CIENT PERIODIQUE

Economic Crisis, COVID-19, and Beirut Port Explosion: Impact on Substance Use, Anxiety, Depression and PTSD Among University Students in Lebanon

Roula Haddad[1], Raymond Bou Nader[2] & Eliane Abi-Jreich Besson[1*]

[1]*Department of Psychology, Saint Joseph University of Beirut, Lebanon*

[2]*Institute of Business Management, Saint Joseph University of Beirut, Lebanon*

Correspondence to: Dr. Eliane Abi-Jreich Besson, Department of Psychology, Saint Joseph University of Beirut, Lebanon.

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Abstract

Background: In 2020, Lebanese people experienced various stressful and traumatic events, such as the economic crisis, the COVID-19 pandemic, and the Beirut port's explosion. People exposed to such circumstances are at high risk of developing several mental disorders.

Objectives: We aim to 1) evaluate the impact of these events on university students' rates of alcohol and tobacco use, 2) identify the levels of substance misuse (tobacco and/or alcohol) and mental health disorders (anxiety, depression and/or post-traumatic stress disorder; PTSD), and 3) assess the relationship between substance misuse and the mental health disorders in question.

Methodology: We recruited students from Saint Joseph University in Lebanon and constituted a non-probabilistic sample of 386 participants using the quota method. Quotas considered were gender, campus of study, and academic level of study. Participants completed an online questionnaire

consisting of socio-demographic questions and standardized scales to collect the prevalence of substance misuse and mental health disorders. The description of our sample was based on the results of descriptive statistics. We conducted the Chi-square test to examine our hypotheses. Crosstab analyses were performed to identify substance misuse according to socio-demographic variables.

Results: The present study indicates that 9% of tobacco users have a high level of dependence, while 12% of alcohol users are at risk of addiction. As a result of the stressful and traumatic events in Lebanon, approximatively 17% had to increase their tobacco and alcohol consumption. The percentages of anxiety, depression, and PTSD found in students were respectively 32%, 24%, and 25%. Regarding the correlations between substance misuse and mental health disorders, alcohol addiction risk was positively correlated to PTSD only.

Conclusion: As a result of the stressful and traumatic events in Lebanon, substance use and mental health disorders have increased among university students. We only found a positive correlation between PTSD and risk of alcohol addiction. In future studies, it is crucial thus to develop adequate prevention programs, and refine the programs already existing in order to intensify the psychological care of students and prevent mental health deterioration.

Introduction

Lebanon in 2020: Economic Crisis, COVID-19, and the Beirut Port Explosion

Over the last few years, the Lebanese people had to endure a series of stressful and traumatic events that can lead to mental health disorders. In October 2019, the economy plunged into a financial crisis that has increased the poverty rate from 49% in 2019, to 82% in 2021 [1,2]. In March 2020, the Lebanese government imposed a lockdown to counter the CoVid-19 pandemic: the health care system was not well equipped to face the pandemic due to the economic crisis, the unstable political climate, and the lack of personnel [3]. In August 2020, a double explosion resulting from 2,750 tons of ammonium nitrate, equivalent to an earthquake measuring 4.5 on the Richter scale, took place at the port of Beirut [4]. The explosion resulted in more than 300 deaths, 6000 injuries, 300,000 displaced, and further deteriorated the country's economic, political, and health situation [2,5].

Stressful and traumatic events can have an impact on a person's mental health and generate several mental health disorders such as anxiety, depression, post-traumatic stress disorder (PTSD), and substance use disorders [6,7]. Unemployment is significantly associated with increased mental health problems [6]. Various studies have shown that the COVID-19 pandemic and the confinement measures can generate PTSD, depression, and anxiety [8-10]. Furthermore, exposure to a traumatic event may trigger the development of PTSD in individuals and is associated with other comorbidities, including mood and substance use disorders [11-15].

