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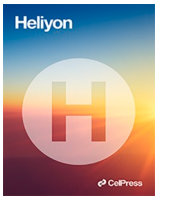

Research article

Measuring the psychosocial impact of COVID-19 by means of the "international student well-being study questionnaire": Evidence on Italian university students

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ABSTRACT

Background: The COVID-19 pandemic appeared as an unpredictable disruption of daily activities. This situation produced a unique mental health impact for the general population, youth, and vulnerable groups. A documented consequence has been alcohol abuse and impaired mental health. To our knowledge, no published study has yet evaluated the rates of depressive symptoms, academic frustration, and substance abuse in the Italian student population in the COVID era linking them to sociodemographic variables.

Aims: To investigate the incidence of depressive symptoms, academic frustration, and substance abuse students developed in one university in Northern Italy during the first COVID-19 outbreak, using a student wellbeing framework borrowed from Allardt's and Bronfenbrenner's theories.

Methods: Descriptive statistics, correlations, Wilcoxon test and factorial ANOVA were performed on data gathered through an online questionnaire sent to a convenience sample of university students. Data collection occurred between 18 May and June 21, 2020.

Results: According to the framework used, Being was the dimension of sociodemographic variables, Having was economic support and Loving was social support. Students experienced academic frustration and related depressive symptoms. Male gender seemed to be less affected by the depressive syndrome. With regard to economic support and related repercussions on depressive symptoms, students who reported that they could not obtain a loan showed significantly higher depressive symptoms. Students benefiting from greater financial support showed less academic frustration. Age appeared to be a predictor of academic frustration since young students proved to be the most frustrated. The examined students' population showed a significant decrease in alcohol and cigarettes consumption.

Conclusions: Having and Being dimensions influenced depression and academic frustration. Having and Loving dimensions were related with use of substances. The study findings support

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the implementation of interventions to help students, at a psychological, social, financial level aiming at fostering the quality of students' educational life.

1. Introduction

The COVID-19 pandemic appeared as an unpredictable and shocking disruption to daily activities considered "untouchable" before its outbreak. Every emergency represents something new for the person and for the community. It has an inherent component of urgency, which identifies the damage, the danger, the risk and determines new practices, response actions to be activated quickly and effectively in order to reduce the risk of greater damage [1].

This emergency turned into a unique mental health impact for the general population, youth and vulnerable groups [2,3]. A documented consequence was alcohol use and abuse and impaired mental health [4,5], with high levels of anxiety, depression, post-traumatic stress disorder, and stress [5]. Within the university student population, even independently of COVID-19, distress, mental disorders, depression and isolation are frequent [6–8], as well as risky health behaviours such as substance abuse [9–11].

With the COVID outbreak and consequent restrictions, students have perceived a radical change in their lives in a global sense [12]. In particular, stressors have shifted from fears of losing a social life to worries about health, family, friends, uncertainty about the future and academic prospects [13,14]. Other harmful effects on students' health were: concentration difficulties, sleep disturbances, decrease in social interactions due to distancing [15]. Furthermore, there have been changes in substance use, with different results based on the studies: in some cases, the use of substances has decreased overall [9,16]; in other cases, the use of smoking remained unchanged, the use of alcohol decreased, cannabis increased [11]. The transition from classroom learning to distance learning, in addition to the closure measures adopted, has affected learning, making it sometimes more difficult for students to maintain concentration, increasing worries about their academic performance and has amplified the level of anxiety [13,15,17].

As the pandemic unfolded, students had to adapt rapidly to changes in their academic personal and social lives [18,19]. This contributed to an increased risk of their mental health impairment [15,17]. The psychosocial well-being of students has been studied in several countries using different data collection tools [16,20–23].

In Spring 2020, a major study was carried out regarding the university student population of different countries during the COVID-19 outbreak: The COVID-19 International Student Well-being Study (C19 ISWS), a cross-sectional multi-country study [24,25].

The multi-centre study was led and coordinated by a research team at the University of Antwerp in Belgium. The aim of the C19 ISWS was to examine the consequences of the COVID-19 pandemic on the well-being of students at universities in Europe, North America, and South Africa via an online survey. The study protocol was published in 2021 [25] and in the same year the first results, overall and relating to the individual countries that participated, were released.

The preliminary aggregated results highlighted damage to the mental health of students [26], as confirmed in other studies especially in the first period of the pandemic [27–30], more evident in women and postgraduate students [31], with the lowest level in the Nordic countries and France, and the highest levels in Turkey, South Africa, Spain and the United States and among medical students [27,30]. Some participants felt that the change in teaching methods had caused significant stress [28] and that the university workload had significantly increased. Some students have expressed anxiety and/or depression due to the possible risk of infection, of themselves and their loved ones [30,32], or for social isolation, distancing and financial uncertainty [26,29,33]. An increase in substance abuse was found among students in some countries [34] while in Belgium and Greece substance abuse was less frequent [30,35].

In Italy, which was one of the first countries so deeply affected by COVID-19, the impact on mental health in the general population was mainly evaluated, reporting how depressive symptoms were increased by socio-demographic variables such as financial problems due to the pandemic, poverty, quality and extent of social support, and personal history also of that large part of Italian university students made up of first or second generation migrants [36–38]. Italian studies have also focused on healthcare workers [39–43]. Only a few studies have focused on the Italian university student population, comparing the incidence of mental health problems with that of other working populations [37,44]. Thus, this study aims at investigating the incidence of depressive symptoms, academic frustration, and substance abuse students developed in one University in Northern Italy during the first COVID-19 outbreak and uncover if there is a correlation between sociodemographic characteristics and self-reported depressive symptoms and academic frustration among students. To our knowledge this study is unique as no other research was carried out in Italy on the effects of the first wave of the COVID-19 pandemic on a population of university students.

