

Regarding the results revealed in a study examining the consequences of alcohol use (YAACQ) in Spain, Argentina and the United States, it can be concluded that the obtained score may significantly differ from country to country, but also from subscale to subscale [24]. For example, students from Argentina and Spain acquired greater mean number of alcohol-related consequences than students from the United States [24]. Based on the results of another study from the United States, university students obtained the highest percentage to the maximum score in the subscales, such as blackouts, social interpersonal problems, impaired control and risky behaviors [21].

Depressive disorder is also a frequent psychological burden among university students, which may impair their interpersonal, social and work functioning [25]. Moreover, the prevalence of depression in students increases during their university studies [26]. Feelings of hopelessness and despondency are common to this disorder, which can affect their academic performance [27]. In fact, depressive symptoms along with alcohol use are a serious combination, as there is a risk of suicide proneness [28]. Based on these facts, it is necessary to examine these two critical disorders among university students.

Factors such as lack of social support, heavy alcohol consumption and traumatic experiences can be considered significant predictors [29]. Ibrahim et al. [25] conducted a systematic review of university students and it can be noted that the significant effect of alcohol use was not large. The high prevalence rate of depression among university students (ranging from 10% to 85%) contributes to the perception of students as a high-risk population [25], while females are at higher risk compared to male counterparts [30]. Leppink et al. [31] also revealed that females were significantly predominant in severe depression and this is in line with the findings that sex differences are greater in major depression than in minor depression [25].

One of the most commonly used screening instruments for depression is the Patient Health Questionnaire-9 (PHQ-9) [32, 33]. According to Kroenke and Spitzer [34], the PHQ-9 fulfills a dual purpose, namely to diagnose depression and to assess the severity of depression. In the Slovak Republic, the PHQ-9 measure was used by Hajduk et al. [35], who examined prevalence and correlations of depression and anxiety in university students, they revealed mild depression in their research sample. The authors also found a higher prevalence of depression among students compared to anxiety, and their results showed that students with a higher score tended to perceive their mental health as less satisfactory [35]. The Czech version of the PHQ-9 measure was successfully assessed in the general population by Dansova et al. [36].

Comparing the results in the international studies using the PHQ-9 measure, it can be concluded that 37.7% of students from the United States had mild to moderate depression, and 4.4% of students had severe depression [31]. In Croatia, 60.8% students suffered from depressive disorder, while 30.3% of students reported mild depression, 16.1% of students reported moderate depression, 7.2% of students reported severely moderate depression, and severe depression was identified in 0.2% of students [37]. Interesting results were provided by Honney et al. [38], who compared the prevalence of depression in medical and non-medical students from

the United Kingdom. Their results revealed that 32.4%, 10.8%, and 5.6% of medical students suffered from mild, moderate and severe depression. Simultaneously, 28.7%, 17.7%, and 12.7% of non-medical students suffered from mild, moderate and severe depression [38]. This fact indicate that medical students were not at higher risk for moderate to severe depressive disorder than non-medical students.

All of these results suggest that depression is frequent in young people's lives and should not be overlooked; on the contrary, efforts should be made to help people overcome these difficulties. One way is to identify possible risk factors and try to eliminate them. It is the problem of alcohol use with consequences that appears to be an important factor in depressed people, who should be given early intervention. Early interventions in problematic drinking behavior could prevent depressive disorders, which can have other consequences. Every indication of problem drinking is crucial for further action to address and overcome these problems in young people's lives.

2.1 The relationship between alcohol-related consequences and depressive disorder

With a focus on the mentioned behavioral and mental disorders in university students, the findings of several studies revealed that psychological symptoms are associated with drinking consequences and alcohol use [23, 39], while depression is no exception [40, 41]. In this regard, Martens [42] confirmed that depressive symptoms in university students were directly related to the negative consequences of alcohol drinking (using the Rutgers Alcohol Problem Index – RAPI), but not to alcohol consumption itself. This builds on the results of Park and Grant [43], in which the consequences of alcohol drinking were significantly associated with psychological risk as well as protective factors. These facts supported the assumption that alcohol-related consequences and mental disorders, such as depression, are closely linked.

The depression-drinking link among university students was examined in several other studies, in which various tools to measure depression and alcohol-related consequences were used. In any case, correlations were clearly found between depressive disorder and drinking consequences [44]. From the perspective of this study, the findings also showed that depressive symptoms were positively and significantly correlated with negative alcohol-related consequences, as measured by the YAACQ score [45]. Similarly, Ruiz et al. [46] confirmed a positive and significant correlation between psychological discomfort and the YAACQ score. Regarding the PHQ-9 measure, several studies can also be found that confirmed a positive association between depression and problem drinking, while Flesch et al. [47] noted that alcohol abuse can be considered a risk factor for a major depressive episode expressed in the PHQ-9 score.

There is also evidence to suggest that depressive symptoms may predict alcohol use and alcohol-related consequences [48, 49], while self-medication plays an important role in this association [50]. On the other hand, problems with alcohol can lead to an increased risk of depression [51, 52]. In this regard, Schutte et al. [53] found that alcohol-related consequences could lead to depression in males, but not in females. This can be explained by the fact that male university students are characterized by higher alcohol consumption and more negative consequences of drinking [23]. As a result, Geisner et al. [23] confirmed a stronger association between psychological symptoms and the negative consequences of alcohol use in males than in females.

On the other hand, Rosenthal et al. [54] used the Brief Young Adult Alcohol Consequences Questionnaire (BYAACQ) in a sample of female university students,

and their findings revealed that experiencing negative alcohol-related consequences, regardless of the amount of alcohol consumption, could lead to a higher risk of depression (PHQ-9). With a focus on casual sex, one of the possible alcohol-related consequences, this experience increased depressive symptoms in female students more than in male students [55]. Accordingly, it can be assumed that female students felt guilty or remorse in this situation and felt that they had violated social expectations [56].