Tobacco and Alcohol Use Disorders

In the "*Diagnostic and Statistical Manual of Mental Disorders*" (DSM-5) tobacco use disorder and alcohol use disorder are characterized by a problematic use of the substance caused by a strong craving, either in quantity or frequency, despite the problems and dysfunction that this use induces in various areas of the individual's life. The person with these disorders realizes the presence of a problematic use but continues to consume despite the dangerousness in certain situations. In addition, the tolerance to the substance may increase and withdrawal symptoms (irritability, anxiety, difficulty concentrating, etc.) can be experienced when stopping or decreasing the consumption [11]. Smoking initiation often derives from a psychosocial motivation. Subsequently, reinforcing effects such as excitement, tranquility, and calmness, will pose obstacles to stopping attempts (Larousse, 2016). However, there is a high comorbidity between alcohol dependence and tobacco dependence [16]. Lebanon ranks second among countries in the Middle East with high tobacco consumption, and third globally for cigarette consumption [17,18]. A national study conducted in Lebanon among individuals over 40 years old, indicated that 60% of the participants had used tobacco. Approximately 10% of the tobacco users were light smokers and 90% were heavy smokers, with a male predominance [19]. Another national study found that 1.5% of the Lebanese population presented an alcohol misuse in 2008 [20]. The World Health Organization (WHO) suggests that the rate of tobacco use in Lebanon is 42.4% whereas 8.7% present an alcohol use disorder [16,21]. The results of a study conducted among students at the American University of Beirut (AUB) in 1998 to assess various post-civil war youth behaviors, indicate that by the time Lebanese students start their university education, approximately 65% have already smoked cigarettes and/or consumed alcohol [22]. In 2005, 37.2% of students at the Lebanese American University (LAU) used cigarettes with a dependency rate of 51.7% [23]. At Saint Joseph University (USJ), 6.4% and 5.7% of medical students presented a nicotine dependence and a chemical dependence on alcohol, respectively. However, among students belonging to other faculties, 15.7% presented a nicotine dependence and 8.5% suffered from a chemical dependence on alcohol [24]. In 2016, 58% of the fourth-year medical students at AUB consumed alcohol, among which 16% carried the criteria of harmful use [25].

Mental Health Disorders

Anxiety and Depression

In the DSM-5, disorders categorized as anxiety disorders include social anxiety, panic disorder, generalized anxiety, etc. Generalized anxiety disorder is characterized by difficulties in controlling one's worries and preoccupations, resulting in distress and impaired daily functioning. Several symptoms are associated with this disorder such as agitation, fatigability, and irritability [11]. In addition, major depressive disorder (MDD) is associated with a multitude of symptoms (depressed mood, anhedonia, fatigue, weight loss or gain, insomnia, hypersomnia, etc.) that result in psychological distress and impairment of daily functioning [11]. There is a high comorbidity between depressive and anxiety disorders, which causes a significant suicidal risk [26].

In 2008, the prevalence of having an anxiety disorder in the Lebanese population was 16.7% whereas the prevalence of having MDD was 9.9%. Women and people who have experienced a war event were at higher risk of developing an anxiety and mood disorders [20]. In 2003, respectively, 69% and 27.63% of medical

students at USJ suffered from anxiety and depression [27]. However, respectively, 22.7% and 23.8% of AUB's medical students showed anxiety and depressive symptoms in 2016 [25]. In April 2020, during the first confinement in Lebanon, 21.9% of Lebanese undergraduate students had moderate anxiety whereas 13.8% had moderate depression [28].

Post-Traumatic Stress Disorder (PTSD)

In the DSM-5, PTSD results from an event exposing the individual to actual death, to a threat of death, to a serious injury, or sexual violence directly or indirectly. Various distressing signs can invade the individual (repetitive memories, dissociative reactions, etc.). The individual persistently attempts to avoid stimuli that reawaken memories related to the traumatic event and may experience negatively altered cognitions and markedly altered arousal and reactivity [11]. In 2008, 3.4% of the Lebanese population had PTSD and the lifetime risk of developing PTSD was 5.3% [20]. Studies have found that social support can act as a protector against the development of PTSD or even depression [29]. In 2020, the confinement measures in Lebanon generated PTSD among individuals: 62.63% felt bad when something reminded them of the stressful situation, 68.94% felt distant or cut off from others, 66% were in a state of alertness and hyper-vigilance [30]. Following the Beirut port explosion, the results of an online survey sent to individuals who were exposed to the traumatic event in question, showed that 37% of the participants had PTSD [31].

Comorbidities: Substance use and Mental Health Disorders

There is a high comorbidity between anxiety disorders and substance use, and this is attributed to three reasons: either due to self-medication given that in 75% of cases, the anxiety disorder precedes substance use, or due to altered neural circuitry caused by substance abuse and inducing an anxiety disorder, or because of environmental and genetic factors [32]. The direction of the relationship between anxiety disorders and substance abuse remains unclear [33]. A study conducted among patients admitted at a psychiatric unit for substance abuse, highlighted that 48.6% of those with an alcohol use disorder, also had an anxiety disorder, and 37% of them were using alcohol to try and reduce their anxiety symptoms. In addition, 45.7% of participants with an anxiety disorder, were also experiencing MDD [32]. Rates of depression, generalized anxiety, and distress were also found to be higher among smokers as compared to non-smokers [34]. Studies also highlighted the link between smoking and depression, but the direction of the relationship remains unclear: either smoking occurs following a depressive episode, or exposure to tobacco subsequently leads to the development of the symptomatology [33]. Tobacco use may also be a predisposing factor for the development of depression [35]. In addition, smokers with depression, have high rates of nicotine dependence and after abstinence, they go through a severely negative mood and are at risk of developing MDD [36]. Furthermore, smokers are twice as likely to have PTSD, and individuals with PTSD are twice as likely to use tobacco in order to reduce their symptoms [12,15]. Various studies suggest that the presence of PTSD leads to smoking [14].