1.1. Theoretical framework

As previously stated, literature evidences the increase of depressive symptom, anxiety and frustration in the general population during COVID-19 first wave and the specific vulnerability of the students population.

Therefore we decided to look at the data gathered through the C19 ISWS study using the theoretical framework addressing the students well-being in the context of Erik Allardt's Theory of Welfare and Urie Bronfenbrenner's Ecological Systems Theory of Development as formalised by Lukasik [45].

Allardt's Theory of Welfare identifies three dimensions of subjective wellbeing [45].

- Having, as the elements linked to the material conditions of life;

- Loving, as the elements linked to social life and social relationships; and
- Being, as the elements associated to psychological wellbeing, self-esteem, society.

In Brofenbrenner's Ecological Systems Theory of Development [46], five different context of individual development are identified: the microsystem, the mesosystem, the exosystem, the macrosystem, and the chronosystem.

In our study, we chose to focus on the macrosystem, as the set of context rules and norms the students have no control on within a specific chronosystem (COVID-19 pandemic). Some collected variables that could operationally describe the Having element (perceived economic support linked to the economic situation), the Loving one (the condition of social withdrawal caused by COVID-19 pandemic) and lastly the Being one (age, gender, and having a migration background). The model is presented in Fig. 1 (Fig. 1).

Moreover, Italy was the first European country going through difficult political decisions to face the COVID-19 spread, so understanding the students reaction that arose when confronted with a change in everyday habits which at the time was unique and unpredictable, seemed to be an extremely valuable information.

To fill this gap, we used data from the University of Parma (Italy) sample of the C19 ISWS, with the following aims.

1. Investigate the levels of depressive symptoms, academic frustration, and substance abuse students developed at a university in Northern Italy during the first COVID-19 outbreak.
2. Verify whether sociodemographic characteristics are associated with self-reported depressive symptoms and academic frustration by students at a university in Northern Italy during the first wave of the COVID-19 pandemic.

2. Materials and methods

2.1. Survey and recruitment

The data of this study were collected in the light of the C19 ISWS, an online survey conducted through questionnaires sent online to the student population of the universities involved. The questionnaire originally produced by the research team that coordinated the international study consisted of seven major sections: (1) socio-demographic variables, (2) study-related information, (3) daily activities/behaviours before and during the COVID-19 outbreak, (4) COVID-19 diagnosis, symptoms, perceived worries, (5) mental well-being questions, (6) students specific questions and concerns, and (7) COVID-19 knowledge and information.

In Table 1, modules and the number of items per module are summarised [25].

Each country had the opportunity to translate the questionnaire. The questionnaire was independently translated into Italian by two members of the Italian study team according to the translation protocol. Each translation difference was discussed and resolved with an agreement between the two team members. The survey was distributed in one Italian university (in Northern Italy) that adhered to the research protocol. In Italy, the distribution of the questionnaire took place between 18 May and June 21, 2020. A flowchart on the questionnaire development is showed in Fig. 2 [25].

More details about the study procedures and questionnaire can be found in the study protocol [25,26].

In this study we have selected some relevant variables, in particular: (i) depressive symptoms, (ii) academic frustration; (iii) factors associated with depressive symptoms or academic frustration; (iv) substances use. Variables are described in detail below.

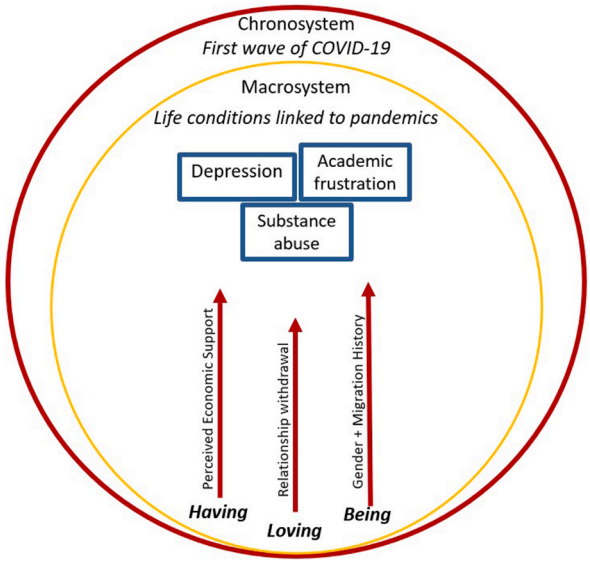

Fig. 1. Theoretical framework, authors' compilation.

Table 1
Measurements and items of the questionnaire adapted from Van de Velde et al. [25].

