The impact of Covid-19 pandemic on mental health and help-seeking behavior among Italian university students. A descriptive and cross-sectional study

Micaela Di Consiglio, Sheila Merola, Tiziana Pascucci, Cristiano Violani, Alessandro Couyoumdjian

Submitted to: JMIR Formative Research
on: July 30, 2021

Table of Contents

The impact of Covid-19 pandemic on mental health and help-seeking behavior among Italian university students. A descriptive and cross-sectional study

Micaela Di Consiglio[1*]; Sheila Merola[1*]; Tiziana Pascucci[1*]; Cristiano Violani[1*]; Alessandro Couyoumdjian[1*]

[1]Department of Psychology, Sapienza University of Rome, Rome, Italy Rome IT
[*]these authors contributed equally

Corresponding Author:
Alessandro Couyoumdjian
Department of Psychology, Sapienza University of Rome, Rome, Italy
Via dei Marsi, 78
Rome
IT

Abstract

Background: To reduce the spread of Covid-19 the Italian government imposed a rigid lockdown and, for a whole year, it kept declaring stringent rules to curb the community spread. The pandemic had a great negative impact on general population mental health, including the one of university students.

Objective: The study provides an overview about symptomatology and help-seeking behavior of university students before and during the Covid-19 pandemic and it aims to evaluate the impact of the different phases of the pandemic on students' mental health.

Methods: We collected data in four time points: (1) March 2019-February 2020, (2) March-May 2020, (3) October-December 2020, (4) January 2020-March 2021. A total of 454 students have been included in the study. Students answered a socio-demographic questionnaire and a standardized questionnaire to evaluate a broad range of symptoms of psychopathology. Descriptive analyses have been conducted to explore student's symptomatology and help-seeking behavior. Considering the significant gender-difference distribution between groups, groups comparison analysis has been conducted considering male and female separately.

Results: Considering the total sample size, results suggest that students have experienced moderate to severe levels of depressive, obsessive-compulsive and anxiety symptomatology. About 14% of the sample met criteria for at least one mental health disorders, but most of them were not receiving mental health care. Moreover, during the lockdown, compared with other phases, female students reported worse symptoms in the following dimension: obsessive-compulsive, interpersonal sensitivity, depression, paranoid ideation and psychoticism. The increasing symptomatology quickly disappeared after the lifting of the quarantine. Results showed any difference in the male groups.

Conclusions: Our findings support the view of a negative mental health condition of university students and indicate an increase of symptomatology during the lockdown among female students. Preventive and support strategies should be improved in the university context.

(JMIR Preprints 30/07/2021:32515)
DOI: https://doi.org/10.2196/preprints.32515

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

1. Introduction

On 5 January 2020, the World Health Organization (WHO) issued the first disease outbreak news report about a cluster of a severe acute respiratory syndrome of unknown cause. Later on the WHO assessed that this disease, named COVID-19 and caused by coronavirus SARS-CoV-2, constituted a public health emergency of international concern and could be characterized as a pandemic. Mainland China was the first region to identify the disease and its pathogen and to impose drastic measures, including lockdowns and face mask mandates, in response to the outbreak. As of March 2020, Italy was the second country in the world, behind only China, in terms of number of registered cases and the first in terms of number of victims. As a result, to tackle the rapid rise of cases in Italy and curb the community spread, Italy's government has declared a state of emergency and imposed a national quarantine, restricting the movement of the population except for necessity and health circumstances. Italy was the first state in Europe to follow such restrictive rules: attending school and going to work was not allowed, except for well-grounded work-related reasons, and public gatherings were prohibited. The decree also provided the obligation to stay isolated at home for anyone infected [1].

These stringent “lockdown” measures, implemented to mitigate the spread of Covid-19, caused a sudden change in the population’s habits and free movements and, as a consequence, some degree of psychological impact on the population, with mental health problems ranging from anxiety, fear, depressive symptoms, sense of loneliness, and sleep problems [2-4]. All around the world, several studies have been conducted to evaluate the effects of the Covid-19 pandemic on population mental health: results showed high rates of different symptomatology such as anxiety (ranging from 6.33% to 50.9%), depression (ranging from 14.6% to 48.3%) and posttraumatic stress disorder (ranging from 7% to 53.8%). Moreover, the prevalence of psychological distress ranged from 44.43% to 38% [5]. Studies conducted on the potential psychological impact on the Italian general public have shown that, during the quarantine period, a high prevalence of individuals presented anxiety and depressive symptoms, posttraumatic stress symptomatology and sleep disturbances [6-8]. Furthermore, some non-governmental organizations have registered an alarming rise in the death rate by suicide; between March and November 2020, 100 out of 200 suicides and suicide attempts in Italy have been correlated with COVID-19 [9]. Hence, for the last year, most of the studies have been conducted to explore the effect of the quarantine on mental health suggesting a great negative impact on individuals health. However, even if the most stringent lockdown lasted some months, the Italian government kept declaring rules to curb the community spread (Table 1). These rules changed

quickly based on different indexes regarding the incidence rate, transmission numbers, hospital occupancy and other factors to assess the risk level in each region. Regions have been classified into three areas - red, orange, yellow- corresponding to three risk scenarios, for which specific restrictive measures are foreseen. Besides the three areas, all the nation had to observe a night curfew (from 10 p.m to 5 a.m) and people were obliged to wear a mask at all times, including outdoors, and maintain a distance of at least one meter from other people. To the best of our knowledge, less is known about the impact of such restrictions on individuals mental health [10].

Table 1. Containment measures in Italy

Phase	Date	Decree
Quarantine Phase (March-May)	March 9, 2020	National lockdown (at-home quarantine, closure of non-essential businesses, schools, and universities. closures).
	May 4, 2020	People are allowed to visit their relative.
	May 18, 2020	Reopening of bars, restaurants, beauty centers and other commercial and non-essential businesses.
Second Phase (October-December)	October 8, 2020	Mandatory use of mask.
	October 13, 2020	Limits on gatherings.
	October 26, 2020	Closure of sport centers, cinema, theaters, museums, and other public space and gathering place.
	November 6, 2020	Imposition of nationwide night curfew and classification of regions into three areas – red, orange, and yellow – corresponding to three risk scenarios, for which specific restrictive measures are foreseen.
	December 24-27, 2020	National red zone.
Third Phase (January-March)	January 1-3, 2021	National red zone.
	January 5-6, 2021	National red zone.
	January 7, 2021	Specific restrictive measures in every Region based on the risk scenarios.

