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## University students' changes in mental health status and determinants of behavior during the COVID-19 lockdown in Greece



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### ABSTRACT

**Introduction:** : The aim of the study was to investigate mental health in university students in Greece, during lockdown due to COVID-19.

**Material and Methods:** : The data were collected online and anonymously, during lockdown; they included 1104 females (aged  $22.08 \pm 4.96$ ) and 431 males (aged  $22.35 \pm 3.11$ ). The analysis included transformation of the data with post-stratification method, descriptive statistics, Chi-square tests, Factorial Analysis of Variance and Relative Risk ratios

**Results:** : The results suggest that during, lockdown major depression was present in 12.43% with 13.46% experiencing severe distress. Risk factors were female sex, history of self-injury, suicidal attempts and following theoretical studies ( $RR=2-5.71$ ). Conspiracy theories were accepted by 20–68%, with students of theoretical studies manifesting higher rates.

**Discussion:** : The results of the current study confirmed that students are at high risk to develop depression and suicidality in relation to the COVID-19 outbreak. They also identified specific risk factors and pointed to the role of believing in conspiracy theories in coping with stress. They also identified populations with higher prevalence of these beliefs. Further targeted research is necessary as well as targeted intervention in vulnerable groups but concerning mental health as well as the reduction of believing in conspiracy theories.

### Introduction

Students' mental health is an area of special interest, both because of the vulnerability of this age group as well as because any disruption during the time of the studies have profound long-term consequences in the lives of the individuals. In combination with the disruption the COVID-19 outbreak caused on university studies and the enduring change it is expected to have in the academic environment, the emergence of feelings of fear, worry, and stress are expected in the students' population.

The aim of the study was to investigate the rate of clinical depression in the population of university students in Greece, during the period of the lockdown. Secondary aims were to investigate the changes in anxiety, distress and suicidal ideation.

### Material and methods

An online protocol was used which included CES-D as the measure for depression and an algorithm were used to identify cases of major depression. The data were collected online and anonymously from April 5th to May 2nd, 2020, during the period of the full implementation of lockdown in the country.

The study sample included 1104 females (aged  $22.08 \pm 4.96$ ) and 431 males (aged  $22.35 \pm 3.11$ ). They were classified, depending on their studies, into three groups: group A (health and biological sciences), group B (technical sciences) and group C (arts, literature, education and related sciences).

The data were post-stratified, descriptive tables were created, Chi-square tests, Factorial Analysis of Variance (ANOVA) with Scheffé as post hoc test and the Relative Risk (RR) were used.

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**Table 1**

The effect of sex, history of suicidal attempt and the lockdown on the emergence of distress, depression, and suicidality.

Depression or distress		Females	Males	Ratio F:M
No history of suicidal attempt	No depression or distress	69.57	79.76	0.87
	Distress	14.45	12.53	1.15
	Depression	15.98	7.71*	2.07
History of suicidal attempt	No depression or distress	38.98	68.75	0.57
	Distress	16.95	12.50	1.36
	Depression	44.07*	18.75	2.35
Ratio History vs. No History	No depression or distress	0.56	0.86	
	Distress	1.17	1.00	
	Depression	2.76	2.43	
<b>Change in suicidality from before the lockdown</b>				
No history of suicidal attempt	not at all	58.18	60.48	0.96
	a little	20.29	19.52	1.04
	much	18.37	18.07**	1.02
	a lot	3.16	1.93**	1.64
History of suicidal attempt	not at all	38.98	56.25	0.69
	a little	23.73	31.25	0.76
	much	28.81**	12.50	2.31
	a lot	8.47**	0.00	N/A
Ratio History vs. No History	not at all	0.67	0.93	
	a little	1.17	1.60	
	much	1.57	0.69	
	a lot	2.68	N/A	

\* comparison of the two extreme at risk groups concerning the development of depression: females with history of suicidal attempt vs. males without such history.

RR = 5.71.

\*\* comparison of the two extreme at risk groups concerning the development of suicidal thoughts: females with history of suicidal attempt vs. males without such history. RR = 1.86.

## Results

Increased anxiety due to the lockdown was reported by all participants and more than 65% reported that it increased at least 'much'. Major depression was present in 12.43% with an additional 13.46% experiencing severe distress. ANOVA reported higher impact on females and in the B and C schools' students. Females were at a double risk to develop depression in comparison to males. When comparing the two extreme groups in terms of risk, females with history of suicidal attempt were at a 5.71-times (44.07% vs. 7.71%; RR = 5.71) higher risk to develop depression during the lockdown in comparison to males without such a history (table 1).

Beliefs in conspiracy theories seem widely prevalent with acceptance ranging from 20 to 68%. Less than 50% rejected six out of fifteen beliefs surveyed. Factorial ANOVA suggested that females had higher beliefs in 14 out of 16 conspiracy theories. School groups differed from one another in most conspiracy theories and overall, there is a consistency that group C manifests higher rates concerning belief in conspiracy theories. Again ANOVA revealed that depressed females being the most believing subgroup, along a continuum with non-depressed males being the less believing group.

The complete results can be found in the webappendix

## Discussion

There is not much in the literature concerning the effect of lockdown on university students' mental health, but initial reports suggest that students constitute a vulnerable population (Kaparounaki et al., 2020).

Concerning the effect of lockdown on the general population, previous research has shown the presence of anxiety and depression in

8.3% and 14.6% in unaffected persons in China (Lei et al., 2020), while another study suggested a prevalence of depression or anxiety as high as 20.4% (Li et al., 2020). Again in China, moderate-to-severe stress, anxiety and depression were noted in 6.5–8.1%, 28.8% and 16.5%, respectively (Wang et al., 2020a), while there were no significant longitudinal reductions (Wang et al., 2020b). A study from Turkey reported 23.6% depression and 45.1% anxiety (Ozdin and Bayrak Ozdin, 2020)

The high rates of believing in conspiracy theories are in accord with findings from other countries (Ahmed et al., 2020; Anonymous, 2020; Uscinski et al., 2020) and are a worrying manifestation. It is of particular importance and it is both disturbing and worrying, the finding that students of those studies leading to professions which will staff the public administration, the political system and, even more importantly, the education system in social, political and ideological/moral topics, manifest the highest rates concerning beliefs in conspiracy theories.

Another finding regarding the beliefs in conspiracy theories was that the latter were related to the presence of depression or distress, and were in accord with the literature (Freyler et al., 2019; Tomljenovic et al., 2020). As correlation does not imply causation, conspiracy theories could be either the cause of depression or on the contrary a copying mechanism against depression. The authors are inclined to propose that the beliefs in conspiracy theories are a copying mechanism against the emergence of distress and depression rather than their cause.

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## Author contributions

All authors contributed equally to the paper

KNF conceived and designed the study. The other authors participated formulating the final protocol, designing and supervising the data collection and creating the final dataset. KNF did the data analysis and wrote the first draft of the paper. All authors participated in interpreting the data and developing further stages and the final version of the paper.

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## Declaration of Competing Interests

None pertaining to the current paper

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### Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.psychres.2020.113298](https://doi.org/10.1016/j.psychres.2020.113298).

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