Module	Topic	Measurements	N. of items(+filter questions)
1	Sociodemographic information	Sex; age; relationship status; migration status; parental migration status; parental education; social and economic capital	8 (+4)
2	Study-related information	Study field; higher-education institution (HEI); whether first-year student; educational program; (international) student status; study importance; study tuition	7 (+1)
3	Before and during COVID-19 outbreak	Financial resources; time spent on studies and paid jobs; living situation; smoking; drinking; cannabis use; moderate and severe physical activity	10 (+1) × 2 (before + during)
4	COVID-19 diagnosis, symptoms, perceived worries	Underlying diseases or conditions; symptoms; stigma (hiding symptoms); diagnosis; risk perception; personal worries about (re-)infection, getting severely ill; worries about the personal network and the health care system; knowing someone with COVID-19; adherence to COVID-19 measures	11 (+2)
5	Stressors, informal support, and mental well-being	Social activities; contact with family and friends; social support; CES-D8 depression scale; frustration; anxiety; boredom; loneliness; sleep	18
6	Student-specific questions and concerns	Help-seeking behaviour (contacting teaching staff, student, and counselling services) for financial, psychosocial, and study-related worries; statements about workload; perceived quality of education; stress due to changed education and examination formats; satisfaction with the communication strategy of the HEI	11 (+1)
7	COVID-19 knowledge and information	COVID-19-related knowledge; attitudes toward government communication strategy (regarding timely and comprehensible information)	10
Total			67 (+10)

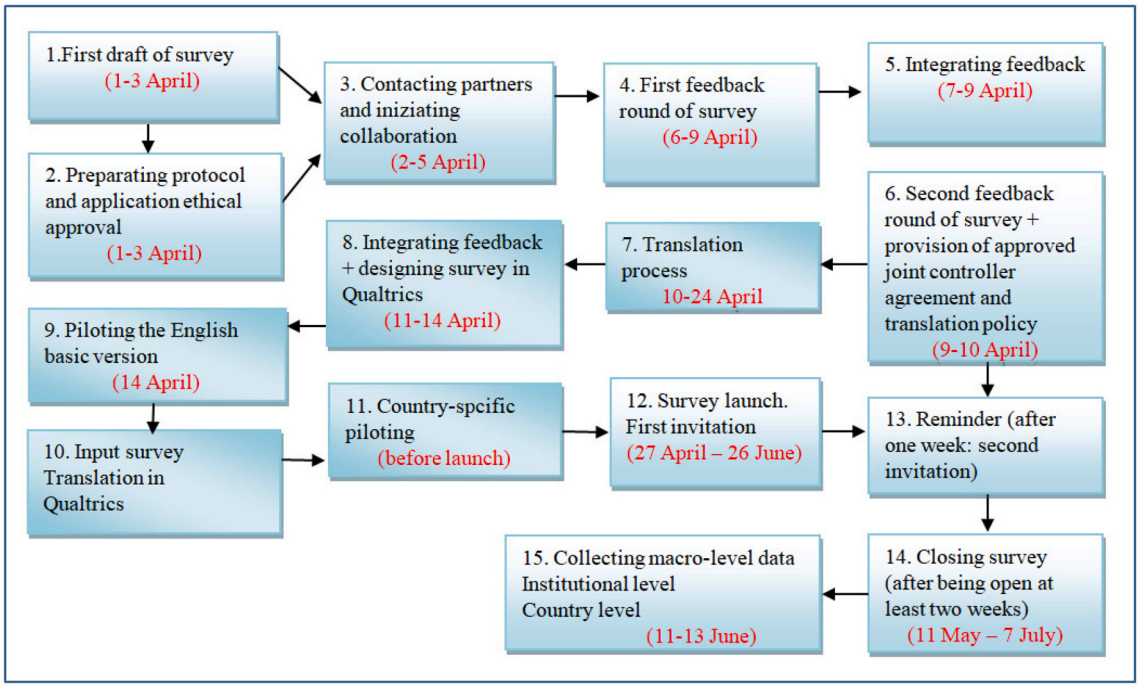

Fig. 2. Survey development, preliminary testing and launch, retrieved from Van De Velde et al. [25].

2.2. Study population and context

For this study, a convenience sample of undergraduate and postgraduate students was recruited on a voluntary basis in one university in Northern Italy. Students' recruitment was conducted in full accordance with data protection regulation. The process started following the data local gatekeeper approval. Both undergraduate and postgraduate students enrolled at the University, received on their institutional email address a first invitation to participate to the study along with the questionnaire link. Fifteen days later, they received another message with a reminder and, again, the link to fill the questionnaire. Data were collected, encrypted and stored on a password-protected university computer. Data collection occurred during the strictest restriction period when the universities' lecture halls and libraries were closed, as well as cafés, restaurants, and non-essential shops.

2.3. Measurements

2.3.1. Depressive symptoms

Depressive symptoms using the short version of the Center for Epidemiological Studies Depression Scale (CES-D 8 scale), scale validate in 2020 [47] were assessed. The scale consists of eight items: (i) feeling depressed, (ii) feeling that everything was an effort, (iii) sleep was restless, (iv) feeling happy, (v) feeling lonely, (vi) enjoyed life, (vii) feeling sad, and (viii) feeling like they could not get going.

A 4-point Likert scale was used to indicate how often during the past week the above-mentioned feelings occurred: (0) none or almost none of the time, (1) some of the time, (2) most of the time, (3) all or almost all of the time. To derive the CES-D 8 score, all eight items were summed up, reversing the items "feeling happy" and "enjoying life" beforehand. The theoretical range of the score is based on the 4 points Likert scale. The sum score can range from 0 to 24, a higher score suggesting higher levels of depressive symptoms.

2.3.2. Academic frustration

Eight questions were asked to assess students' perceived academic frustrations due to the pandemic [48] (Tasso et al., 2021): (i) increased workload, (ii) knowing less what is expected in courses, (iii) being concerned not to be able to complete the academic year, (iv) poorer quality of education, (v) change in teaching methods caused stress, (vi) sufficient information about changes by university, (vii) satisfaction with measures at university, (viii) feeling able to talk with university staff about concerns. A 5-point Likert scale was used with the following options: (1) strongly agree, (2) agree, (3) neither agree nor disagree, (4) disagree, (5) strongly disagree. Items were summed up, so that higher scores indicated lower academic frustration. The score has a theoretical range from 8 to 40.