Materials and Methods

Design

Following the principles of the quantitative research method, we aim to assess the impact of the economic crisis, the COVID-19 pandemic, and the Beirut port explosion, on tobacco and alcohol consumption rates of students pursuing their studies at Saint Joseph University of Beirut (USJ). Levels of tobacco dependence and risk of alcohol addiction among students will be identified. Rates of anxiety, depression, and PTSD will also be reported. Correlations between substance abuse (tobacco and/or alcohol) and mental health disorders (anxiety, depression, and PTSD) will be investigated.

Research Questions and Hypotheses

Based on various studies highlighting the relationship between stressful events and mental health disorders, such as anxiety, depression, PTSD, and substance use disorders) [6-10,14,15,32-34], we aim to explore the hypotheses presented in table 1:

Table 1: Research hypotheses: general and sub-hypotheses

Hypothesis number	Research hypotheses
H1	Students who have increased their tobacco consumption after the economic crisis, the CoVid-19 pandemic, and the Beirut port explosion, presented higher levels of tobacco dependence.
H2	Students who have increased their alcohol consumption after the economic crisis, the CoVid-19 pandemic, and the Beirut port explosion, presented a risk of alcohol addiction.
H3	High levels of tobacco dependence are related to anxiety, depression, and/or PTSD among university students.
H3a	A high level of tobacco dependence is related to anxiety among university students.
H3b	A high level of tobacco dependence is related to depression among university students.
H3c	A high level of tobacco dependence is related to PTSD among university students.
H4	A risk of alcohol addiction is related to anxiety, depression, and/or PTSD among university students.
H4a	A risk of alcohol addiction is related to anxiety among university students.
H4b	A risk of alcohol addiction is related to depression among university students.
H4c	A risk of alcohol addiction is related to PTSD among university students.

Measures

Following the approval of USJ's Ethics Committee (USJ-2021-23), an anonymous self-administered questionnaire was shared online with USJ's students belonging to the Beirut campuses in January 2021. The questionnaire was broken down into several sections. First, students answered sociodemographic questions and indicated if they have been diagnosed with a mental health disorder in the past 12 months. Secondly, participants answered questions developed by the research team to self-assess their current use of tobacco and alcohol and indicated on a scale ranging from "1" (not at all) to "5" (extremely) the impact of the economic crisis, the COVID-19 pandemic, and the Beirut port explosion on their consumption. Only students who use tobacco were asked to fill the "Fagerström Nicotine Dependence Test" (FTND) to identify their level of tobacco dependence: very low, low, medium, high, or very high [37-39]. This 6-item scale, validated in French, is reliable to assess smokers in different populations and its internal consistency coefficient (Cronbach's alpha) is moderate, ranging from 0.55 to 0.74 [40]. Subsequently, recruiters who consume alcohol completed the validated French version of the "DETA/CAGE (Cut, Alcohol, Guilt, Eye-Opener)" questionnaire to evaluate whether they had or not a risk of alcohol addiction [41]. The validity and reliability of the scale have been demonstrated in most studies conducted in a clinical setting and its sensitivity ranges from 43% to 94%, and specificity from 70% to 97% [42-44]. Finally, all participants completed the following standardized and validated scales to evaluate their level of anxiety, depression, and if they met the criteria of PTSD: "Hospital Anxiety and Depression Scale" (HAD-S) and "Post-traumatic Stress Disorder Checklist version DSM-5" (PCL-5) [45,46]. The "HAD-S" is a 14-item self-administered questionnaire that is composed of two separate subscales to assess anxiety (HADS-A), and depression (HADS-D) [45,47]. The scale has been validated in French and has proven to be effective in primary care patients and among the general population [45]. The literature indicates a good internal consistency for the scale: the Cronbach's alpha is approximately 0.82 for each subscale [48]. However, the "PCL-5" is a self-questionnaire consisting of 20 items aiming to assess the presence of PTSD [46,49]. The psychometric properties of the French version of the scale have been proven in a sample of trauma-exposed university students, with high reliability (r = 0.82), validity, internal consistency (Cronbach's alpha = 0.94) [49,50].

Recruiting Method and Sampling

The recruitment of participants was conducted among USJ students, over 18 years old and studying at one of the five campuses of Beirut: humanities campus (CSH), medical sciences campus (CSM), science and technology campus (CST), social sciences campus (CSS), and innovation and sports campus (CIS). Students belonging to the North, South, and the Beqaa campuses were excluded to create a more homogeneous sample. The questionnaire was posted on social media and shared via email with all USJ students at the campuses in question. Recruitment lasted for a period of 50 days (from late January till mid-March 2021) and resulted in 704 respondents.

To create a representative sample of USJ students at the Beirut campuses, we used a non-probabilistic sampling method, specifically the quota method. The quotas chosen were the campus of study, gender, and university level of education. We were informed of the distribution of the students at our campuses of interest according to their gender and university level of education to adequately apply the non-probabilistic sampling method. The tolerated and posed margin of error was d = 5% and the p-value opted was p = 0.5.