1.1. Mental health among university students

COVID-19 outbreak has impacted almost all sectors of the society, including higher education. Indeed, because of social distancing all the classes have been suspended and students had to follow lessons using online platforms during the lockdown [11]. These changes had a great impact on students' life style, academic performance and on their mental health. Most students have negative perceptions about e-learning and believe that it does not have a great impact on their learning [12]. Approximately 50% of students reported a decrease in study hours and in their academic

performance, over 10% of students delayed graduation or dropped out from classes, about 40% of working students lost their job [13] and approximately 55% of students reported increasing concern about the exam outcomes [14]. Regarding mental health issues, students reported an increased level of stress, anxiety, and depression during the COVID-19 pandemic [15-17] and an increase of suicidal thoughts [18]. Moreover, students reported difficulty in concentrating on academic work, negative changes in their sleep and dietary patterns [17]. Some studies found significant sex difference: female students showed more anxiety than male students [19] and they were at more risk to develop depression in comparison to males. Moreover, females reported more sleep and sexual problems [18]. Some factors contributed to increase stress, anxiety and depression among university students such as worry about health, disruption of the daily routine and the decrease of social interaction [17]. Other risk factors for developing mental health problems during the lockdown were a history of self-injury and suicidal attempts [18]. These results are particularly relevant if we consider that, even before the pandemic, mental health problems were very common among university students. Anxiety disorders (i.e. panic disorder, social phobia, generalized anxiety disorders), mood disorders and substance disorders are the most prevalent disorders among university students [20]. Even if it is not a specific diagnosis, suicide is a significant problem among university students: 6.7% of students have suicidal ideation [21]. Moreover, mental health problems were associated with role impairment in different domains [22] and with university career problems [23]. Often, students do not ask for psychological help despite feeling the need for it. Young people prefer to ask for help from friends or family rather than doctors or psychologists [24]. Several factors prevent help-seeking behavior, such as excessive costs, the fear of being stigmatized, and general misinformation about mental health [25, 26].

Such evidence strongly suggests the need to prioritize students' mental health [27] and that the psychological health of university students impacted by the pandemic should be taken seriously. In the wake of this emergency, Sapienza University of Rome has offered online psychological support to his students. Online therapy represents the best way to help students that are facing psychological and emotional problems due the pandemic and the consequence of routine disruption [28]. Besides a Counselling Service, students could also join the NoiBene program. NoiBene is an online intervention to promote psychological well-being and prevent psychological distress through the development of a series of competences (i.e. life skills) and through the reduction of dysfunctional coping strategies. Before the pandemic, NoiBene had already been used, and analyses showed its effectiveness in promoting psychological well-being and reducing dysfunctional coping strategies among university students [29]. To deal with Covid-19 related stress, modules about loneliness,

relaxation techniques, breathing exercises, and mindfulness have been added. Moreover, the intervention included individual weekly meetings with a Tutor, a psychologist that supervised the program. The Tutor aimed to monitor the progress of the online program, to provide answers to any questions that the students might have about the exercises, and to give support for any issues concerning the quarantine.

1.2. The study: aims and scopes

The present study aims to provide an explorative and descriptive overview about symptomatology and help-seeking behavior of students included in NoiBene between March 2019 and March 2021. NoiBene protocol was approved by the local Ethical Committee of the Department of Psychology, Sapienza University of Rome. Moreover, we hypothesized that, as well as the first quarantine, the following restrictions had impacted the individual's psychological health. In particular, we divided students in three phases: (a) March 2020 - May 2020 (Quarantine Phase); (b) October 2020 - Decembre 2020 (Second Phase); (c) January 2021 - March 2021 (Third Phase). The quarantine phase was characterized by the most stringent lockdown and by a gradual reopening. During the second phase, after an increase of transmission, the government imposed new restrictive measures such as the mandatory use of the mask (including outdoors), the prohibition on the gathering of more than a certain number of people, a nationwide night curfew etc. Moreover, the government classified regions into three areas corresponding to three risk scenarios. Lastly, during the third phase, besides previous rules that have been maintained, specific national quarantine have been imposed during the festivity (Table 1). Therefore, we compared clinical symptomatology between students Before Covid with students gathered in the three phases (Quarantine Phase, Second Phase, Third Phase). We formulate a series of research hypotheses based on the specific measures restriction in the different phases, the evolution of the pandemic, as well as the increasing knowledge and advances about COVID-19 (including virus origin, its transmission and the mechanisms to stop the spread of the virus).

Considering that the Covid-19 quarantine significantly limited social interaction increasing feelings of loneliness [30, 31], we expected that depressive symptomatology and relational problems during the first quarantine was higher than students' symptomatology before the pandemic and during the following months. Moreover, considering the high level of uncertainty regarding health and economic issues during the quarantine as well as the uncertainty about the evolution of the pandemic, we expected that anxiety symptomatology during the first quarantine was higher than anxiety symptomatology during the other phases [32]. Lastly, we expected that during the Third Phase

student's distress was higher than the Second Phase but lower than the Quarantine Phase. Indeed, in the Third Phase, people brought with them a year of restriction and suffering. Moreover, the beginning of the vaccination campaign promoted hope and a more positive perspective of change but, on other hand, has been associated with fear and uncertainty regarding its efficacy [33, 34].

2. Methods

2.1. Participants

NoiBene was advertised using the official Sapienza website on a page devoted to promoting well-being services. Participation was totally voluntary and free of charge. NoiBene was presented as a guided self-help program to develop some useful skills to cope with the well-being challenges due to the pandemic. A consent form about the research protocol was presented to every student that asked to follow the program. This consent was optional: if they preferred they could use the program without participating in the study. Twenty-one students did not accept to be included in the study. In conclusion, four-hundred-fifty-four (*N=454*) students were included in the study.