2.3.3. Factors associated with depressive symptoms or academic frustration

The following sociodemographic characteristics were included: age in years, gender (female, male, diverse), having a migration background (respondent or at least one parent being born outside of Italy). Fields of study were taken into consideration and, to assess the perceived social support linked to the economic situation, students were asked if they could easily borrow 500 Euros within two days, one person minimum (0, 1, 2, 3 or more).

2.3.4. Substances abuse

Four questions were asked to assess students' use of substances (tobacco and alcohol). They were asked to provide the number of cigarettes smoked daily before and during the COVID-19 outbreak and the number of glasses of alcohol drunk before and during the COVID-19 outbreak.

2.4. Statistical analysis

For all included variables, descriptive statistics were presented using means and standard deviations for metric variables and total numbers and percentages for categorical/dichotomous variables. Correlation and Wilcoxon tests were used to assess the change in substances use during and after COVID-19 outbreak.

For the outcome "depressive symptoms" and "academic frustration" a factorial ANOVA was run including the following variables as factors: sociodemographic variables, perceived economic social support. In both models, we tested the included variables for multicollinearity. Hence, all variables simultaneously in the models were included. All analyses were conducted using the statistical software SPSS 21.

The analysis and reading of the data were oriented towards the theoretical framework expressed in the introduction to the study (45) and elaborated by the authors.

3. Results

3.1. Sample characteristics

On a total of 29,134 students enrolled in the University [49], 12,534 participants completed the survey, in line with the general number of students which was reached by the same study in different countries (9967 Dutch students [11], 5021 students in one

Table 2
Distribution fields of study of survey participants (N = 12,534)

N. Percentage		
Social Behavioral Sciences	2116	16.9%
Health	2005	16%
Engineering	1844	14.7%
Language	1238	9.9%
Business administration	1216	9.7%
Education	930	7.4%
Communication technologies	730	5.8%
Others	2455	19.6%

German university [28], 7199 in a second German university [33]). After excluding participants with missing values for any of the included variables, 9191 observations remained and were left for analysis (73%).

In the sample, 73% were female, 26% male, and 0.6% diverse with a mean age of 23.5 years (sd = 5,3).

The distribution in the fields of study is made up of some study courses including the most attended ones.

The distribution of college students with reference to the fields of study, being a demographic data, was calculated on the total participants as showed in Table 2 and Fig. 3, while the subsequent elaborations were processed on observations or 9191 sample units.

The first variables considered in this study were academic frustration and the manifestation of depressive symptoms in the participating college students.

The results show that the students showed academic frustration and that the latter is related to depressive symptoms.

Actually, the mean CES-D 8 score was 2.2 (sd: 0.7), while the mean score of academic frustration which is made up of 8 items was 2.6 (sd: 0.7).

Depressive symptoms and academic frustration were tested using Pearson correlation test and were found to be positively correlated in a statistically significant ($p < 0.001$)), we assumed that the data is normal, referring to the large number of participants and based on the central limit theorem. Because of the nature of the data, it was impossible to evaluate the correlation between substance use and depressive symptoms and academic frustration.

3.2. *Characteristics associated with depressive symptoms*

With respect to the depressive symptoms highlighted, the following associated characteristics were analysed: (i) gender (being dimensioned in the framework), (ii) perceived economic support (having dimension), (iii) being personally migrant, (iv) being children of migrants (v) and age (being dimension).

A factorial ANOVA was conducted to compare the main effects of gender, perceived economic support, personal migration and parents' migration considering if both or only one parent was born abroad and age of college students on four levels (<21 years, 21–22 years, 23–24 years, >24 years), on depressive symptoms.

All the effects were statistically significant at the 0.05 and 0.001 significance level except for personal migration and age.

The main effect for gender, indicating the male gender therefore seems to be less affected by the depressive syndrome.

The main effect for perceived economic support reported being able to easily borrow EUR 500 within two days from one to three people, indicating a significant difference ($p < 0.001$) between 0 person ($M = 2.4$ sd $\pm$ 0–69), 1 person ($M = 2.3$ sd $\pm$ 0.63), 2 persons ($M = 2.2$ sd $\pm$ 0.63), and 3 or more persons ($M = 2.2$ sd $\pm$ 0.72)

The main effect for parents' migration, indicating a significant difference between Yes (born in Italy) ($M = 2.2$ sd $\pm$ 0.65), one outside ($M = 2.3$ sd $\pm$ 0.70) and both outside ($M = 2.4$ sd $\pm$ 0.66).

Bonferroni post-hoc tests were run to provide information about which levels between the independent variables were significant.

The main results are shown in Table 3 and Fig. 4.

Students who reported that they cannot get a loan (in this case of 500 euros, indicating 0 people) show significantly higher depressive symptoms. Therefore, the fact of not having perceived financial support affects the increase in depressive symptoms.

The condition of being an emigrant student in relation to depressive symptoms did not show statistically significant differences.

Students who have one or both migrant parents report more depressive symptoms. Parental status is therefore a predictor of depressive symptoms.

Characteristics Associated with Academic Frustration.