Although indirect evidence has created expectations, the relationship between the YAACQ score and the PHQ-9 score has not yet been examined in some regions. The above-mentioned evidence has suggested that depressive disorder and alcohol-related consequences may show interesting results in higher education, where the issue of mental health and unhealthy behavior is of undeniable importance. Insufficient examination of this issue can also be observed in the regions of the Czech and Slovak Republics. In these regions, the effects of alcohol-related consequences on depressive symptoms remain unknown. For this reason, the presented study filled this gap and provided public policy makers as well as experts with an inspiring perspective. At present, every country needs up-to-date information for responsible decision-making, the development of effective strategies and the implementation of interventions. In addition, at the time of the COVID-19 pandemic, it is necessary to monitor the patterns of behavior of vulnerable groups of the population, which are certainly also students. It has been shown that the COVID-19 pandemic can negatively contribute to students' psychological discomfort and unhealthy behavior [57, 58]. The main reasons for students' discomfort were worries about their health and the health of their loved ones, difficulty concentrating, sleep disorders, physical distancing and increased academic concerns [58]. These facts can lead to more serious consequences and a risk of substance abuse. In any case, all necessary measures to prevent an increase in alcohol-related problems should be adopted [59].

The purpose of the presented study was to assess the situation of alcohol-related consequences and depressive disorder in the Czech and Slovak Republics and to provide a valuable platform for the development of strategies and interventions in these regions. When developing and optimizing diagnostic procedures, prevention and treatment, it is desirable to specify potential patients. One way in the specification process is to differentiate according to sex characteristics.

3. Materials and methods

The analyses included data obtained using the YAACQ [21] and PHQ-9 [33] measures. The PHQ-9 measure was successfully validated in several studies aimed at university students [60, 61]. Its reliability and psychometric properties are evidenced by the fact that this measure has been included in many studies on the mental health of university students from various countries, such as Australia [62], the United Kingdom [38], the United States [31] or Croatia [37]. In terms of cross-cultural comparison, the usefulness of PHQ-9 was supported by a study at universities in Germany and China [63] and a study focusing on young adults from Poland and Korea [64]. The PHQ-9 consisted of nine survey items with a four-point scale (0 not at all; 1 several days; 3 more than half the days; 4 nearly every day) aimed at screening for depressive disorder among university students. This brief measure of depression could reach a score ranging from 0 to 27. On this basis, it was possible to know the probability of major or subthreshold depressive disorder at various cut points defining the lower limits of mild, moderate, moderately severe, and severe depression [32, 33]. The score was decisive in the assessment, while the higher the value, the more intense the depressive disorder. In assessing, several studies used

score assigned at intervals (0–4 none; 5–9 mild; 10–14 moderate; 15–19 moderately severe; 20–27 severe). For the purposes of this research (i.e. application of regression and correlation analysis), it was more appropriate to use the gross score obtained by the students.

In general, the YAACQ measure covers from mild to more severe alcohol-related consequences and includes the following eight subscales: (1) social interpersonal problems – SOC, (2) impaired control – CONTR, (3) self-perception – SELF-P, (4) self-care – SELF-C, (5) risky behaviors – RISK, (6) academic/occupational consequences – AC-OCC, (7) physiological dependence – PHYS-DEP, and (8) blackout drinking – BLKOUT. Interestingly, two subscales (impaired control, self-care) take into account problem areas that are not fully assessed by other existing measures [10]. It can also be noted that the total YAACQ score correlated with another similar measure (RAPI), which supports the validity of this measure [21]. The advantages of YAACQ have been proven in several studies conducted among students [9, 20, 65] and the use of this eight-factor structure has been supported across countries and cultures [12, 21]. As in the previous case, the gross score was used for the YAACQ measure. A dichotomous scale is commonly used for this instrument (0 no; 1 yes), but in this research, the scale was extended (1 strongly disagree; 2 disagree; 3 undecided; 4 agree; 5 strongly agree). The total score of YAACQ or its individual subscales was formed by the sum of the individual items. The dichotomous scale had a number of benefits that were evident in the diagnostics, as the overall score reflected a number of consequences and it was not difficult to complete. The conversion to a 5-point scale could be more accurate and offer the use of more statistical methods. The use of an extended scale was more appropriate for research and academic purposes. There was some risk when comparing the results with the dichotomous scale, but this risk was minimal.

3.1 Research sample and data collection

The data collection was performed in two parallel levels. First, university representatives as well as teachers were contacted by e-mail with a request to distribute the questionnaire to students. Second, the questionnaire was distributed through student groups on social networks (universities, faculties, dormitories, student communities). The research sample consisted of university students from the Czech and Slovak Republics, who stated that they had consumed alcohol in the last 3 months. Data collection was conducted in 2020, when it is necessary to take into account the coronavirus disease 2019 (COVID-19) pandemic. The questionnaire was distributed electronically. The total sample consisted of 2514 respondents (CZE: n = 1193, 47.5%). The data were cleaned up. First, respondents who answered doubtfully to the control question (in numerical terms, one million has six zeros – the scale of agreement/disagreement) were excluded (n = 179), then erroneous responses caused by the system (blank items, even if it was a mandatory item) were excluded (n = 27) and last, foreign students were excluded (n = 87).

The collection process can be characterized as quota sampling with a focus on the approximate proportionality of the responses in each country. The field of study can be considered as the main quota criterion (there was an effort to collect at least 30 responses per study field in each country). Efforts have also been made to include most universities (with the exception of foreign universities and foreign detached institutions). The quota sampling criteria were met and the research sample included the vast majority of all universities. **Table 1** provides the basic characteristics of the research sample.