2.2. Measures

To assess psychological distress, we administered to every students the Symptom Checklist-90-Revised, SCL-90-R [35, 36], a multidimensional self-report inventory covering 9 dimensions of psychological distress: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. It also includes three global indices of psychological distress: Global Severity Index (GSI - index of overall psychological distress), Positive Symptom Distress Index (PSDI – index of the intensity of symptoms), and Positive Symptoms Total (PST – number of self-reported symptoms). These scores are converted to standard T-scores using the norm group appropriate for the participants. T-scores between 55 and 65 suggest a moderate to elevated symptomatology; T-scores above 65 suggest an elevated symptomatology. The Italian translation and validation showed Cronbach α from 0.68 to 0.87 for the nine dimensions. In the present sample, Cronbach α ranged from 0.77 to 0.91 for the nine dimensions.

Moreover, every student completed an *ad hoc* questionnaire to collect demographic data (i.e. age, occupation, residence) and information about academic status (i.e. faculty, degree course, lesson attendance, grade average, number of performed exams etc.).

2.3. Procedure

Every student that asked to participate received a personal account on NoiBene [29]. After the first login, students had to provide informed consent after reading about data protection and privacy

according to the General Data Protection Regulation (GDPR; EU 2016/679) and about the research protocol. Then, they had to complete a “Preselection” module. In this module, the student had to answer the SCL-90-R questionnaire. Students with elevated levels of symptomatology were contacted for a diagnostic interview. If severe ongoing clinical conditions (i.e. bipolar disorders, psychotic disorders) or suicidal ideation was confirmed, the student was directed towards a treatment more suited to his or her needs. In this case, NoiBene was used as a support for their therapy. Otherwise, each student was contacted by a Tutor. An experienced psychotherapist supervised the activity of the Tutors during all the duration of the program. Students could meet the Tutor once a week; the meetings were held on video-calls platforms, guaranteeing a private space. Every meeting started with a mood check. Then, the Tutor introduced specific contents regarding psychological well-being or cognitive vulnerability and took time to discuss any issues with the students. Between meetings, every student was asked to complete the module regarding the topic discussed previously. Indeed, except for the first one, every meeting included a revision about homework (see Table S-1 in Supplementary Materials for more details).

3. Statistical Analyses

Statistical analyses were performed using SPSS version 27 (IBM). A series of descriptive analyses were conducted on participant characteristics (i.e. demographic variables, academic data, symptomatology, help-seeking behavior). A Chi-Squared Test was carried out to examine gender-based differences. Considering the significance difference between males and females the following analyses were conducted considering differently male and female groups. A series of One-Way-Anovas were conducted to investigate differences between four female groups (BeforeCovid VS Quarantine VS SecondPhase VS ThirdPhase). A series of non-parametric Kruskal-Wallis analysis were conducted to investigate differences between four male groups (BeforeCovid VS Quarantine VS SecondPhase VS ThirdPhase). The level of significance was set at $p < .05$. Effect sizes have been calculated using partial eta squared and it has been interpreted based on benchmarks suggested by Cohen [37]: $n^2=0.01$, small effect size; $n^2=0.06$, medium effect size; $n^2=0.14$ large effect size. The post hoc analyses of significant interaction were conducted using the Fisher LSD post hoc test.

4. Results

4.1 Sample Characteristics

Considering the total sample size (*N*=454), most of them are female (85.02%) with a mean age of 24.80 (SD 4.10). Most of the students live with their parents (63.1%), with flatmates (25.3%) and a minor number with their partners (5.7%), alone (3.7%) or with a brother or sister (1.1%). The

majority of participants (61.7%) were enrolled in the Faculty of Medicine and Psychology and attended a master degree (59%). About 35.9% of the students never sought psychological help, 15.9% of the students had accessed mental health treatment in the past and 6.8% of students were in an ongoing therapy. About 41.4% did not give this information. Participants' reasons for participating in the study included getting to know themselves better (79.5%), improving themselves (66.7%) and for the importance of prevention (36.1%). Other reasons included to deal with psychological problems (25.3%) and to collaborate in psychological research (11.5%).

To investigate any differences between groups on the variables age and gender we conducted a One-Way-Anova and a Chi-Squared test, respectively. No significant differences were found on variable age ($F_{3, 453}$=.58, P=.63). A Chi-Squared Test showed a gender difference between groups (X^2_3=12.8, P=.005). In particular, there were more males in the Quarantine group (ASR 2.8) and more female in the Third group (ASR 2.4). Considering the different distribution on male and females across groups (Table 2), we decided to conduct group comparison analyses differently male and female groups.

Table 2. Gender by groups

Gender	BeforeCovid (*n = 153)*	Quarantine (*n = 74)*	Second Phase (*n = 98)*	Third Phase (*n = 129)*	Total (*n = 454)*
F	82.4%	74.3%	88.8%	91.5%	85.02%
M	17.6%	25.7%	11.2%	8.5%	14.98%

4.2. Symptomatology

Considering the total sample size (*N*=454), students' mean scores were below the pathological cut-off in every clinical dimension, as measured with the SCL-90-R questionnaire. However, it is worth noting that the percentage of students who scored above the cut-off was substantial (Table 3). For example, about 35.2% of students reported an elevated level of depressive symptomatology, and 32.5% of students reported obsessive-compulsive symptomatology. Moreover, the GSI, an index that measures overall psychological distress, indicated that 28.6% of students presented an elevated level of psychological distress. The PSDI, an index that measures the intensity of the overall symptomatology, indicated that 32.8% of students reported intensive symptomatology above the normal range of reference.