For a 95% confidence level, we had a z = 1.96. These data allowed us to calculate the number of respondents and therefore the sample size (n) to be recruited from our target population of 8425 students. By applying the following formula, we obtained a sample size of n = 386 [51]:

$$n = \frac{z^2 p(1-p)}{d^2}$$

Therefore, from the 704 respondents, 386 participants were randomly selected according to the three quotas mentioned.

Statistical Analyses

Several statistical tests were performed using SPSS Statistics (Version 25). In addition to the descriptive statistics, we executed the Chi-Square Test for Association to test our three general hypotheses. Crosstabs analyses were also performed to identify tobacco dependence and alcohol addiction risk by gender, place of living, the campus of study, and the presence of a psychological or psychiatric diagnosis received in the past 12 months.

Results

Descriptive Analyses

Our sample consisted of 386 students (39% male; 61% female). Participants were divided into three age categories and 52% were aged between 18 and 21 years old. Regarding the place of living, most of the students lived either in Mount Lebanon (55%) or in Beirut (34%). Based on the quota sampling method, the distribution of students among the Beirut campuses of USJ was as follows: 27% from CSM, 26% from CST, 20% from CSH, 19% from CSS, and 8% from CIS. Regarding the university level of education, more than half of the students were at the bachelor's level (56%). Among the 21% who had received a psychological diagnosis (anxiety, depression, PTSD, OCD, or other) in the last 12 months, 19% were undergoing a pharmacological treatment. Table 2 presents all the sociodemographic characteristics of our sample.

Table 2: Sociodemographic characteristics of students (N = 386)

Variable	Valid % (*n*)
Sex	
Male	40% (152)
Female	60% (234)
Gender	
Male	39% (152)
Female	59% (229)
Non-binary	2% (5%)

Age	
18-21	52% (201)
22-24	32% (125)
25 and above	16% (60)
Place of living	
Mount-Lebanon	55% (212)
Beirut	34% (133)
South-Lebanon	5% (20)
Beqaa	3% (11)
North-Lebanon	2% (8)
Nabatieh	1% (2)
Employment	
Yes	20% (76)
No	80% (310)
Marital status	
Single	69% (267)
In a relationship	27% (104)
Married	3% (12)
Divorced	1% (2)
Separated	0% (1)
Confession	
Christian	69% (266)
Muslim	23% (88)
Druze	2% (10)
Atheist	6% (22)
Campus of study	
CSM	27% (105)
CSH	20% (79)
CIS	8% (31)
CST	26% (99)
CSS	19% (72)
University level of education	
Bachelor	56% (215)
Master's	34% (130)
Ph.D.	10% (41)

Psychological follow-up in the last 12 months	
Yes	17% (64)
No	83% (322)
Presence of a psychological diagnosis in the last 12 months	
Yes	21% (81)
No	79% (305)
Psychological diagnosis received in the last 12 months (*n = 81)*	
Anxiety	37% (30)
Depression	34% (27)
PTSD	15% (12)
OCD	3% (2)
Other	11% (10)

Prevalence of Substance use and Mental Health Disorders

Substance use: Tobacco Dependence and Risk of Alcohol Addiction

We found that 30% of the students recruited use tobacco (cigarettes, IQOS, etc.) while 62% drink alcohol. We also found that, respectively, 18% and 17% of the students have experienced some change in their smoking and alcohol use habits because of the economic crisis, the CoVid-19 pandemic, and/or the Beirut port explosion. The pandemic had the greatest impact on tobacco and alcohol consumption levels while the Beirut port explosion influenced them the least: 29% noted that the pandemic affected their tobacco use, whereas 26% of the recruits experienced a change in their alcohol consumption because of it. The results of the "FTND" test (M = 2.09; SD = 1.96) revealed that 33% of tobacco users have a dependence that varies between low and high: 16% have a low level of dependence, 8% suffer from a moderate dependence, 9% present a high dependence while the rest of the students (67%) suffer from a very low dependence (Table 3). However, the results of the "DETA/CAGE" questionnaire (M = 0.46; SD = 0.89) administered only to alcohol users highlight that 12% are at risk of alcohol addiction (Table 3).

Mental Health Disorders: Anxiety, Depression, and PTSD

Students completed the two subscales (HADS-A and HADS-D) of the "Hospital Anxiety and Depression Scale" (HADS) to evaluate their anxiety and depression. The results of the "HADS-A" (M = 8.71; SD = 4.16) subscale indicate that 61% had anxiety symptoms: 29% of the students had a doubtful state of anxiety and 32% had a certain state of anxiety (Table 3). However, the results of the "HADS-D" (M = 7.66; SD = 4.15) stipulated those depressive symptoms were identified among 47% of the participants: 23% have a doubtful state of depression, and 24% suffer from a certain state of depression (Table 3). According to the "PCL-5" (M = 24.7; SD = 17.73) questionnaire, we found that a quarter of the recruited students had PTSD (Table 3). We also calculated the Cronbach's Alpha of the "PCL-5" to identify its reliability in our study. The coefficient reached 0.94 which indicates very good reliability (Peterson, 1995).