The study and its concept were approved by the ethics committee of the General University Hospital in Prague as individual research (Ref. 915/20 S–IV). All

Variable	ALL n (%)	CZE n (%)	SVK n (%)
Residence – school:			
Dormitory	759(30.19)	194(16.26)	565(42.77)
Private accommodation	372(14.8)	256(21.46)	116(8.78)
With family	215(8.55)	164(13.75)	51(3.86)
With a friend	57(2.27)	31(2.6)	26(1.97)
At home	1111(44.19)	548(45.93)	563(42.62)
Field of study:			
Education	283(11.26)	223(18.69)	60(4.54)
Humanities and arts	150(5.97)	87(7.29)	63(4.77)
Social, economic and legal sciences	1089(43.32)	568(47.61)	521(39.44)
Natural Science	95(3.78)	42(3.52)	53(4.01)
Design, technology, production and communications	203(8.07)	74(6.2)	129(9.77)
Agricultural and veterinary sciences	102(4.06)	58(4.86)	44(3.33)
Health service	187(7.44)	44(3.69)	143(10.83)
Services (tourism, sports, security, etc.)	258(10.26)	57(4.78)	201(15.22)
Informatics, mathematics, ICT	147(5.85)	40(3.35)	107(8.1)
Form of study:			
Full-time	2112(84.01)	885(74.18)	1227(92.88)
Part-time	402(15.99)	308(25.82)	94(7.12)
Degree of study:			
1st degree	1441(57.32)	545(45.68)	896(67.83)
2nd degree	659(26.21)	326(27.33)	333(25.21)
Combined 1st and 2nd degree	78(3.1)	43(3.6)	35(2.65)
3rd degree	336(13.37)	279(23.39)	57(4.31)
Sex:			
Males	779(30.99)	297(24.9)	482(36.49)
Females	1735(69.01)	896(75.1)	839(63.51)

Table 1.
Characteristics of respondents.

respondents who participated in the research confirmed their informed consent at the beginning of the questionnaire. All aspects in this research were conducted with respect to the seventh revision of the World Medical Association–Declaration of Helsinki [66] and the second revision of the Farmington Consensus [67].

3.2 Statistical analysis

The statistical processing in this study consisted of two main parts, namely the first part focused on the statistical description of the data and the second part focused on the examined relationship. Descriptive statistics included the basic characteristics (mean (Mean), median (Median), standard deviation (SD), kurtosis (Kurt), skewness (Skew), minimum (Min), maximum (Max)), which were presented generally without classification of respondents as well as in the sex

classification of respondents. Subsequently, Pearson's correlation coefficient (r) and Spearman's correlation coefficient (Spearman's ρ) were used to analyze the associations. Prior to this statistical procedure, normality (the Henze-Zirkler test for multivariate normality) and the presence of outliers (a quantile method based on Mahalanobis distance) were verified. The hypothesis of normality was rejected. However, it should be noted that due to the size of the sample, the normality tests may have been skewed and may have tended to reject the normality hypothesis. This was followed by regression analysis using a simple OLS model, before which the assumptions for use were verified (the Bonferroni outlier test, the Breusch-Pagan test). A simple quantile regression analysis ($\tau = 0.25, 0.50, 0.75$) was applied to assess the effects, and the standard error was estimated by Powell's kernel version for the covariance matrix estimate on the commonly used Hall-Sheather bandwidth rule. IBM SPSS Statistic software (IBM Corp., Armonk, NY, USA) and R v 4.0.2 (RStudio, Inc., Boston, MA, USA) were used for statistical processing.

4. Results

Figure 1 shows the intensity of the total YAACQ and PHQ 9 scores. This visualization consists of the mean values of the percentage expression to the maximum value in terms of selected indicators. The presented figure provides some information, the most important of which is the low probability that the values of outputs in the Slovak Republic and the Czech Republic have acquired significant differences. This was evidenced by the result of the Wilcoxon nonparametric test, which in both indicators showed a p-value higher than 0.05 for the countries (p-value: YAACQ = 0.156; PHQ-9 = 0.137). On the other hand, it is possible to observe certain differences between regions in both indicators. Thus, a significant difference between the individual regions was found using the Kruskal Wallis test (YAACQ: $\chi^2 = 36.404$, p-value = 0.020; PHQ-9: $\chi^2 = 33.311$, p-value = 0.043). Sex characteristics were also taken into account in terms of differences, and the Wilcoxon test confirmed significant differences between males and females in both indicators at a level lower than 0.001 (mean YAACQ % to max: females = 32.7%, males = 36.8%; mean PHQ-9% to max: females = 23.1%, males = 20.2%). On this basis, the inclusion of sex characteristics in subsequent calculations were warranted. More intense color
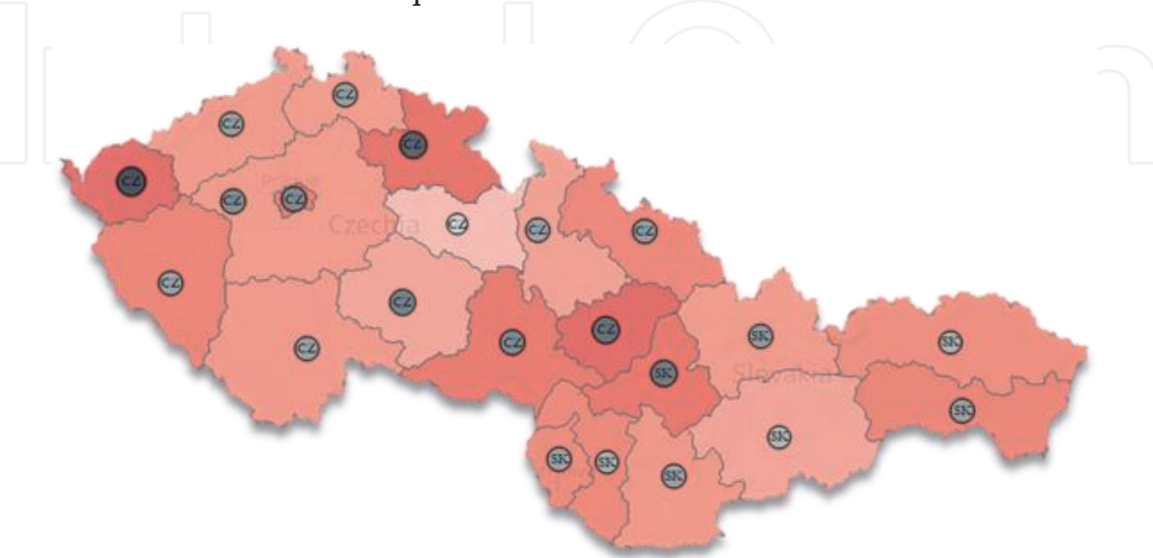
Figure 1.
Relationship between the YAACQ score and the PHQ-9 score (% to max - mean) in the Czech Republic and the Slovak Republic. Note: Color shading of choropleth map – YAACQ (% to max - mean); circles in regions – PHQ-9 (% to max - mean); CZ – Czech Republic; SK – Slovak Republic.