Table 3. Mean scores of SCL-90-R and percentage of pathological students

Variable	M (SD)	55 ≤ T < 65 (%)	T ≥ 65 (%)	Tot (%)
SCL-90[a]				
Somatization	48.84 (10.77)	12.6	11.0	23.6
Obsessive-compulsive	50.09 (11.39)	17.6	14.5	32.5
Interpersonal sensitivity	48.03 (9.94)	16.5	7.3	23.8
Depression	52.35 (12.27)	16.7	18.5	35.2
Anxiety	50.38 (10.72)	17.0	11.7	28.6
Anger-Hostility	47.59 (8.65)	13.0	4.8	17.8
Phobic anxiety	50.14 (10.35)	12.6	8.6	21.1
Paranoid ideation	44.10 (8.47)	8.1	3.7	11.9
Psychoticism	49.95 (9.43)	14.1	9.7	23.8
GSI[b]	49.66 (10.80)	16.7	11.9	28.6
PSDI[c]	51.24 (9.77)	21.6	11.2	32.8
PST[d]	48.18 (11.45)	18.5	11.2	29.7

[a] Symptom Checklist-90-Revised
[b] Global Severity Index
[c] Positive Symptom Distress Index
[d] Positive Symptom

4.3. Group comparison

A series of One-Way-Anovas were conducted to investigate differences between four female groups: BeforeCovid VS Quarantine VS SecondPhase VS ThirdPhase. As shown in Table 4, one-way

ANOVA showed a significant difference between groups on obsessive-compulsive dimension ($F_{3, 385}$=3.51, P=.015, η2p=.03). A further post hoc test found that participants in the Quarantine group scored significantly higher than participants in BeforeCovid group (P=.005), in the SecondPhase group (P=.002) and in ThirdPhase group (P=.014). Results indicated a significant difference between groups in the interpersonal sensitivity dimension ($F_{3, 385}$=5.11, P=.002, η2p=.04). A further post hoc test found that interpersonal sensitivity in the Quarantine group was significantly higher than in BeforeCovid group (P<.001), in the SecondPhase group (P<.001) and in ThirdPhase group (P<.001). Analyses showed a significant difference between groups on depression dimension ($F_{3, 385}$=4.20, P=.006, η2p=.03). Post hoc analyses suggest that the level of depression in the Quarantine group was statistically higher than the BeforeCovid group (P<.001), SecondPhase group (P=.006) and higher than the ThirdPhase group (P=.004). There was a statistically significant difference between groups in the paranoid ideation dimension as determined by one-way ANOVA ($F_{3, 385}$=3.76, P=.011, η2p=.03). Post hoc analyses suggest that the level of paranoid ideation in the Quarantine group was statistically higher than BeforeCovid group (P=.014), SecondPhase group (P=.002) and statistically higher than ThirdPhase group (P=.003). Moreover, analysis showed significant differences in the psychoticism dimension ($F_{3, 385}$=3.96; P=.008, η2p=.03). A post hoc test revealed psychoticism in the Quarantine group was statistically higher than the BeforeCovid group (P=.01), the SecondPhase group (P=.005) and statistically higher than the ThirdPhase group (P<.001). One-way ANOVA showed a significant difference between groups on the GSI index ($F_{3, 385}$=3.65, P=.013, η2p=.03). Post hoc analysis indicated that the level of overall psychological distress in the Quarantine group was significantly higher than the BeforeCovid group (P=.004), SecondPhase group (P=.004) and ThirdPhase group (P=.004). Lastly, analysis showed a significant difference between groups on the PST index ($F_{3, 385}$=4.41, P=.005, η2p=.03). Post hoc analyses indicate that the number of self-reported symptoms in the Quarantine group was statistically higher than the BeforeCovid group (P<.001), SecondPhase group (P=.003) and statistically higher than the ThirdPhase group (P=.002). There were no statistically significant differences between group means as determined by one-way ANOVA in the other dimensions.

Table 4. Mean (SD) score by female groups; ANOVA analysis

	Groups				One-Way-Anovas			
SCL-90-R[a]	BeforeCovid *(n = 126)*	Quarantine *(n = 55)*	SecondPhase *(n = 87)*	ThirdPhase *(n = 118)*	F	df	*P* value	Partial η^2
Somatization	48.82 (10.89)	51.44 (9.75)	48.02 (11.22)	48.29 (10.74)	1.34	3	.26	
Obsessive-compulsive	48.70 (11.62)	53.74 (11.75)	47.97 (10.01)	49.31 (10.65)	3.51	3	.015	.03
Interpersonal sensitivity	47.10 (9.76)	52.37 (11.55)	46.64 (9.62)	46.72 (8.86)	5.11	3	.002	.04
Depression	50.34 (12.59)	57.01 (11.86)	51.37 (11.84)	51.37 (11.36)	4.20	3	.006	.03
Anxiety	49.49 (11.80)	52.28 (10.73)	49.07 (9.20)	49.84 (9.42)	1.21	3	.31	
Anger-Hostility	47.25 (8.72)	49.67 (10.43)	47.25 (8.19)	47.24 (8.07)	1.23	3	.30	

Phobic anxiety	49.11 (9.53)	52.29 (13.68)	51.55 (11.49)	48.84 (7.33)	2.46	3	.06	
Paranoid ideation	43.63 (8.88)	46.91 (9.15)	42.55 (6.79)	42.86 (8.01)	3.76	3	.011	.03
Psychoticism	49.31 (9.87)	53.05 (10.95)	48.75 (7.89)	48.20 (7.27)	3.96	3	.008	.03
GSI[b]	48.49 (11.65)	53.45 (10.58)	48.21 (9.88)	48.46 (9.53)	3.65	3	.013	.03
PSDI[c]	46.46 (11.98)	52.56 (10.11)	46.89 (10.54)	46.94 (10.76)	2.20	3	.09	
PST[d]	50.22 (10.20)	54.01 (9.45)	50.28 (10.11)	50.86 (8.95)	4.41	3	.005	.03

[a] Symptom Checklist-90-Revised
[b] Global Severity Index
[c] Positive Symptom Distress Index
[d] Positive Symptom

A series of Kruskal-Wallis analysis were conducted to investigate differences between four female groups: BeforeCovid VS Quarantine VS SecondPhase VS ThirdPhase. As shown in Table 5, results showed no significant differences between male groups.