Table 3: *Prevalence of tobacco dependence, risk of alcohol addiction, anxiety, depression, and PTSD among our sample*

Variable	Valid % (*n)*
Levels of tobacco dependence among tobacco users (*N*=117)	
Very low	67% (78)
Low	16% (19)
Moderate	8% (10)
High	9% (10)
Risk of alcohol addiction among alcohol users (*N*=239)	
Yes	12% (28)
No	88% (211)
Anxiety (*N* = 386)	
Absence of anxiety	39% (152)
Doubtful state of anxiety	29% (112)
Certain state of anxiety	32% (122)
Depression (*N* = 386)	
Absence of depression	53% (205)
Doubtful state of depression	23% (89)
Certain state of depression	24% (92)
PTSD (*N* = 386)	
Yes	25% (96)
No	75% (290)

Inferential Analyses

Impact of Stressful and Traumatic Events on Tobacco and Alcohol Use

The first hypothesis of our study attempted to identify higher tobacco dependence levels among students who have increased their tobacco consumption after the economic crisis, the COVID-19 pandemic, and the Beirut port explosion. To address this hypothesis, we conducted the Chi-Square Test for Association. We examined the correlation between students' self-reported responses to their current level of tobacco use, and their level of tobacco dependence as measured by the "FTND" scale. We found a significant relationship between increased smoking following these events, and high levels of tobacco dependence, with $\chi^2(12) = 27.88$, $p < 0.05$. We confirmed our first hypothesis stating that students who have increased their tobacco use following the stressful and traumatic events in question, presented higher levels of tobacco dependence (Table 4).

Haddad, R., Bou Nader, R. & Abi-Jreich Besson, E. (2022). Economic Crisis, COVID-19, and Beirut Port Explosion: Impact on Substance Use, Anxiety, Depression and PTSD Among University Students in Lebanon. *CPQ Neurology and Psychology, 5*(3), 01-22.

Table 4: *Levels of tobacco dependence and self-assessment of tobacco use after the economic crisis, the CoVid-19 pandemic, and the Beirut port explosion*

	Self-assessment of tobacco use					
	A	B	C	D	E	Total
Levels of tobacco dependence						
Very low	40.0%	86.7%	84.6%	93.3%	62.5%	67.2%
Low	24.0%	13.3%	7.7%	6.7%	16.7%	15.5%
Moderate	8.0%		7.7%		14.6%	8.6%
High	28.0%				6.3%	8.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Following the economic crisis, the CoVid-19, and the Beirut port explosion, I
A. smoke several times a day when I used to smoke once a day
B. smoke once a day when I used to smoke several times a week
C. smoke several times a week when I used to smoke less often
D. started smoking
E. smoke the same as before

Our second hypothesis aimed to identify a risk of alcohol addiction among students who have increased their alcohol consumption after the economic crisis, the COVID-19 pandemic, and the Beirut port explosion. We conducted the Chi-Square Test for Association and correlated the students' self-reported responses of their current level of alcohol consumption, with the results of the "DETA/CAGE" questionnaire. A significant relationship was also found between the increase in alcohol consumption following the three events in question, and the risk of alcohol addiction, with $\chi^2(4) = 36.31$, $p < 0.05$. For example, all the students who started drinking several times a day when they used to drink once a day, were at risk of alcohol addiction (Table 5). These results confirm our second hypothesis and therefore stipulate that alcohol users who have increased their consumption following the stressful situation in Lebanon, present a risk of alcohol addiction.

Table 5: *Risk of alcohol addiction and self-assessment of alcohol use after the economic crisis, the COVID-19 pandemic, and the Beirut port explosion*

	Self-assessment of alcohol use					
	A	B	C	D	E	Total
Risk of alcohol addiction						
No		50.0%	73.0%	81.0%	94.3%	88.3%
Yes	100.0%	50.0%	27.0%	19.0%	5.7%	11.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Following the economic crisis, the CoVid-19, and the Beirut port explosion, I
A. drink alcohol several times a day when I used to drink once a day
B. drink alcohol once a day when I used to drink several times a week
C. drink alcohol several times a week when I used to drink less often
D. started drinking alcohol
E. drink alcohol the same as before

Haddad, R., Bou Nader, R. & Abi-Jreich Besson, E. (2022). Economic Crisis, COVID-19, and Beirut Port Explosion: Impact on Substance Use, Anxiety, Depression and PTSD Among University Students in Lebanon. *CPQ Neurology and Psychology, 5*(3), 01-22.