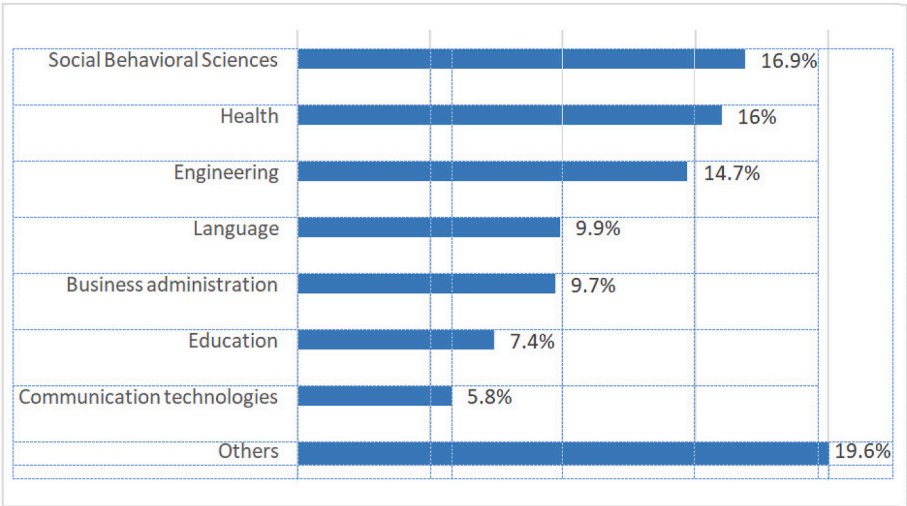

Fig. 3. Distribution fields of study of survey participants (N = 12,534).

Table 3
Characteristics associated with depressive symptoms (Bonferroni post-hoc tests) (N = 9191)

	Mean	Sd [95%CI]	F Ratio	p
Gender				
Male	2.1	0.64	(F 2.9281) 51.6	<0.001
Female	2.3	0.65		
Not indicating	2.3	0.67		
Perceived economic support				
0 person	2.4	0.69	(F 3.9281) 57.5	<0.001
1 person	2.3	0.63		
2 persons	2.2	0.63		
3 or more persons	2.2	0.72		
Parents migration				
Yes (born in Italy)	2.2	0.65	(F 2.9281) 5.6	<0.05
One outside	2.3	0.70		
Both outside	2.4	0.66		

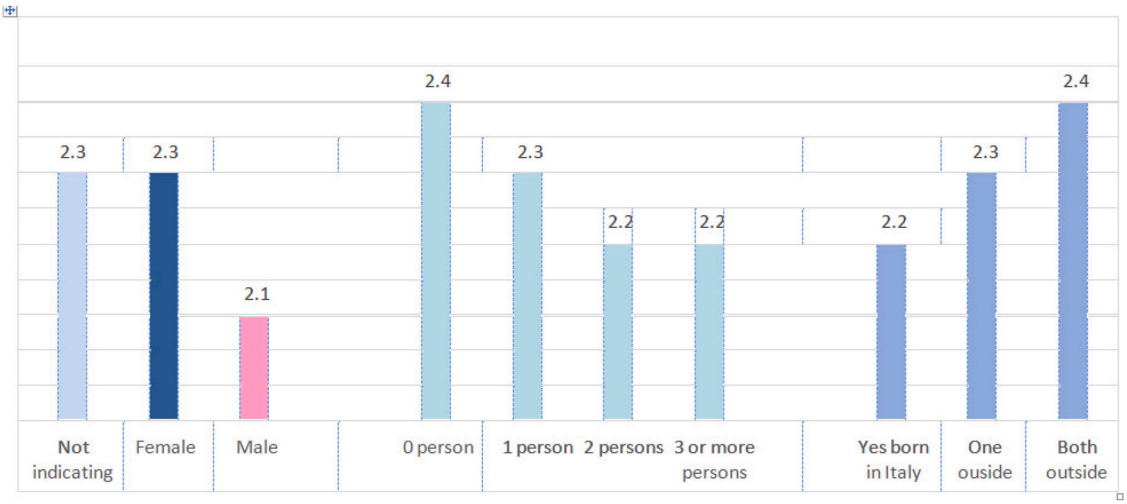

Fig. 4. Characteristics associated with depressive symptoms (Bonferroni post-hoc tests) (N = 9191).

With regard to academic frustration, the following associated characteristics were analysed: (i) gender, (ii) perceived economic support, (iii) personal migration; (iv) parents' migration, and (v) age.

A factorial ANOVA was conducted to compare the main effects of gender, perceived economic support reported being able to easily borrow EUR 500 within two days, personal migration and parents' migration whether both parents were born abroad or just one of them and age on four levels (<21 years, 21–22 years, 23–24 years, >24 years), on academic frustration.

Regarding academic frustration, comparison between genders showed that the female gender resulted significantly (p<,001) more

Table 4
Characteristics associated with Academic Frustration (Bonferroni post-hoc tests) (N = 9191)

	Mean	Sd [95%CI]	F Ratio	p
Gender				
Male	2.7	0.74	(*F 3*.2908) 15	<0.001
Female	2.6	0.70		
Not indicating	2.6	0.69		
Perceived economic support				
0 person	2.5	0.72	(F 3.9208) 27.3	<0.001
1 person	2.6	0.69		
2 persons	2.6	0.70		
3 or more persons	2.7	0.84		
Age				
<21 years	2.5	0.65	(F *3*.9201) 91.1	<0.001
22–23 years	2.5	0.68		
23–24 years	2.6	0.79		
>24 years	2.8	0.76		

frustrated (M = 2.6 sd ± 0.70) than male gender (M = 2.7 sd ± 0.74), and not indicated gender (M = 2.6 sd ± 0.69).