Table 5. Mean (SD) score by male groups; Kruskal-Wallis analysis

	BeforeCovid (*n*=27)		Quarantine (*n*=19)		Second Phase (*n*=11)		Third Phase (*n*=11)		Kruskal-Wallis		
SCL-90-R[a]	M (SD)	Mean Rank	M (SD)	Mean Rank	M (SD)	Mean Rank	M (SD)	Mean Rank	X^2	*df*	*P* values
Somatization	48.98 (10.91)	34.96	44.69 (6.19)	28.11	52.91 (19.69)	41.73	51.09 (11.23)	37.18	3.70	3	.30
Obsessive-compulsive	52.07 (13.46)	30.96	50.69 (10.80)	29.76	56.82 (10.76)	40.55	60.45 (11.61)	45.32	6.29	3	.10
Interpersonal sensitivity	51.33 (12.01)	35.02	48.89 (9.26)	31.71	48.55 (8.39)	32.14	51.73 (7.17)	40.41	1.54	3	.67
Depression	54.11 (13.59)	32.72	53.13 (12.14)	31.18	55.55 (10.90)	35.50	61.27 (13.94)	43.59	3.11	3	.37
Anxiety	52.52 (12.92)	31.94	49.66 (7.06)	31.45	52.82 (13.70)	33.36	60.82 (13.17)	47.18	5.50	3	.14
Anger-Hostility	47.22 (7.93)	33.89	47.92 (10.16)	34.21	45.09 (6.19)	28.68	50.36 (8.96)	42.32	2.73	3	.43
Phobic anxiety	49.80 (11.31)	30.78	48.77 (7.92)	33.26	51.36 (9.07)	36.95	55.91 (17.10)	43.32	3.71	3	.29
Paranoid ideation	48.72 (9.90)	38.07	44.08 (7.30)	28.53	43.55 (8.50)	26.55	50.09 (7.82)	44.00	7.01	3	.07
Psychoticism	52.85 (12.82)	32.81	51.92 (8.35)	33.87	54.27 (14.43)	34.50	55.09 (9.18)	39.73	.99	3	.80
GSI[b]	52.63 (13.57)	33.04	49.44 (8.59)	30.24	53.18 (11.38)	35.36	57.82 (9.57)	44.59	3.92	3	.27
PSDI[c]	51.61 (11.01)	30.83	48.38 (10.84)	34.39	50.77 (11.36)	39.77	58.05 (10.26)	38.41	2.14	3	.54
PST[d]	51.24 (11.28)	33.50	52.81 (8.71)	29.89	55.27 (10.60)	33.77	54.05 (7.11)	45.64	4.61	3	.20

[a] Symptom Checklist-90-Revised
[b] Global Severity Index
[c] Positive Symptom Distress Index
[d] Positive Symptom

5. Discussion

The present study aims to provide an explorative and descriptive overview about psychological distress and symptomatology of students included in NoiBene between March 2019 and March 2021.

In particular, we investigated if the different phases of Covid-19 restriction impacted differently on students' mental health. To date, 454 students have been included in the NoiBene program. Most of the sample is composed of females (85.02%). This data is consistent both with the percentage of females that are usually included in web-based intervention [38] and with data suggesting that they are much less inclined to seek mental help than women [39]. Our results indicate a major number of males in the Quarantine group compared with other groups (Table 2). From the beginning of pandemic, it was immediately clear that, apart from physical health, mental health needed to be seriously taken into consideration. For this reason, psychologists and non-governmental services increased and strengthened online counseling therapy, or e-therapy [40]. It is possible to hypothesized that the increased attention to mental health has normalized the need to ask for help. Considering that the perceptions of normativeness influence help-seeking behavior [41], it could be the reason why a major number of males asked for help during the quarantine.

5.1. Symptomatology and help-seeking behavior

Considering the total sample size (*N=454*), we conducted descriptive analysis on the levels of symptomatology measured with the SCL-90-R questionnaire. Our data revealed that many students have experienced moderate to severe levels of depression symptomatology (35.2%), obsessive-compulsive symptomatology (32.5%) and anxiety symptomatology (28.6%). These results are consistent with other findings [20] suggesting a high prevalence of mental health problems among university students. Particularly, one-hundred-thirty-two students (29.07% of the total sample size) after the completion of the SCL-90-R questionnaire, were contacted for a psychodiagnostic interview due to the high scores obtained. Of the 132 students, 24.2% students refused the interview. A broad range of evidence identified a series of barriers to treatment such as low perceived need, the desire to handle the problem on one’s own, attitudinal, and structural barriers [42] and internalized and treatment stigma [43]. Considering that these students decided to participate in NoiBene we can hypothesize that they perceived a need, but they wanted to handle the problem by themselves. To support this hypothesis, it should be mentioned that young people often use self-help programs, such as NoiBene, to deal with their mental health problems [24]. One-hundred (*n*=100) accepted the interview. Of the 100 students, 64% students met criteria for at least one mental disorder according to The Diagnostic and Statistical Manual of Mental Disorders, DSM-5 [44]. Of these students, eleven (*n*=11) were already receiving mental health care so they were included in the NoiBene program, whereas fifty-three students (*n*=53), after the interview, were directed toward psychotherapy. Of the 53 students, about 55% students decided to start psychotherapy but twenty-three (*n*=24) did not

accept. This is a noteworthy outcome: thanks to the individual meeting that we conducted we had the opportunity to give personalized feedback about the individual's symptomatology and to inform students about how and where to find help in the area. According to the high percentage of students that accepted psychological therapy, it seems to be an efficacy strategy [45]. Regarding students that did not accept, during the interview, we had the opportunity to explore individual barriers to help-seeking: the main reasons for refusing were concerned with the low perceived need, the fear of being misunderstood by other relevant people or the idea that talking with a psychologist would mean stoke their problems. Besides the low perceived need, the students' choices have been influenced by treatment stigma, that is the stigma associated with treatment for mental health, and the anticipated stigma, in other words, the fear of being perceived unfairly by others [43]. Nevertheless, these students asked for access at NoiBene: it suggests that NoiBene reached people who would otherwise not ask for help. Using this advantage, future research should focus on the development of a strategy to reduce the stigma among students that are reluctant to start psychotherapy.