Mental Health Disorders and Tobacco Dependence

Our third hypothesis attempted to identify a positive correlation between high levels of tobacco dependence and the presence of 1) anxiety, 2) depression, and/or 3) PTSD among our sample. We conducted the Chi-Square Test for Association and found no significant relationship between high levels of tobacco dependence and a certain state of anxiety, with $\chi^2(6) = 5.67$, $p > 0.05$. We also did not find a significant relationship neither between high levels of tobacco dependence and a certain state of depression, with $\chi^2(6) = 2.35$, $p > 0.05$, nor between high levels of tobacco dependence and PTSD, with $\chi^2(3) = 2.05$, $p > 0.05$. Therefore, our third hypothesis was completely denied: high levels of tobacco dependence do not imply the presence of anxiety, depression, and/or PTSD among university students.

Mental Health Disorders and Risk of Alcohol Addiction

Our fourth hypothesis attempted to identify a positive correlation between a risk of alcohol addiction and the presence of 1) anxiety, 2) depression, and/or 3) PTSD among our participants. The results of the Chi-Square Test for Association indicate a positive correlation only between PTSD and the risk of alcohol addiction, with $\chi^2(1) = 14.81$, $p < 0.05$. One-quarter of the recruits (25.9%) simultaneously presented these two mental health disorders. However, we did not find a significant relationship neither between a certain state of anxiety and the risk of alcohol addiction, with $\chi^2(2) = 4.54$, $p > 0.05$, nor between a certain state of depression and risk of alcohol addiction, with $\chi^2(2) = 3.67$, $p > 0.05$. These results highlight that the presence of an alcohol addiction risk does not imply the presence of anxiety and/or depression but is related to the presence of PTSD.

Crosstabs Analyses

By performing crosstabs analyses, we identified the levels of tobacco dependence and the risk of alcohol addiction according to several sociodemographic variables. Regarding gender, males have a higher risk of alcohol addiction than females (12.9% vs 10.9%) and rate higher on tobacco addiction levels than females (10.9% vs 5.7%). However, among tobacco and alcohol users living in Beirut, 10.4% have a high level of tobacco dependence and 15.9% are at risk of alcohol addiction. In addition, among those residing in Mount-Lebanon, 6.8% present a high level of tobacco dependence and 11.3% are at risk of alcohol addiction. Among students belonging to the humanities (CSH) and medical sciences (CSM) campuses, we have 10.7% and 21.4% who present a moderate level of tobacco dependence. Risks of alcohol addiction appear most at the technical sciences (CST) (12.5%) and humanities campuses (CSH) (11.3%). Regarding the university level of education, master's students present higher levels of tobacco dependence whereas undergraduate students have a greater risk of alcohol addiction. Table 6 show an overview of our crosstabs analyses.

Table 6: *Tobacco dependence and alcohol addiction risk according to sociodemographic variables (N=386)*

Sociodemographic variables	Tobacco dependence *n* (%)				Risk of alcohol addiction *n* (%)	
	Very low	Low	Moderate	High	Absence	Presence
Sex						
Male	39 (60.9%)	11(17.2%)	7(10.9%)	7(10.9%)	88 (87.1%)	13 (12.9%)
Female	39 (73.6%)	8(15.1%)	3(5.7%)	3(5.7%)	123(89.1%)	15 (10.9%)
Place of living						
Beirut	27(56.3%)	12(25.0%)	4(8.3%)	5(10.4%)	58(84.1%)	11(15.9%)
Beqaa	2(100.0%)	0(0.0%)	0(0.0%)	0(0.0%)	8(100.0%)	0(0.0%)
Mount-Lebanon	42(71.2%)	7(11.9%)	6(10.2%)	4(6.8%)	133(88.7%)	17(11.3%)
Nabatieh	2(100.0%)	0(0.0%)	0(0.0%)	0(0.0%)		
North-Lebanon	1(50.0%)	0(0.0%)	0(0.0%)	1(50.0%)	6(100.0%)	0(0.0%)
South Lebanon	4(100.0%)	0(0.0%)	0(0.0%)	0(0.0%)	6(100.0%)	0(0.0%)
Campus						
CSM	9(64.3%)	1(7.1%)	3(21.4%)	1(7.1%)	54(94.7%)	3(5.3%)
CSH	18(64.3%)	3(10.7%)	3(10.7%)	4(14.3%)	47(88.7%)	6(11.3%)
CIS	7(63.6%)	4(36.3%)	0(0.0%)	0(0.0%)	18(90.0%)	2(10.0%)
CST	26(70.3%)	6(16.2%)	2(5.4%)	3(8.1%)	56(87.5%)	8(12.5%)
CSS	18(66.7%)	5(18.5%)	2(7.4%)	2(7.4%)	36(80.0%)	9(20.0%)
University level of education						
Bachelor	47(68.1%)	15(21.7%)	2(2.9%)	5(7.2%)	113(86.9%)	17(13.1%)
Master's	25(67.6%)	4(10.8%)	4(10.8%)	4(10.8%)	72(88.9%)	9(11.1%)
Ph.D.	6(54.5%)	0(0.0%)	4(36.4%)	1(9.1%)	26(92.9%)	2(7.1%)
Psychological diagnosis received in the last 12 months						
No diagnosis	60(69.8%)	11(12.8%)	8(9.3%)	7(8.1%)	167(89.8%)	19(10.2%)
Anxiety	3(50.0%)	2(33.3%)	1(16.7%)	0(0.0%)	14(82.4%)	3(17.6)
Depression	7(50,0%)	5(35.7%)	0(0.0%)	2(14.3%)	15(78.9%)	4(21.1%)
OCD	1(100.0%)	0(0.0%)	0(0.0%)	0(0.0%)	1(100.0%)	0(0.0%)
PTSD	4(80,0%)	0(0.0%)	0(0.0%)	1(20.0%)	7(77.8%)	2(22.2%)
Other	3(60.0%)	1(20.0%)	1(20.0%)	0(0.0%)	7(100.0%)	0(0.0%)