The main effect for perceived economic support reported being able to easily borrow EUR 500 within two days from one to three people $p < 0.001$, indicating a significant difference between 0 person (M = 2.5 sd ± 0.72), 1 person (M = 2.6 sd ± 0.69), 2 persons (M = 2.6 sd ± 0.70), and 3 or more persons (M = 2.7 sd ± 0.84).

In reference to academic frustration, related to age, the main effect, indicating a significant difference between young age (more frustrated) respect to a more advanced age (Table 4 and Fig. 5).

Perceived financial support influences the level of academic frustration, so those with more financial support show less academic frustration. Age is also a predictor of academic frustration: young students appear to be the most frustrated, unlike older ones.

3.3. Consumption of substances of abuse

With regard to the consumption of substances of abuse such as cigarettes and alcohol, consumed daily before and during the COVID-19 outbreak by the students examined, a significant decrease in the use of alcohol and cigarettes emerges.

The mean of daily cigarettes consumption before COVID-19 outbreak was 5.2 (sd: 4.8) and during the outbreak 4.8 (sd: 6). A Signed-Ranks Test indicated that pre-COVID cigarette consumption was statistically significantly higher than during COVID, Z = 30 $p < 0.001$.

The weekly consumption of glasses of alcohol before outbreak was 2.69 (sd: 3.9) and during the outbreak 1.8 (sd: 4.3). A Signed-Ranks Test indicated that pre-COVID alcohol consumption was statistically significantly higher than during COVID, Z = 34 $p = 0.000$.

4. Discussion

This study aims at investigating the incidence of depressive symptoms, academic frustration, and substance abuse students developed in one university in Northern Italy during the first COVID-19 outbreak and uncover if there is a correlation between sociodemographic characteristics and self-reported depressive symptoms and academic frustration among students. To our knowledge this study is unique as no other research was carried out in Italy on the effects of the first wave of the COVID-19 pandemic on a population of university students. The chosen theoretical framework allowed us to analyse, within the chronosystem first wave of Covid-19, the macro-system: pandemic-related student living conditions. Within this complex system, we were able to recognise how the Having, Loving and Being factors can influence depression, academic frustration and substance abuse.

The courses of study most represented in the reference sample were: psychology (16.9%), health sciences (16%) and engineering (14.7%). A greater adherence to the study by the student population belonging to health or socio-psychological degrees could lead to the assumption of a greater sensitivity/knowledge of this population with respect to the problems caused by the pandemic. Furthermore, the impact that environmental and urban planning has on the quality of life, collective and individual health may have favoured the participation of engineering students [50].

The application of the framework shows how the chronosystem consisting of the COVID-19 pandemic and the consequent restrictive measures (macrosystem) have led to an increase in depressive symptoms in the population under study, particularly in the female population (being dimension in the framework), in those with less economic support (having dimension) and in those with a history of migration (being a dimension). This would seem to mirror what was reported in the larger study conducted by Van de Velde

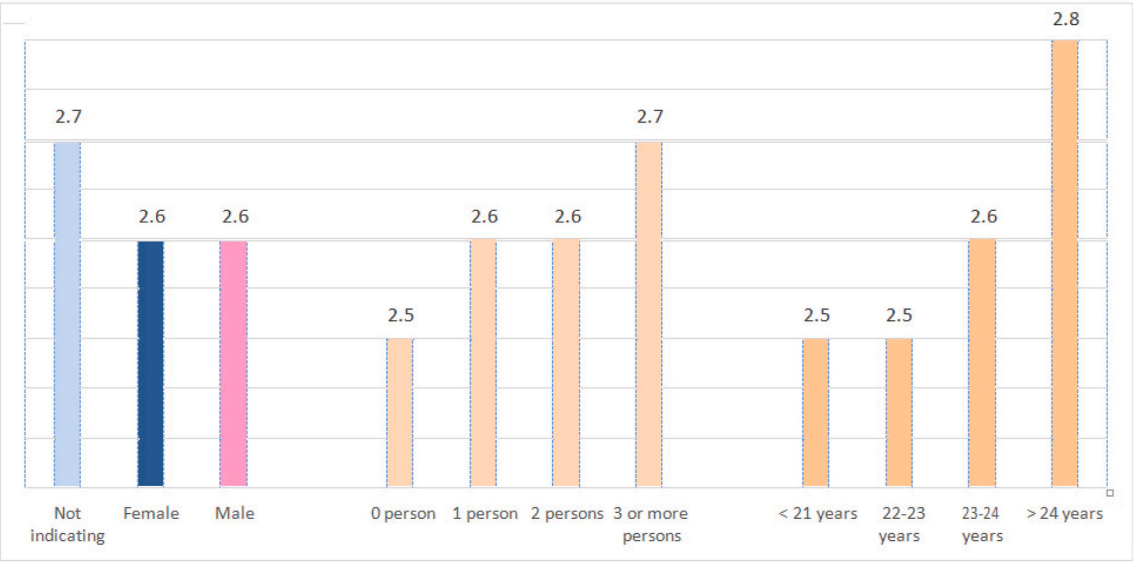

Fig. 5. Characteristics associated with Academic Frustration (Bonferroni post-hoc tests) (N = 9191).

[26] which involved university students from 26 high- and middle-income countries. The increase in depressive symptoms has also been highlighted in other national studies belonging to this project [27–32,51] and in researches not belonging to this project [16,20,22].