5.2. Group comparison

Considering the significance difference between males and females the group comparison analyses were conducted considering differently male and female groups. A series of One-Way-Anovas were conducted to investigate differences between four female groups: BeforeCovid VS Quarantine VS SecondPhase VS ThirdPhase. As shown in Table 4, ANOVAs showed significant effects between female groups in the following clinical dimensions, as measured by SCL-90-R: obsessive-compulsive, interpersonal sensitivity dimension, depression, paranoid ideation and psychoticism. The further post-hoc analysis reveals that females in the Quarantine group scored significantly higher than females in the BeforeCovid group, in the SecondPhase group, and in the ThirdPhase group in all the dimensions previously mentioned. Looking at the results as a whole, it is possible to hypothesize that during the quarantine the most affected areas are the one related to mood and to the quality of interpersonal relations. Indeed, this pattern of symptomatology is recurring in patients with major depression [46]. Moreover, considering that the interpersonal sensitivity, paranoid ideation and the psychoticism dimensions focus, respectively, on feelings of inadequacy and inferiority, on behavior such as hostility, suspiciousness, and on isolated lifestyle [36], it is possible to hypothesize that social distancing had contributed to arise interpersonal relation uncertainties and the presence of negative expectations about interpersonal relationships. Previous studies focused especially on intimate relationships during the lockdown indicated that high levels of stress were associated with intimate relationships decline [47] and that attachment style of partners predicts interpersonal problems and the efficacy of problem-solving strategies [48]. Other studies focused on familiar relationships

suggested that working at home can exacerbate familiar conflict especially for those that were working with other familiars/housemates at home [49]. Lastly, analysis showed significant effects between female groups on PTS and GSI indexes. Here too, female students in the Quarantine group scored higher than students in the other groups. These results suggest that during the quarantine period students reported a higher level of overall psychological distress and a major number of self-reported symptoms. In conclusion, this study indicates that the lockdown has a great negative impact on female mental health. Despite the increasing symptomatology during the quarantine among female students, results suggest that it quickly disappeared after the lifting of the quarantine. Interestingly, it seems that quarantine did not have an influence on male students. Indeed, a series of Kruskal-Wallis analysis were conducted to investigate differences between four male groups: BeforeCovid VS Quarantine VS SecondPhase VS ThirdPhase. Results showed no significant differences between male groups. This data is consistent with other studies suggesting that Covid-19 had a more negative impact on females than males [50] and that, during the lockdown, females were at more risk to develop depression compared to males [18] and showed more anxiety than male students [19].

5.3. Limitation and future directions

The study has several limits. First of all, most of the participants were female (85.02%). For this reason, we decided to run an analysis for male and females, separately. However, the small male sample size could have reduced the chance of detecting a true effect. Second, our sample recruitment was not totally random: students decided spontaneously to participate in the NoiBene program, and it can suggest that they have a particular interest in improving their mental health or that they perceive a need for help. It could have contributed both to the high percentage of psychopathological students and to the heterogeneity of our samples. However, the different flow of students that asked to be included in NoiBene at different moments represent an important indicator of help-seeking behavior. Lastly, the four groups that we considered in our analysis are composed of different participants, so we did not have the opportunity to examine any changes over time. However, we had the opportunity to compare psychopathological dimensions between groups to understand how different phases of Covid-19 restriction impacted the individual's psychological health. About the matter, it would be interesting to differentiate between students living in different regions with different risk scenarios or taking into account risk and protective factors that underlying the psychopathology during the pandemic.

Besides these limitations, the study has different strengths: we had the chance to assess students

before and during the pandemic and it gave us the opportunity to observe any change probably associated with the quarantine and the following restrictive rules. Moreover, we conducted individual interviews with every student reporting a high level of psychological distress: it had a fundamental impact on helping students to understand the best treatment suiting their needs. In addition, self-reports questionnaires can yield much valuable and diagnostic information, but they can not be used to define a diagnosis. Conducting individual interviews allowed us to go beyond this limit and to be totally sure about students' symptomatology.

Abbrevations

GSI: general symptomatic index

PSDI: positive symptom distress index

PST: positive symptom total

SCL-90-R: Symptom Checklist-90-Revised

WHO: World Health Organization

References

1. Rezza G., Bella A., Riccardo F., Pezzotti P., D'Ancona F., Siddu A. (2020) *Pandemia di COVID-19.* URL: *https://www.epicentro.iss.it/coronavirus/sars-cov-2* (Retrieved October 9, 2020)

2. Jahrami, H., BaHammam, A. S., Bragazzi, N. L., Saif, Z., Faris, M., & Vitiello, M. V. (2021). Sleep problems during the COVID-19 pandemic by population: a systematic review and meta-analysis. *Journal of Clinical Sleep Medicine*, *17*(2), 299-313. https://doi.org/10.5664/jcsm.8930

3. Killgore, W. D., Cloonan, S. A., Taylor, E. C., & Dailey, N. S. (2020). Loneliness: A signature mental health concern in the era of COVID-19. *Psychiatry research*, *290*, 113117. https://doi.org/10.1016/j.psychres.2020.113117

4. Wu, T., Jia, X., Shi, H., Niu, J., Yin, X., Xie, J., & Wang, X. (2020). Prevalence of mental health problems during the COVID-19 pandemic: A systematic review and meta-analysis. *Journal of affective disorders.* https://doi.org/10.1016/j.jad.2020.11.117

5. Xiong, J., Lipsitz, O., Nasri, F., Lui, L. M., Gill, H., Phan, L., ... & McIntyre, R. S. (2020). Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of affective disorders.* https://doi.org/10.1016/j.jad.2020.08.001

6. Gualano, M. R., Lo Moro, G., Voglino, G., Bert, F., & Siliquini, R. (2020). Effects of Covid-19

lockdown on mental health and sleep disturbances in Italy. *International journal of environmental research and public health, 17*(13), 4779. https://doi.org/10.3390/ijerph17134779

