Experiences of the COVID-19 pandemic: cross-sectional analysis of risk perceptions and mental health in a student cohort

[1]Ru Jia MSc [Research Assistant],

[2]Holly Knight PhD [Senior Research Fellow],

[3,4]Holly Blake PhD [Associate Professor of Behavioural Science],

[5]Dame Jessica Corner PhD [Pro-Vice-Chancellor and Professor of Cancer and Supportive Care]

[6]Chris Denning PhD [Professor of Stem Cell Biology, Director of the Biodiscovery Institute]

[7]Jonathan Ball PhD [Professor of Molecular Virology]

[8]Kirsty Bolton PhD [Research Fellow]

[2]Joanne R Morling PhD [Clinical Associate Professor in Public Health]

[1]Carol Coupland PhD [Professor of Medicine Statistics in Primary Care]

[9]Grazziela Figueredo PhD [Senior Research Data Scientist]

[10]David Ed Morris PhD [Assistant Professor in Electronic Engineering]

[7]Patrick Tighe PhD [Associate Professor of Immunology]

[10]Armando Villalon PhD [Research Fellow]

[1]Kieran Ayling PhD [Senior Research Fellow],

[1*]Kavita Vedhara PhD [Professor of Health Psychology]

[1]Division of Primary Care, University of Nottingham, University Park, Nottingham,

NG7 2RD, UK.

---

[*] Author to whom all correspondence should be addressed: Professor Kavita Vedhara, Division of Primary Care, University of Nottingham, University Park, Nottingham, NG7 2RD, UK. Kavita.vedhara@nottingham.ac.uk; Tel +44 115 8466931

1

[2]Division of Epidemiology and Public Health, University of Nottingham, City Hospital, Nottingham, NG7 2RD, UK.

[3]School of Health Sciences, University of Nottingham, QMC, Nottingham, NG7 2HA, UK.

[4]NIHR Nottingham Biomedical Research Centre, Nottingham, UK.

[5]University Executive Board, University of Nottingham, Nottingham, NG7 2RD, UK.

[6]Biodiscovery Institute, University of Nottingham, University Park, Nottingham, NG7 2RD, UK.

[7]School of Life Sciences, The University of Nottingham, Nottingham, UK

[8]School of Mathematical Sciences, University of Nottingham, University Park, Nottingham, NG7 2RD, UK.

[9]School of Computer Science, University of Nottingham, Nottingham, NG8 1BB, UK.

[10]Bioengineering Research Group, Faculty of Engineering, University of Nottingham, University Park, Nottingham, NG7 2RD, UK.

Author contributions

All authors designed the study. RJ analysed the data and RJ, HK and KV wrote the first draft. All authors provided critical revisions. All authors read and approved the submitted manuscript. As corresponding author, KV attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

Declaration of interest

We declare no competing interests.

Role of funding

Abstract

Objective: This study examined the COVID-19 risk perceptions and mental health of university students on returning to campus in the midst of the COVID-19 pandemic.

Methods: An online survey was completed during the first four weeks of the academic year (October 2020) by 897 university students. The survey included demographics and measures of experiences of COVID-19 testing, self-isolation, shielding, perceived risk, mental health and indices capturing related psychological responses to the pandemic.

Results: We observed higher levels of depression and anxiety, but not stress, in students compared with pre-pandemic normative data, but lower than levels reported earlier in the pandemic in other similar cohorts. Depression, anxiety and stress were independently associated with greater loneliness and reduced positive mood. Greater worry about COVID-19 was also independently associated with anxiety and stress. Female students and those with pre-existing mental health disorders were at greatest risk of poor mental health outcomes.

Conclusion: Although students perceived themselves at only moderate risk of COVID-19, the prevalence of depression and anxiety among university students should remain a concern. Universities should provide adequate support for students' mental health during term-time. Interventions to reduced loneliness and worry, and improve mood, may benefit students' overall mental well-being.

Key words: covid-19, university students, risk perception, mental health

Introduction

The COVID-19 pandemic has unquestionably disrupted lives across the world. Increasing evidence has reported poorer mental health associated with the lockdown, especially among young people.[1-3]' Despite concerns regarding risk of infection,[4] universities across the United Kingdom (UK) reopened for the autumn term in 2020. Within weeks, over 60 institutions reported COVID-19 cases and thousands of students were required to self-isolate. It became clear that in addition to an increased risk of infection, students had mental health difficulties associated with the challenges of the pandemic.[5] Although evidence from earlier in the pandemic suggested that young adults and students were at greater risk of mental health difficulties,[2, 3, 6] there has been little focus on students' experiences while present at university. Office for National Statistics (ONS) surveyed 1,295 students from three UK universities and showed that between 12 and 18 October 2020 about half (49%) of the students reported poorer wellbeing and mental health than before the autumn term and 91% perceived COVID-19 as a risk to their physical or mental health.[6]However, it is less clear which students were at greatest risk of mental health difficulties and the psychological characteristics associated with poorer mental health outcomes. According to stress and coping theory we would not expect effects on mental health to be uniform but to vary according to an individual's cognitive appraisal (e.g. perceived risk) and available psychosocial resources.[7]

Here we sought to add to our understanding of the effects of the pandemic on university students at the start of the academic year during the second surge of COVID-19 in the UK. We report cross-sectional findings regarding the relationship between perceived risk of COVID-19 on mental health; and consider groups who may be most at risk of mental health difficulties and the potential modifiable influences that could be the focus of future interventions.