Haddad, R., Bou Nader, R. & Abi-Jreich Besson, E. (2022). Economic Crisis, COVID-19, and Beirut Port Explosion: Impact on Substance Use, Anxiety, Depression and PTSD Among University Students in Lebanon. *CPQ Neurology and Psychology, 5*(3), 01-22.

Discussion

Tobacco and Alcohol Use Among University Students

In the present study, the rate of alcohol consumption (62%) is higher than that of tobacco consumption (30%). These rates are lower than those found at AUB in 1998: 65% were tobacco users and 66.5% were alcohol users [22]. However, approximately 18% of the participants increased their tobacco and alcohol use because of the pandemic, the economic crisis, and/or the Beirut port explosion; the pandemic is the event that most influenced these changes. Regarding substance misuse, 33% of smokers have a tobacco dependence that varies between low and high and 12% of alcohol users present a risk of addiction. A more detailed observation of the characteristics of students presenting a low to a high level of dependence on tobacco and a risk of alcohol addiction, allows us to observe a male predominance, similar to the results found in previous studies [22,23]. Several studies highlight that the higher rates of tobacco and alcohol use among men are related to a variety of factors such as social norms that might state that their use is more accepted among men [52]. Despite having more than half of our sample residing in Mount-Lebanon (55%), we notice a high tobacco consumption (43.7%) and a greater risk of alcohol addiction (15.9%) among students living in Beirut. This implies that students may have resorted to substances because of the Beirut port explosion, as they probably experienced it or witnessed it directly. There were no remarkable differences across campuses of study regarding substance misuse.

Our results lead us to three areas of consideration. First, students completed the questionnaire between January and March 2021, and thus during a period of total confinement in Lebanon, which may have affected the amount they typically consume: most students live with their parents and their social habits were restricted and modified. Other studies have also shown that the ease of access to substances must be considered given that it plays a significant role in the amount consumed [53]. Secondly, higher rates of alcohol consumption found in our study are consistent with the results of previous studies conducted among university students [54]. Thirdly, a variety of factors may have contributed to the identification of lower rates of tobacco use than those found in previous studies. Social desirability bias may have interfered by creating discomfort among students during the completion of the questionnaire, especially since the study is attached to the Department of Psychology at USJ. In addition, the fact that USJ implements a "Tobacco-Free Campus" policy, may have reduced smoking rates. For example, a study conducted among students at AUB in 2018, indicates that after one year of the implementation of a law that prohibits smoking within the university, the rate of smokers decreased from 26% to 21%, and 70% of the tobacco users emphasize that this law has contributed to reducing their smoking [55]. Finally, some tobacco users identify themselves as non-smokers despite habitual use. A study conducted among students at LAU in 2005, indicates that 11.7% of those who consume at least one pack of cigarettes per week and 82.4% of nargileh users, identify themselves as non-smokers [23].

Mental Health Disorders: Anxiety, Depression, and PTSD

The present study attempted to identify the presence of anxiety, depression, and/or PTSD in students, likely to be triggered by the stressful and traumatic events experienced in Lebanon in 2020. High rates of anxiety,

depression, and PTSD were identified: 61% suffer from anxiety symptoms (29% doubtful and 32% certain state of anxiety), 47% suffer from depressive symptoms (23% doubtful and 24% certain state of depression), and 25% met the criteria of PTSD. Anxiety and depression rates are higher than those found in previous studies [19,25,27]. El Zouki et al. (2022) [56] found that 26% of university students in Lebanon suffer from PTSD due to the Beirut Blast whereas 31.5% and 40.3% had PTSD due to the Covid-19 pandemic and the economic crisis, respectively. Overall, the higher rates of PTSD found in their study can be explained by the fact that the onset of PTSD takes sometimes more than six months to appear following a traumatic event [11].