7. Mazza, C., Ricci, E., Biondi, S., Colasanti, M., Ferracuti, S., Napoli, C., & Roma, P. (2020). A nationwide survey of psychological distress among Italian people during the COVID-19 pandemic: immediate psychological responses and associated factors. *International journal of environmental research and public health, 17*(9), 3165. https://doi.org/10.3390/ijerph17093165

8. Rossi, R., Socci, V., Talevi, D., Mensi, S., Niolu, C., Pacitti, F., ... & Di Lorenzo, G. (2020). COVID-19 pandemic and lockdown measures impact on mental health among the general population in Italy. F*rontiers in psychiatry, 11*, 790. https://doi.org/10.3389/fpsyt.2020.00790

9. Foundation BRF (n.d.). *Osservatorio suicidi Covid.* URL: https://www.fondazionebrf.org/osservatorio-suicidi-covid-19/ (Retrieved October 9, 2020)

10. Ministero della salute (n.d.). *FAQ – Covid-19, questions and answers.* URL: https://www.salute.gov.it/portale/nuovocoronavirus/homeNuovoCoronavirus.jsp (Retrieved June 1, 2021)

11. Pragholapati, A. (2020). COVID-19 IMPACT ON STUDENTS. https://doi.org/10.17605/OSF.IO/NUYJ9

12. Abbasi, S., Ayoob, T., Malik, A., & Memon, S. I. (2020). Perceptions of students regarding E-learning during Covid-19 at a private medical college. *Pakistan Journal of Medical Sciences*, *36*(COVID19-S4), S57. https://doi.org/10.12669/pjms.36.COVID19-S4.2766

13. Aucejo, E. M., French, J., Araya, M. P. U., & Zafar, B. (2020). The impact of COVID-19 on student experiences and expectations: Evidence from a survey. *Journal of public economics*, *191*, 104271. https://doi.org/10.1016/j.jpubeco.2020.104271

14. Quintiliani, L., Sisto, A., Vicinanza, F., Curcio, G., & Tambone, V. (2021). Resilience and psychological impact on Italian university students during COVID-19 pandemic. Distance learning and health. *Psychology, Health & Medicine,* 1-12. https://doi.org/10.1080/13548506.2021.1891266

15. Husky, M. M., Kovess-Masfety, V., & Swendsen, J. D. (2020). Stress and anxiety among university students in France during Covid-19 mandatory confinement. *Comprehensive Psychiatry, 102*, 152191. https://doi.org/10.1016/j.comppsych.2020.152191

16. Liu, X., Liu, J., & Zhong, X. (2020). Psychological state of college students during COVID-19 epidemic. *Available at SSRN 3552814*. http://dx.doi.org/10.2139/ssrn.3552814

17. Son, C., Hegde, S., Smith, A., Wang, X., & Sasangohar, F. (2020). Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *Journal of medical internet research, 22*(9), e21279. doi: 10.2196/21279

18. Patsali, M. E., Mousa, D. P. V., Papadopoulou, E. V., Papadopoulou, K. K., Kaparounaki, C. K., Diakogiannis, I., & Fountoulakis, K. N. (2020). University students' changes in mental health status and determinants of behavior during the COVID-19 lockdown in Greece. Psychiatry research, 292, 113298. https://doi.org/10.1016/j.psychres.2020.113298

19. Wang, C., & Zhao, H. (2020). The impact of COVID-19 on anxiety in Chinese university students. *Frontiers in psychology*, 11, 1168. https://doi.org/10.3389/fpsyg.2020.01168

20. Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., ... & Kessler, R. C. (2018). WHO World Mental Health Surveys International College Student Project: Prevalence and distribution of mental disorders. *Journal of abnormal psychology, 127*(7), 623-638. https://doi.org/10.1037/abn0000362

21. Downs, M. F., & Eisenberg, D. (2012). Help seeking and treatment use among suicidal college students. *Journal of American College Health, 60*(2), 104-114. https://doi.org/10.1080/07448481.2011.619611

22. Alonso, J., Mortier, P., Auerbach, R. P., Bruffaerts, R., Vilagut, G., Cuijpers, P., ... & WHO WMH-ICS Collaborators. (2018). Severe role impairment associated with mental disorders: results of the WHO world mental health surveys international college student project. *Depression and anxiety, 35*(9), 802-814. https://doi.org/10.1002/da.22778

23. Pace, D., & Quinn, L. (2000). Empirical support of the overlap between career and mental health counseling of university students. *Journal of College Student Psychotherapy, 14*(3), 41-50. https://doi.org/10.1300/J035v14n03_06

24. Rickwood, D. J., Deane, F. P., & Wilson, C. J. (2007). When and how do young people seek professional help for mental health problems?. *Medical journal of Australia, 187*(S7), S35-S39. https://doi.org/10.5694/j.1326-5377.2007.tb01334.x

25. Eisenberg, D., Golberstein, E., & Gollust, S. (2007). Help-Seeking and Access to Mental Health Care in a University Student Population. Medical Care, 45(7), 594-601. Retrieved July 30, 2021, from http://www.jstor.org/stable/40221479

26. Eisenberg, D., Downs, M. F., Golberstein, E., & Zivin, K. (2009). Stigma and help seeking for mental health among college students. *Medical Care Research and Review, 66*(5), 522–541. https://doi.org/10.1177/1077558709335173

27. Cuijpers, Pim, Randy P. Auerbach, Corina Benjet, Ronny Bruffaerts, David Ebert, Eirini Karyotaki, and Ronald C. Kessler. Introduction to the special issue: The who world mental health international college student (wmh-ics) initiative. *International Journal of Methods in Psychiatric Research 28*, no. 2 (2019): e1762. https://doi.org/10.1002/mpr.1762

28. Li, T. M., & Leung, C. S. (2020). Exploring student mental health and intention to use online counselling in Hong Kong during the COVID-19 pandemic. *Psychiatry and Clinical Neurosciences*. doi: 10.1111/pcn.13117