shading represents a higher value (in the case of the PHQ-9 indicator, the higher value is represented not only by color shading, but also by the size of the circle). In this context, a certain relationship could be observed between the YAACQ and PHQ-9 indicators, as in several regions with a higher intensity of the YAACQ indicator, a higher intensity of the PHQ-9 indicator can also be found. This fact was also supported by Spearman's correlation coefficient (ρ – 0.262; p-value <0.001). This secondarily declared the appropriateness of choosing a quantile regression model.

The first row of **Table 2** (TheoryM) shows the theoretical interval of the analyzed indicators, i.e. the lowest and highest value that the respondent could obtain. In this table, it is also possible to observe descriptive characteristics for all respondents (without classification), as well as separately for males and females. The significance of differences in all indicators was assessed using the Wilcoxon test. As the scales can take on different intervals of values (TheoryM), the results can be seen through the share of the maximum of the theoretical interval. Based on this, the highest score was found in the SOC subscale (mean = 12.376; 41.25% of the TheoryM maximum) and the BLKOUT subscale (mean = 14.585; 41.67% of the TheoryM maximum). On the other hand, the assessment of standard deviations (SD) has the highest added value in terms of comparing the values obtained for males and females. Apart from the PHQ-9 score, all of the cases showed lower values for females, meaning that the responses of females were more constant. As can be seen, the indicators associated with the negative consequences of alcohol use (YAACQ) were more common in males. On the other hand, the indicator of depressive disorder was more common in females.

In general, the PHQ-9 score indicates the level of intensity of perceived depression in five intervals. The results showed that exactly 50% of the students were identified in the "none" interval, a slightly increased depression in the "mild" interval was found in 29.8% of the students, the share of the "moderate" interval showed 11.6%, the share of the students with "moderately severe" depression was 5.5% and the group with the highest level of perception of depressive symptoms in the "severe" interval included 3.1% of the students.

The following part is devoted to the assessment of the associations between the selected indicators of alcohol-related consequences and depression in general, as well as in the sex classification. In the first step, the Henze-Zirkler test for multivariate normality was used, which showed significant deviations from the normal distribution in all of the analyzed cases. Also, the presence of outliers was assessed using a quantile method based on Mahalanobis distance, and a significant proportion of outliers were found. At this point, it should be noted that the research included a relatively large set of data, in which tests tend to reject the hypothesis of normality. For this reason, the results are provided in both parametric (Pearson's r) and nonparametric (Spearman's ρ) alternatives.

As mentioned above, **Table 3** shows both parametric and non-parametric alternatives to the bivariate analysis of associations. The double use of the correlation test minimized the statistical error resulting from the computational processes. In most cases, the parametric alternative of the test (Pearson's r) acquired slightly higher values than the nonparametric alternative (Spearman's ρ). Each analyzed association was significant at the level of $\alpha < 0.001$. Focusing on the results in the given table, the strength of the association up to 0.30 can be interpreted as low to medium, up to 0.50 as medium to substantial and up to 0.70 as substantial to very strong. Accordingly, most of the associations between the selected YAACQ subscales could be considered as substantial to very strong. The associations between the score in the individual YAACQ subscales and the PHQ-9 score were shown to be low to medium. In general, SELF-P and SELF-C could be considered the most