Substance Use and Mental Health Disorders

In our study, half of the recruits diagnosed with anxiety and depression in the past 12 months before the study, were found to be tobacco users with low to high levels of tobacco dependence. The inferential analyses conducted did not indicate any correlation between high levels of tobacco dependence and mental health disorders (anxiety, depression, and/or PTSD). In addition, the risk of alcohol addiction was not related to anxiety or depression but was found to be positively correlated with PTSD. A quarter of our population presents simultaneously PTSD and a risk of alcohol addiction.

Based on our results, we can state that tobacco and alcohol are coping mechanisms that have protected their users from the development of anxiety and depression. However, they have led to higher levels of tobacco dependence and greater risks of alcohol addiction. Nevertheless, presenting an alcohol addiction risk did not eliminate the appearance of PTSD among students, whereas high levels of tobacco dependence did not seem to be linked to this disorder. In other words, despite the presence of high levels of tobacco dependence, the use of this substance may have been a coping mechanism for the development of PTSD, whereas presenting a risk of alcohol addiction did not eliminate the risk of developing this disorder.

In addition, given that the prevalence of anxiety, depression, and PTSD are high, we can say that students presenting these diagnoses have put in place positive coping strategies that have allowed them to avoid substance use; it should be noted that those suffering from PTSD had a risk of addiction to alcohol, but not high levels of tobacco dependence. Results from previous studies suggest evidence consistent with ours, indicating the use of active and positive coping mechanisms despite the presence of mental health disorders. For example, a study conducted among medical students highlighted that students experiencing performance pressure overload and depressive symptoms have chosen social support and leisure activities as coping mechanisms; the use of substances (alcohol, tobacco, and cannabis) was the least used coping mechanism [57].

Strengths and Limitations

The present research is characterized by various strengths in terms of subject matter, sampling, and statistical analyses. First, Lebanese university students experienced multiple stressful and traumatic events in 2020 which creates the need to conduct studies aiming to assess and quantify their impact on mental health. We sought to identify substance use and various mental health disorders likely to occur in students following the events in question. This varied assessment can also help in developing and refining mental health

prevention strategies. In terms of sampling, the high response rate (704 participants) allowed us to create a non-probabilistic sample and not just a convenience sample. The quota method used resulted in the design of a representative population of students belonging to the Beirut campuses of USJ while considering their campus of study, gender, and university level of education. Thus, the results obtained can be generalized to all students attending one of the five USJ campuses in Beirut. In addition, multiple and extensive analyses were performed to correlate several variables at the statistical level. First, we asked students to self-assess their tobacco and alcohol use following the stressful events in question and indicate their impact on their substance consumption levels. Then, after identifying substance use and mental health disorder rates, we evaluated the correlation between substance use (tobacco and alcohol) and several mental health disorders (anxiety, depression, and PTSD). Finally, we conducted crosstabs analyses to further investigate tobacco dependence and risk of alcohol addiction based on the following sociodemographic variables: gender, living location, the campus of study, level of academic education, and psychological or psychiatric diagnosis received in the past 12 months.

Several limitations emerge from our study, mainly related to the questionnaire administrated. Firstly, social desirability bias may have interfered with the scores by influencing the responses of students who prefer to give a good image of themselves, especially for questions concerning tobacco and alcohol consumption. It would have been preferable to administer a scale to limit this source of desirability bias; this was not applied in our study to minimize the number of participants who decided to withdraw from the study in the middle of the questionnaire, given that it was already long and consisted of multiple measurement scales. Secondly, even though we chose globally known and validated measurement scales, they are not standardized to the Lebanese population, which may affect the validity and reliability of the responses. Thirdly, the questionnaire was administered during a period of confinement in Lebanon, which may lead to two limitations: increased rates of anxiety, depression, and PTSD, as evidence suggests that confinement can lead to such mental health disorders; and decreased rates of tobacco and alcohol use, as most of the students live with their families and their regular social activities, in which they often use these substances, were hampered due to confinement.

Conclusion

To conclude, we can say that following the economic crisis in Lebanon, the CoVid-19 pandemic, and the Beirut port explosion, levels of tobacco dependence and risks of alcohol addiction have increased among students belonging to the Beirut campuses of USJ. Alcohol remains a more widely used substance than tobacco among our population. These stressful events have also increased the prevalence of mental health disorders, including anxiety, depression, and PTSD. High levels of tobacco dependence and risks of alcohol addiction were not related to the development of any of these mental disorders, except for PTSD. We only found a positive correlation between the risk of alcohol addiction and PTSD. The direction of this correlation remains unclear and needs further investigation. Our results imply that individuals suffering from mental health disorders have put in place positive coping strategies to deal with their experiences without resorting to substances and developing an addiction.

In future studies, it would be interesting to screen students belonging to the North, South, and the Beqaa campuses of USJ and not only the Beirut campuses. Moreover, it is crucial to develop adequate prevention programs, refine the existing ones, and intensify the psychological care of students within the university in order to accompany a whole generation in one of the most critical periods at the national level.

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