In particular, in a study [26] the authors describe the prevalence of depressive symptoms in university students, with a substantial transnational variation of these symptoms, with the lowest mean level in the Nordic countries and France, while the mean levels highest have been found in Turkey, South Africa, Spain and the United States. In this study, as in the Hungarian one, the lack of social support (the Loving dimension in the utilised framework) is also a condition that increases the state of depression [51]. Matos Fialho [28], in Germany, established a correlation between the increase in student workload due to different ways of delivering courses during the pandemic and a higher incidence of depressive symptoms.

For Stathopoulou [30] it is first-year students who report more depressive symptoms which would seem to worsen in the absence of frequent contact with their family of origin or friends or due to the lack of a trusted person with whom to discuss personal matters.

According to Alkureishi, in a study of medical students [27], stress is highlighted more highly in relation to age groups and race; targeting second- and third-year students and students of Black, Asian and other minority ethnic races.

In the study by Solomou [29], the most influential variables on the unveiling of depressive symptoms are stress and academic satisfaction, young age and the modest economic possibilities of the interviewees. These data support what is expressed by the Italian sample in which, however, there is a greater tendency towards depression in more mature students (the Being dimension in the framework). This phenomenon could be attributable to the sudden change in the methods of delivering training activities and carrying out exams and to a lesser experience/incline of more mature students with respect to distance learning [18].

A German and Greek study [30,32], unlike the others, highlights the fear of virus infection for oneself or one's family members as a highly influential factor on depression.

Remaining in the specificity of an Italian population, the results coincide with those reported by a study conducted at the beginning of 2021 [52]. In the study, over 40% of Italians reported a worsening of anxious and depressive symptoms during the lockdown. Again, women are more at risk. Affordability was also correlated with the risk of depression [52].

As for academic frustration, which in our study is linked to factors such as economic support (the Having dimension) and age (the Being dimension in the framework), it has been found in several other studies, linked to the increased workload during the pandemic and the concern of not being able to complete the studies [28,53] to future academic perspectives [13].

Academic frustration is also linked to students' perceived loneliness and narrowing of social relationships [27,51], with concerns related to their learning experiences and with evidence of lower satisfaction with the quality of teaching [30].

To interpret the reasons for these data, it is important to consider that everyday life is structured around work and the rhythm of the day is determined by the time dedicated to work and the ways in which it is tackled. Remote work in contact with the computer screen alters the perception of the workload itself by dematerializing the living relationship and its need for closeness or distance.

For university students, the time required for learning with face-to-face teaching is different from that required online, the attention ability differs. A further burden to the workload comes from a widespread prejudice that stigmatises the worker as much as the student. Staying at home, working from home, is interpreted as working less, studying less. It has also been highlighted how the house itself becomes the object of redefinition: more people work or study in the same space which becomes small, unsuitable. The dimension of domestic familiarity merges with the dimension of work production and that of family affectivity with the intrusiveness of learning paths. Everything is expressed and materialised in the same space with an indistinct promiscuity of roles and situations [54].

Contrary to expectations, a reduction in both alcohol and tobacco consumption was recorded in the Italian student population covered by this study. This trend would appear to lessen in students who did not have the opportunity to borrow money (the Having dimension in the framework) and in those from families with a higher educational background (the Loving dimension). The lower use of tobacco and alcohol was also observed in students in Greece, the Netherlands and Belgium [9,30,35], but not in that of the other countries included in the international survey [26]. In some cases, substance abuse was significantly increased [34].

In an independent study [11] the changes in the Dutch student population were observed in relation to the consumption of tobacco, alcohol and cannabis before and during the introduction of the anti-contagion restrictive measures. The data presented showed that the use of tobacco remained stable, while alcohol consumption decreased on a weekly basis. Conversely, there has been an increase in cannabis use. This phenomenon would seem to be more evident in the population of single male students, who moved into their own accommodation, children of immigrants and with access to student loans. Again, the distance/absence of support from the family of origin, the migratory background and limited economic availability are confirmed as predisposing factors to a greater consumption of drugs.

The results of the study highlight, in the university population, a phenomenon related to depression, anxiety crisis, academic frustration, certainly highlighted by the pandemic period, but also present before the pandemic.

Several studies, carried out in the pandemic period, conclude their reflections by highlighting the need to pay attention to the psycho-social well-being of students and to improve access to any support services [53,55], considering student support a priority for universities.

The pandemic has therefore had a negative impact on students and, according to some authors, could have long-term consequences on their mental and physical health and education [51].

The results gathered, allowed to collect new information about the specific sample of students of this Italian university. First of all, we found that mild depressive symptoms and academic frustration were present in these students during COVID-19 first wave. These two variables were correlated, confirming the important existing connection between mood and cognitive and social performance.

Moreover, data gave the possibility to draw a "risk profile" for the students of this university.