29. Di Consiglio, M., Fabrizi, G., Conversi, D., La Torre, G., Pascucci, T., Lombardo, C., ... & Couyoumdjian, A. (2021). Effectiveness of NoiBene: A Web-based programme to promote psychological well-being and prevent psychological distress in university students. *Applied Psychology: Health and Well-Being, 13*(2), 317-340. https://doi.org/10.1111/aphw.12251

30. Banerjee, D., & Rai, M. (2020). Social isolation in Covid-19: The impact of loneliness. *International Journal of Social Psychiatry, 66*(6):525-527. https://doi.org/10.1177/0020764020922269

31. Killgore, W. D., Cloonan, S. A., Taylor, E. C., & Dailey, N. S. (2020). Loneliness: A signature mental health concern in the era of COVID-19. *Psychiatry research, 290*, 113117. https://doi.org/10.1016/j.psychres.2020.113117

32. del Valle, M., Andrés, M. L., Urquijo, S., Yerro Avincetto, M. M., López Morales, H., & Canet Juric, L. (2020). Intolerance of uncertainty over covid-19 pandemic and its effect on anxiety and depressive symptoms. http://dx.doi.org/10.30849/ripijp.v54i2.1335

33. Akarsu, B., Canbay Özdemir, D., Ayhan Baser, D., Aksoy, H., Fidancı, İ., & Cankurtaran, M. (2021). While studies on COVID-19 vaccine is ongoing, the public's thoughts and attitudes to the future COVID-19 vaccine. *International journal of clinical practice*, *75*(4), e13891.

https://doi.org/10.1111/ijcp.13891

34. Moccia, G., Carpinelli, L., Savarese, G., Borrelli, A., Boccia, G., Motta, O., ... & De Caro, F. (2021). Perception of Health, Mistrust, Anxiety, and Indecision in a Group of Italians Vaccinated against COVID-19. *Vaccines*, *9*(6), 612. https://doi.org/10.3390/vaccines9060612

35. Derogatis, L. R. (1977). *SCL-90-R:* Administration, scoring and procedures manual I. Baltimore. *MD: Johns Hopkins.*

36. Sarno, I., Preti, E., Prunas, A., & Madeddu, F. (2011). *SCL-90-R Symptom Checklist-90-R Adattamento italiano.* Giunti, Organizzazioni Speciali

37. Cohen, J. (2013). *Statistical power analysis for the behavioral sciences. Academic* press. ISBN: 1483276481

38. Davies, E. B., Morriss, R., & Glazebrook, C. (2014). Computer-delivered and web-based interventions to improve depression, anxiety, and psychological well-being of university students: a systematic review and meta-analysis. *Journal of medical Internet research*, *16*(5), e130. doi: 10.2196/jmir.3142

39. Oliver, M. I., Pearson, N., Coe, N., & Gunnell, D. (2005). Help-seeking behaviour in men and women with common mental health problems: cross-sectional study. *The British Journal of Psychiatry, 186*(4), 297-301. DOI: https://doi.org/10.1192/bjp.186.4.297

40. Barak, A., & Grohol, J. M. (2011). Current and future trends in internet-supported mental health interventions. *Journal of Technology in Human Services*, 29(3), 155-196. https://doi.org/10.1080/15228835.2011.616939

41. Nadler, A. (1990). Help-seeking behavior as a coping resource. In M. Rosenbaum (Ed.), *Learned resourcefulness: On coping skills, self-control, and adaptive behavior* (pp. 127–162). New York: Spri

42. Andrade, L. H., Alonso, J., Mneimneh, Z., Wells, J. E., Al-Hamzawi, A., Borges, G., ... & Kessler, R. C. (2014). Barriers to mental health treatment: results from the WHO World Mental Health (WMH) Surveys. *Psychological medicine*, *44*(6), 1303. doi:10.1017/S0033291713001943

43. Clement, S., Schauman, O., Graham, T., Maggioni, F., Evans-Lacko, S., Bezborodovs, N., ... & Thornicroft, G. (2015). What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychological medicine*, *45*(1), 11-27.

doi:10.1017/S0033291714000129

44. American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. American Psychiatric Pub. ISBN: 089042554X

45. Gulliver, A., Griffiths, K. M., Christensen, H., & Brewer, J. L. (2012). A systematic review of help-seeking interventions for depression, anxiety and general psychological distress. *BMC Psychiatry, 12*(1), 81. https://doi.org/10.1186/1471-244X-12-81

46. Kennedy, B. L., Morris, R. L., Pedley, L. L., & Schwab, J. J. (2001). The ability of the Symptom Checklist SCL-90 to differentiate various anxiety and depressive disorders. *Psychiatric Quarterly, 72*(3), 277-288. https://doi.org/10.1023/A:1010357216925

47. Goodwin, R., Hou, W. K., Sun, S., & Ben-Ezra, M. (2020). Quarantine, distress and interpersonal relationships during COVID-19. *General psychiatry, 33*(6). doi: 10.1136/gpsych-2020-100385

48. Overall, N., Chang, V., Pietromonaco, P. R., Low, R. S. T., & Henderson, A. M. E. (2020, August 9). Relationship Functioning During COVID-19 Quarantine. https://doi.org/10.31234/osf.io/7cvdm

49. Dockery, M., & Bawa, S. (2020). Working from Home in the COVID-19 Lockdown. *BCEC, 19*, 1-5. URL: https://bcec.edu.au/assets/2020/05/BCEC-COVID19-Brief-4_Working-from-home.pdf

50. Prowse, R., Sherratt, F., Abizaid, A., Gabrys, R. L., Hellemans, K. G., Patterson, Z. R., & McQuaid, R. J. (2021). Coping With the COVID-19 Pandemic: Examining Gender Differences in Stress and Mental Health Among University Students. *Frontiers in psychiatry, 12*, 439. https://doi.org/10.3389/fpsyt.2021.650759

Supplementary Files

Multimedia Appendixes

Intervention Protocol.
URL: http://asset.jmir.pub/assets/4a20b8cb10821134b4bb8a0e5a01571f.docx