Statistic	SOC	CONTR	SELF-P	SELF-C	RISK	AC-OCC	PHYS-DEP	BLKOUT	PHQ-9
TheoryM	6–30	5–25	4–20	8–40	9–45	5–25	4–20	7–35	0–27
Mean	12.376	8.727	6.682	13.231	13.833	7.138	4.965	14.585	6.002
Median	11	7	5	11	12	5	4	13	4.5
SD	5.317	4.299	3.759	6.332	6.075	3.473	1.798	6.645	5.328
Kurt	0.486	1.693	2.110	1.590	3.435	5.329	7.186	0.140	1.675
Skew	0.963	1.444	1.643	1.425	1.760	2.187	2.416	0.869	1.358
Min	6	5	4	8	9	5	4	7	0
Max	30	25	20	40	45	25	18	35	27
Males									
Mean	13.126	9.367	6.902	14.281	15.250	7.942	5.371	16.108	5.465
Median	12	8	5	12	13	6	4	15	4
SD	5.689	4.541	3.828	6.778	7.093	4.106	2.056	7.142	5.107
Kurt	0.382	0.835	1.511	0.859	2.104	3.442	3.096	−0.380	2.063
Skew	0.918	1.204	1.474	1.194	1.502	1.832	1.738	0.623	1.454
Min	6	5	4	8	9	5	4	7	0
Max	30	25	20	40	44	25	16	35	27
Females									
Mean	12.040	8.439	6.583	12.759	13.197	6.777	4.783	13.901	6.244
Median	11	7	5	10	11	5	4	13	5
SD	5.107	4.155	3.724	6.064	5.441	3.081	1.638	6.292	5.409
Kurt	0.428	2.246	2.437	2.042	3.806	6.059	11.126	0.468	1.532
Skew	0.958	1.573	1.728	1.545	1.810	2.319	2.898	0.976	1.319
Min	6	5	4	8	9	5	4	7	0
Max	30	25	20	40	45	25	18	35	27
Wilcoxon rank sum test (Sex)									
W	749127	768035	712307	776281	795381	794436	790832	798066	612152
p-value	<0.001	<0.001	0.023	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 2.
Descriptive statistics.

predictive subscales in terms of the PHQ-9 score. However, the differences in the correlation of individual scales were often very small. Due to the fact that the increased rate of associations between individual subscales was also confirmed, a simple regression model was applied in the following part focused on regression analysis.

The application of regression analysis (OLS) itself was determined by several tests of assumptions. The Bonferroni outlier test did not show any outliers at the level of $\alpha < 0.01$, but the Breusch-Pagan test identified all the models as heteroskedastic, at the mentioned level of significance. Therefore, a white estimator of HC3 was used to assess the effect.

The results in **Table 4** show that all the associations were significant at the level of significance $\alpha < 0.001$. Simultaneously, the coefficients were positive, which

ρ \ r	SOC	CONTR	SELF-P	SELF-C	RISK	AC-OCC	PHYS-DEP	BLKOUT	PHQ-9
SOC		0.622	0.579	0.552	0.678	0.515	0.388	0.626	0.225
CONTR	0.613		0.678	0.656	0.562	0.582	0.497	0.586	0.218
SELF-P	0.549	0.606		0.636	0.503	0.461	0.394	0.495	0.262
SELF-C	0.529	0.635	0.607		0.554	0.627	0.487	0.531	0.243
RISK	0.698	0.590	0.516	0.567		0.581	0.426	0.648	0.201
AC-OCC	0.479	0.562	0.433	0.590	0.55		0.484	0.554	0.208
PHYS-DEP	0.342	0.448	0.345	0.446	0.394	0.417		0.399	0.203
BLKOUT	0.636	0.610	0.489	0.536	0.656	0.553	0.390		0.187
PHQ-9	0.208	0.195	0.257	0.231	0.208	0.177	0.163	0.196	
MALES									
SOC		0.633	0.550	0.58	0.694	0.542	0.402	0.643	0.185
CONTR	0.611		0.690	0.652	0.547	0.583	0.509	0.549	0.199
SELF-P	0.515	0.615		0.622	0.491	0.460	0.392	0.481	0.286
SELF-C	0.528	0.620	0.587		0.544	0.650	0.512	0.546	0.238
RISK	0.720	0.582	0.484	0.550		0.558	0.417	0.630	0.167
AC-OCC	0.515	0.586	0.462	0.608	0.577		0.497	0.562	0.220
PHYS-DEP	0.339	0.437	0.349	0.463	0.383	0.445		0.411	0.200
BLKOUT	0.640	0.572	0.467	0.532	0.630	0.586	0.381		0.128
PHQ-9	0.162	0.210	0.279	0.222	0.148	0.170	0.149	0.135	
FEMALES									
SOC		0.61	0.593	0.530	0.665	0.490	0.366	0.609	0.257
CONTR	0.610		0.673	0.652	0.566	0.576	0.480	0.598	0.239
SELF-P	0.563	0.603		0.644	0.515	0.467	0.397	0.504	0.257
SELF-C	0.524	0.635	0.617		0.551	0.605	0.458	0.511	0.260
RISK	0.685	0.583	0.532	0.566		0.581	0.408	0.649	0.245
AC-OCC	0.452	0.540	0.416	0.574	0.521		0.453	0.534	0.227
PHYS-DEP	0.335	0.444	0.342	0.425	0.380	0.386		0.368	0.227
BLKOUT	0.631	0.616	0.498	0.528	0.653	0.520	0.377		0.237
PHQ-9	0.242	0.207	0.255	0.255	0.258	0.203	0.197	0.249	

Note: Above the diagonal is a parametric alternative (Pearson's r) and below the diagonal is a nonparametric alternative (Spearman's ρ). The p-values are not shown, as all of the analyzed relationships were significant at the level of α < 0.001.

Table 3.
Correlation analyses.

means that an increased risk of depressive disorder can be associated with experience in selected dimensions of alcohol-related consequences. The multiple R^2 showed relatively low values, which can be considered a certain limitation.

The most important output of the presented study is shown in **Table 5**, which is devoted to the assessment of the effects of the score in the individual YAACQ

PHQ-9	SOC	CONTR	SELF-P	SELF-C	RISK	AC-OCC	PHYS-DEP	BLKOUT
α (SE)	3.21† (0.28)	3.65† (0.26)	3.30† (0.26)	3.56† (0.28)	3.56† (0.28)	3.73† (0.27)	3.02† (0.37)	3.81† (0.26)
β (SE)	0.23† (0.02)	0.27† (0.03)	0.20† (0.02)	0.18† (0.02)	0.18† (0.02)	0.32† (0.04)	0.60† (0.08)	0.15† (0.02)
R2	0.05	0.05	0.07	0.06	0.04	0.04	0.04	0.04

Note: SE – standard error;
† p-value <0.001.