In fact, we found out that, during COVID-19 first wave that being a female student, having a lower economic social support and

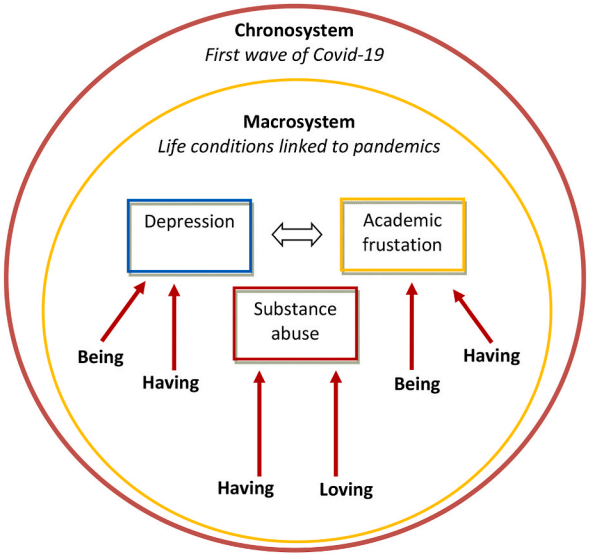

Fig. 6. Overview of main results.

parents with a migration story, increased depressive symptoms. We can hypothesise that this defines a large group of students, 2nd generation migrants who, born and raised in Italy from foreign parents, still have a precarious economic balance and have a narrower support network which puts them more at stake when sudden problematic events occur. This could worsen their emotional wellbeing and increase depressive symptoms. Nonetheless, the withdrawal from social activities during lockdown, could have worsen this condition dramatically reducing the social resources (peers, teachers) usually exploited to cope with adverse events.

When coming to academic frustration, the "risk profile" changes and, even if the impact of a lower economic social support remains strong, it now pairs with age. Younger students with a lower economic social support were more exposed to academic frustration during COVID-19 first wave.

We can hypothesise that this finding is linked to the investment that this student profile made in academic studies and, the sudden disruption of traditional teaching and studying activities, generated a higher level of frustration and a difficulty in the required adjustments.

Finally, we found that these students reduced the substances (alcohol and cigarettes) consumption during COVID-19 outbreak, a finding that give us a very important information: these use of these substances seems to be linked more to a "social consumption" than a coping individual strategy.

All of these findings are new information we gather on the students of this Italian university and their implication is the definition of the aforementioned "risk profiles". An overview of our main results is graphically depicted in Fig. 6.

COVID-19 was a stress test for assessing the psychosocial frailties of university students. A few years after the pandemic these results could still be useful in providing important data to university institutions in northern Italy that could activate prevention measures for those students with characteristics that fall within the group of identified fragilities.

4.1. Limitations

The data reported here cannot be representative of the entire Italian student population but can only be read in reference to the student population of the University of Parma. Furthermore, it is necessary to emphasize the exposure to a non-response bias, as we had a high nonresponse rate, which limits the interpretation of the data.

Another limitation is the data collection, which compares data on pre- and post-outbreak substance use based solely on what has been self-reported and could be exposed to social desirability bias and an underestimation of previous use behaviour.

A further limitation of the study is always due to its cross-sectional nature; in fact, both the presence of depressive symptoms and academic frustration and the associations linked to them refer to a precise moment in time, i.e. what was present immediately after the outbreak of the COVID-19 pandemic. It would be desirable to have longitudinal data that allow for an assessment of the evolution of these components during the pandemic up to what is currently present in the student population in terms of depressive symptoms, academic frustration and substance use following adaptation to the pandemic over time and to the changes in the course of academic life that have occurred in this period of time.

5. Conclusion

This study has allowed us to shed light on Italian university students' well-being in the pandemic era and to compare our findings with various other studies conducted in other countries. The adoption of specific theoretical framework helped us to describe the

relationships between our sample and the perceived economic support, the relationship withdrawal and the gender associated with a migration background factors within a clear chronosystem the first wave of COVID-19.

In particular, the framework adopted allowed us to highlight that both depression and academic frustration are mainly influenced by the Being and Having factors as defined by the model. Interestingly, the reduction of substance abuse is always influenced by the Having factor (reduced economic support), but also by the Loving factor, in its meaning of relationship with the family, which has a high academic qualification. Our results underline the importance of carefully considering the negative impact of the pandemic on students' mental health and on their ability to successfully graduate.

The study findings show the importance of implementing supporting interventions, at a psychological, social, economic level aiming at improving the overall quality of students' teaching and learning experience.

Universities should commit themselves to address arising issues particularly from high-risk groups which express distressing situations, especially in unprecedented times like the COVID-19 pandemic was.

Declarations

Ethics statement

Authors declares that this manuscript is unique version of their data; Authors modifies data availability statement inserting a link allowing access to all data.

Authors ensure that they have written entirely original works, and that the authors don't have used the work words of others.

The authors thank the university students who participated in the research.

The authors declare that they submitted only this article from the research data collected and analysed.

The authors affirm that they didn't use generative AI and AI-assisted technologies in scientific writing.

Ethical approval and consent to participate

This study was approved by the Research Ethics Board of the University of Parma (reference number 2020/05/125). All participants were recruited on a voluntary basis and asked to sign an informed consent form.

Data availability statement

We provide public access to the research data supporting our paper, to comply with the open data requirements of the journal.

Research data are available at the link Zenodo. University of Parma. (2024). COVID-19 International Wellbeing Study: Italian data [Data set]. Zenodo. https://doi.org/10.5281/zenodo.10521799.

This link will remain available for 5 years after the publication of the article.

CRediT authorship contribution statement

Chiara Cosentino: Writing – original draft, Investigation, Formal analysis, Data curation. **Annavittoria Sarli:** Writing – original draft, Formal analysis, Data curation. **Massimo Guasconi:** Software, Methodology, Formal analysis, Data curation. **Fabio Mozzarelli:** Methodology, Formal analysis. **Chiara Foà:** Formal analysis, Data curation. **Rosangela De Simone:** Writing – original draft, Project administration. **Dimitris Argiropoulos:** Supervision, Methodology. **Giovanna Artioli:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Conceptualization. **Antonio Bonacaro:** Writing – review & editing, Supervision, Methodology.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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