Table 4.
Assessment of the effects of YAACQ on PHQ-9 (OLS model).

PHQ-9	τ	ALL		MALES		FEMALES	
		α(SE)	β(SE)	α(SE)	β(SE)	α(SE)	β(SE)
SOC	0.25	1.00†(0.22)	0.10†(0.02)	**0.50(0.43)**	0.10***(0.03)	0.61**(0.28)	0.15†(0.02)
	0.5	2.20†(0.30)	0.20†(0.03)	2.59†(0.56)	0.12***(0.04)	2.00†(0.36)	0.23†(0.03)
	0.75	4.33†(0.48)	0.33†(0.04)	3.60†(0.74)	0.30†(0.06)	3.38†(0.66)	0.46†(0.06)
CONTR	0.25	1.00†(0.21)	0.14†(0.02)	**<0.01(0.38)**	0.20†(<0.01)	1.23†(0.27)	0.15†(0.03)
	0.5	2.50†(0.29)	0.25†(0.03)	1.75†(0.48)	0.25†(0.05)	2.61†(0.38)	0.28†(0.05)
	0.75	5.08†(0.45)	0.38†(0.05)	4.33†(0.73)	0.33†(0.08)	4.50†(0.52)	0.50†(0.06)
SELF-P	0.25	1.27†(0.18)	0.18†(0.03)	**<0.01(0.36)**	0.25†(0.05)	1.14†(0.23)	0.21†(0.04)
	0.5	2.67†(0.26)	0.33†(0.04)	1.40***(0.45)	0.40†(0.07)	2.67†(0.31)	0.33†(0.05)
	0.75	4.87†(0.41)	0.53†(0.06)	3.60†(0.61)	0.60†(0.09)	4.67†(0.51)	0.58†(0.08)
SELF-C	0.25	0.89†(0.21)	0.11†(0.02)	**−0.14(0.41)**	0.14†(0.03)	1.00†(0.27)	0.13†(0.02)
	0.5	2.20†(0.28)	0.20†(0.02)	1.40***(0.49)	0.20†(0.04)	1.75†(0.35)	0.25†(0.03)
	0.75	4.73†(0.42)	0.27†(0.03)	3.56†(0.66)	0.28†(0.05)	4.47†(0.54)	0.32†(0.04)
RISK	0.25	1.23†(0.24)	0.08†(0.02)	2.00†(<0.01)	**<0.01(0.03)**	0.82***(0.30)	0.13†(0.02)
	0.5	2.13†(0.32)	0.19†(0.02)	2.56†(0.60)	0.12***(0.04)	1.86†(0.41)	0.24†(0.03)
	0.75	4.43†(0.51)	0.29†(0.04)	3.88†(0.60)	0.23†(0.05)	3.40†(0.67)	0.40†(0.05)
AC-OCC	0.25	1.17†(0.17)	0.16†(0.04)	1.20***(0.42)	**0.01*(0.05)**	0.75**(0.31)	0.25†(0.05)
	0.5	2.50†(0.30)	0.30†(0.04)	1.94†(0.52)	0.29†(0.07)	2.00†(0.43)	0.40†(0.07)
	0.75	4.50†(0.53)	0.50†(0.06)	4.00†(0.54)	0.40†(0.07)	5.50†(0.58)	0.50†(0.08)
PHYS-DEP	0.25	0.67†(0.31)	0.33†(0.06)	2.00†(0.59)	**<0.01(0.11)**	**0.29(0.39)**	0.43†(0.08)
	0.5	2.00†(0.39)	0.50†(0.08)	2.67†(0.69)	0.33**(0.13)	**1.00(0.64)**	0.75†(0.14)
	0.75	4.50†(0.71)	0.88†(0.15)	5.00†(0.84)	0.50***(0.15)	3.00***(0.95)	1.25†(0.20)
BLKOUT	0.25	1.00†(0.21)	0.08†(0.01)	2.00†(0.41)	**<0.01(0.03)**	0.83***(0.27)	0.12†(0.02)
	0.5	2.57†(0.28)	0.14†(0.02)	3.13†(0.52)	0.07**(0.03)	2.00†(0.34)	0.20†(0.03)
	0.75	4.75†(0.44)	0.25†(0.03)	5.62†(0.77)	0.13***(0.05)	4.00†(0.49)	0.33†(0.04)

Note: SE – standard error;
* p-value <0.1;
** p-value <0.05;
*** p-value <0.01;
† p-value <0.00;
non-significant associations are highlighted in bold.

Table 5.
Assessment of the effects of YAACQ on PHQ-9 (quantile regression).

subscales on the PHQ-9 score. When assessing the results, it is most appropriate to focus on the β coefficients (independent variable). The standard error should also be taken into account when interpreting, while the lower the value, the more stable the model. This has the highest added value when comparing the β coefficients in males and females, while the results revealed lower values predominantly in the female models. Based on the results, the significant effects of alcohol-related consequences on depressive disorder can be clearly confirmed in the vast majority of analyzed cases. The associations that cannot be considered significant at the level of $\alpha < 0.05$ were found only in ten cases (highlighted in bold). In all cases that supported to be significant, positive regression coefficients were found, which can be understood in the sense that alcohol-related consequences may be a risk factor for depressive disorder. In other words, an increased PHQ-9 score may be associated with an increased score in the YAACQ subscales. By focusing on the differences between females and males, the results suggested that females had a higher intensity of effects based on regression coefficients.

5. Discussion

In order to develop successful addiction diagnosis programs and strategies, it is necessary to know the variables that predict the development of substance use problems. This study contributed to this knowledge, as diagnostic information on university students with alcohol problems in the Czech and Slovak Republics could be useful for the development of effective prevention strategies in addiction issue. Although many countries have effective strategies and can be an inspiration, the countries examined in this study implement active interventions and prevention aimed at students to a very small extent. This issue is little discussed at professional, political and social level, and therefore, the need to address it is overlooked. There is a lack of support for university counseling centres for students and, in addition, information on the current situation is insufficient.

The successful development of addiction prevention policy requires the availability of multidimensional analyses and the creation of specific databases that would make it possible to assess the effectiveness of policy in individual geographically defined areas [68]. Many national researches were initiated within international institutions [69]. These facts were the motivation for conducting research in national conditions. The main aim of the presented study was to assess the relationship between alcohol-related consequences and depressive disorder. This aim was met in a sample of university students from the Czech and Slovak Republics.

Based on the results of the descriptive analysis, it can be concluded that males acquired a higher score in all subscales of alcohol-related consequences. Similarly, Geisner et al. [23] revealed more alcohol-related consequences for male students and Merrill et al. [20] found significant sex differences in risky behaviors (RISK) and academic/occupational consequences (AC-OCC). This is consistent with the findings of Lemley et al. [22], who revealed that sex was a significant predictor for negative alcohol-related consequences, while male students tended to obtain a higher YAACQ score. This may be explained by the fact that male students are more prone to excessive alcohol consumption than female students [23], while their heavier drinking can be associated with alcohol-related consequences [70]. Males also perceived alcohol-related consequences less negatively than females [71]. In this regard, females were less likely to be exposed to risk factors and alcohol-related consequences. In contrast, protective factors against alcohol-related consequences predominated in females, as they perceived greater social sanctions for drinking and they were less likely to have characteristics associated with excessive drinking, such

as aggressiveness, uncontrollable behavior, sensation-seeking, and others [72]. On the other hand, there is also interesting evidence that although female students consumed less alcohol, they were more likely to experience negative consequences when drinking [73]. This can be explained by the fact that females have less alcohol dehydrogenase than males, they are less efficient at metabolizing alcohol and thus more vulnerable to its effects.

In the Czech and Slovak regions, students acquired the highest percentage to the maximum score in blackouts (41.67%), while different values could be found in other countries, such as the United States (56.71%) [21], Argentina (26%) and Spain (29,43%) [24]. In terms of impaired control, Czech and Slovak students obtained a comparable percentage to its maximum score (34.91%) as students from the mentioned countries (the United States = 35.33% [21]; Argentina = 35.8%; Spain = 28.8% [24]). Similar results with students from the United States (32%) [21] could be observed in risky behaviors (the Czech and Slovak Republics = 34.58%).

Regarding depression, female students acquired a higher PHQ-9 score than their male counterparts. This fact follows the evidence that depressive disorder (PHQ-9) is more common in females [74]. There are several other findings confirming that depression is a more frequent mental problem for females [30], while sex predispositions to mental disorders remain unclear. Albert [75] tried to explain this on the basis of biological factors that may contribute to a higher prevalence of depression in females as well as to their mental vulnerability. There are also insights into this issue that addressed sex differences in depression during adolescence, and their results showed that the causes of depression were more common in females, who were also more likely to develop risk factors for depressive disorder than males [76]. In the context of the main idea of this study, it should be noted that the main risk factors for depression among female students include low economic status, chronic illness, and unhealthy patterns of behavior [77].

In general, the results in this study also showed that 29.8%, 11.6%, 5.5% and 3.1% of students suffered from mild, moderate, moderately severe and severe depression. This can be compared with the findings of Hajduk et al. [35], who identified depression in 35.5% of Slovak students. For comparison, similar results were found in university students from the United Kingdom [38]. Croatian students also reported depressive disorder with a similar prevalence (mild = 30.3%, moderate = 16.1%, moderately severe = 7.2%, severe = 0.2%) [37]. Students from the United States had mild to moderate depression in a prevalence of 37.7%, and 4.4% of students suffered from severe depression [31]. This suggests that depression in Slovak and Czech students reached a comparable level with other countries even during the COVID-19 pandemic. By comparing depression, the measured scores did not differ much from the scores before the COVID-19 pandemic [35]. Due to the lack of information on the YAACQ score obtained by Czech and Slovak students, it was not possible to compare the values before the COVID-19 pandemic. At the same time, there is a need to compare the reported depression and the consequences of alcohol use after the COVID-19 pandemic.

The results also indicated the existence of significant and positive associations between all the examined indicators (individual alcohol-related consequences, depression), while the associations between the consequences of alcohol use and depressive disorder were identified in low to medium intensity. The findings in this study agree with the findings of other international studies that have revealed that depression is associated with alcohol-related consequences [42, 45]. This was also confirmed between psychological discomfort, such as distress, and the YAACQ score [46]. In this study, a stronger association was found in female students. Also, similar results were revealed in regression models, and the significant effects of alcohol-related consequences on depressive disorder were confirmed in the vast

majority of the analyzed cases. Correlation analysis as well as regression analysis provided an output with positive coefficients, meaning that the increased risk of depressive disorder can be associated with experience in selected dimensions of alcohol-related consequences. Specifically, the findings of Geisner et al. [23] showed a stronger association between psychological symptoms and alcohol-related consequences in males, who were also characterized by higher alcohol consumption and more negative alcohol-related consequences. The results presented in this study partially agree with the findings of Schutte et al. [53], who revealed that alcohol-related consequences could cause depression in males, but not in females. On the contrary, the results of this study support the findings of Rosenthal et al. [54], who revealed that experiencing negative alcohol-related consequences (BYAACQ) may lead to a higher risk of depression (PHQ-9) among female students. The study conducted by Miller et al. [78] should also be emphasized, while their findings showed that blackouts were associated with other consequences of alcohol use (BYAACQ), which in turn were associated with depressive disorder (PHQ-8). In other words, blackouts showed direct and indirect effects on depression in young adults [78]. Focusing on other alcohol-related consequences, the experience of casual sex also increased depressive symptoms in females more than in males [55], while guilt, remorse, feelings that violated societal expectations played an important role in this situation [56]. Last but not least, the findings of this study are close to the knowledge that alcohol use disorder may increase the risk of subsequent depressive disorder [40, 41].

These findings could be useful to support the development of diagnostic variables for alcohol addiction in Czech and Slovak university students. Effective diagnostic measures and prevention programs exist in many other regions, which can be an inspiration. The examined regions should implement them in the university environment. It seems that strategies should also include monitoring the consequences of alcohol use and subsequent depressive symptoms, while experts should distinguish between the individual dimensions of the consequences. The idea is whether chronic alcohol use causes brain changes associated with depression [79], or whether there are genetic or other variables that could explain the relationship revealed in this study. The findings provide great potential for clinical and diagnostic research, that can build on this study.

6. Conclusion and implications

The results of this study represent valuable outputs for national policy makers, as well as for national and international research communities, whose ambition is to examine psychological and behavioral predictors and sex differences in addictive behaviors. All of the above-mentioned findings suggested that the consequences of alcohol use should be an integral part of policy and professional discussions on young people's mental health, as these consequences can be an important factor in the increased risk of depressive disorder. Also, students represent a group of the population of society that is to become an active productive part of it, and they represent potential current and future health care, criminal justice, and social burdens as well. Therefore, it is necessary to point out these aspects and to support the development of prevention addiction programs for this population group as well.

For this reason, public health policies should be strengthened in order to raise people's awareness of the threats of alcohol use and other consequences that may affect the mental health of individuals. Policy makers should strive to integrate mental health into all aspects of social and health policies, strategies and interventions. This research supports the idea that alcohol use with a risk of addiction and

consequences contributes negatively to the symptoms of depression in young people. Specifically, the dimensions of self-perception and self-care appear to be the most important among Slovak and Czech young adults. This fact requires a special attention in the development of diagnostic procedures and the implementation of interventions in the field of addiction in these geographical regions. As the YAACQ is able to predict drinking patterns [10] and the level of drinking risk [11], it is welcome if the dimensions of alcohol-related consequences are also taken into account in alcohol addiction policies. In fact, prevention and education should also play a key role in universities and counseling centres. It would be beneficial if prevention programs for female students focused on coping and overcoming depressive symptoms. On the other hand, there is a need to focus on helping male students with alcohol use disorders and the subsequent consequences of drinking. In general, there is a lack of university counseling centres to help students overcome difficult situations in their lives. Professionals providing adequate help should also focus on the individual alcohol-related consequences as an accompanying aspect of diagnosing alcohol addiction, which would also lead to the prevention of mental disorders such as depression. Promoting an active lifestyle will continue to play an important role in this issue.

In the regions of the Czech and Slovak Republics, alcohol use disorders, together with the consequences of drinking, do not have the necessary attention and are overlooked not only at universities, but also in society as a whole. It is important to be aware of the importance of this issue at both professional and political level. Interventions are urgently needed to prevent young people from becoming addicted.

Health literacy is also considered as an important part of prevention programs at various stages of addiction [80–82]. In the Slovak and Czech Republics, there is no health literacy system that would include specific programs for different population groups [83]. Therefore, it is very difficult to estimate the extent to which the emergence and development of addiction among university students is determined by an insufficient level of health literacy (or its complete absence) and the extent to which it is determined by socio-economic factors. The family and the quality of the previous educational process also play an important role in problem drinking.

In any case, regional differences in addiction need to be examined, while it is also important to examine the consequences of alcohol use, the level of addiction, the mental health of the population and the economic parameters of the region, which may provide greater opportunities for addiction [84]. The ambition in this differentiating perspective was to point out the sex-differentiated effects of problem drinking with consequences, specifically in terms of the higher prevalence of depression in females than in males. Taking these differences into account can also significantly support the development of sex-differentiated services and programs [4, 85, 86]. From an international perspective, the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) [87] also pointed to the limited nature of services specialized for females. Although there is at least one such facility in almost every EU country, the demand is much higher and it is therefore necessary to ensure greater availability of specialized health care.

One of the strengths of this study is the fact that the research was conducted in a relatively large geographically area. The sample size is not negligible, as the sample in this study covered the vast majority of Czech and Slovak universities. The study also has several weaknesses that need to be taken into account when interpreting the results. The limitations of the presented research may include the fact that the sample was not random, and thus certain questions may arise regarding the representativeness of the research sample. Given the size of the sample and the fact that quota sampling was used, it was not expected that the findings would be

significantly distorted due to the non-random sampling. Also, the questionnaire was distributed electronically and there is no guarantee that students have read all the attached information, which can be considered a limitation. There was also a possible limitation when comparing the results with the results of other authors, as a multilevel scale was used in this research, which is perceived as more accurate. It is not known how the COVID pandemic influenced access to alcohol, and this may be a weakness of the study.

As already emphasized, there is a need for scientific interest in the issue of addictive behavior and mental disorders. Future research will focus on uncovering other hidden differences in terms of health, mental disorders and alcohol use. In more detail, it is planned to compare these indicators between different fields of study. The ambition is to extend the research sample and to make a comparison between all countries belonging to the Visegrad Group. The time frame of data collection in this research also provides space for comparing the results aimed at evaluating changes in the addictive behavior of university students during the COVID-19 pandemic with the period after this pandemic situation. The international dimension of the research will provide an insight into the strength of the impact of the socio-economic changes caused by the COVID-19 pandemic on the emergence and development of the young generation's addiction.

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Conflict of interest

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