Materials and Methods

Recruitment

Ethical approval was received from the University of Nottingham Faculty of Health Sciences Research Ethics Committee (FMHS 96-0920). Participants were not compensated for their participation. Students enrolled at the University of Nottingham (UK) aged 18 or over were invited to participate via recruitment emails and through a social media campaign. Recruitment took place between October 5th 2020 and November 1st 2020.

Procedures

Participants provided informed consent online before completing the online survey (JISC Online Surveys). The survey included items assessing demographics and experiences of COVID-19 testing, self-isolation, shielding, and measures of perceived risk, positive mood, loneliness, COVID-19 worry (supplementary appendix Table S1) depression (Patient Health Questionnaire (PHQ-9, α= 0.90)), anxiety (Generalized Anxiety Disorder Scale (GAD-7, α= 0.92)), and stress (Perceived Stress Scale (PSS-4, α= 0.70)).

Results

In total, 897 students were recruited. Four participants were excluded due to being <18 years. Sixty-two per cent of the cohort was female (n=556) with an average age of 20.7 years (SD = 3.4) and predominantly consisted of undergraduates (n=789, 88%).

In terms of COVID-19 experiences, the average perceived risk of getting COVID-19 was moderate (mean=6.1, SD=2.5, range =1-10). Forty-three per cent (n=383) reported having had a National Health Service (NHS) COVID-19 test and/or an asymptomatic test administered at the University of Nottingham, among whom 29.2% (n=112) had received a positive result; 64.5 % (n=247) had received a negative result. Most participants (n=772, 84%) reported that they knew someone who had (or thought they had) COVID-19. More than half of the participants (51%, n=461) had experienced a period of self-isolation and 15% (n=142) reported shielding during the pandemic. Detailed characteristics of the cohort and COVID-19 experiences are presented in Table 1.

Table 2 reveals higher mean values for depression and anxiety, compared with previously published population norms among young adults.[8, 9] Analysis according to clinical cut-offs indicated 28% and 21% met criteria for depression and anxiety respectively (supplementary appendix Table S2).[10] Mean scores for anxiety, depression, and stress were higher among students who had undertaken a NHS COVID-19 test but no difference was found between those who tested positive and negative (supplementary appendix Table S3). Univariable regression analysis showed that higher perceived risk was significantly associated with greater depression (B=0.07, CI: 0.03, 0.10, p<0.001), anxiety (B=0.08, CI: 0.05, 0.12, p<0.001), and stress (B=0.14, CI: 0.06, 0.22, p<0.001). However, when adding in demographic and psychological factors to the model, the effect of perceived risk was no longer significant. Multivariable regression analyses showed that being female and having pre-existing mental health disorders were independently associated with greater depression, anxiety, and stress. Greater loneliness and reduced positive mood were also independently associated with greater depression, anxiety, and stress; whereas worry about COVID-19 was only associated with anxiety and stress (supplementary appendix Table S4-S6).

6

Table 1: Demographics and COVID-19 experiences in the cohort (n=893)

	Whole sample
Mean age	20.7 (3.4)
Ethnicity	
White British	509 (66%)
BAME background	303 (34%)
International students	197 (22%)
Term-time living	
Private accommodation (alone)	56 (6%)
Private accommodation (with family)	40 (4%)
Private accommodation (with others)	527 (59%)
Halls of residence	270 (30%)
Year of study	
1st year Undergraduate	233 (26%)
2nd year Undergraduate	167 (19%)
3rd year Undergraduate	260 (29%)
4th Year Undergraduate	106 (12%)
5th year and above Undergraduate	23 (3%)
Postgraduate	94 (11%)
Other	10 (1%)
Existing physical health issue	83 (9%)
Experience of COVID-19	
Experienced COVID-19 symptoms	232 (26%)

7

Received NHS COVID-19 test	334 (38%)
Tested positive	111 (33%)
Tested negative	199 (60%)
Unsure at time of report	24 (7%)
Received asymptomatic COVID-19 test	74 (8.3%)
Tested positive	7 (9.5%)
Tested negative	62 (83.8%)
Unsure at time of report	4 (5.4%)
Prefer not to say	1 (1.4%)
Self-isolation behaviour	459 (51%)
Shielding behaviour	142 (16%)
Know someone who have had (or think they have had) COVID-19	749 (84%)

Table 2: Mean scores for all measures in the cohort (n=893)[a]

		Gender		Pre-existing mental health disorder	
	Whole sample	Male (n=333)	Female (n=556)	No (n=656)	Yes (n=199)
Depression (PHQ-9)					
Mean (SD)	*7.00 (6.1)*[b]	5.79 (5.7)	7.66 (6.2)	5.64 (5.3)	11.2 (6.6)
Anxiety (GAD-7)					
Mean (SD)	*4.90 (5.3)*[b]	3.62 (4.6)	5.67 (5.5)	3.52 (4.2)	9.16 (6.0)
Stress (PSS-4)					
Mean (SD)	6.35 (3.0)[b]	5.84 (2.9)	6.65 (2.9)	5.80 (1.8)	7.96 (2.9)
Perceived risk (1-10)					

8

Mean (SD)	6.1 (2.5)	5.82 (2.6)	6.34 (2.3)	6.01 (2.5)	6.60 (2.3)
Positive mood					
Mean (SD)	21.01 (4.9)	21.31 (5.0)	20.84 (4.8)	21.91 (4.7)	18.49 (4.4)
Loneliness					
Never	144 (16.1%)	78 (23.4%)	66 (11.9%)	133 (20.3%)	7 (3.5%)
Hardly ever	222 (24.9%)	83 (24.9%)	138 (24.8%)	183 (27.9%)	28 (14.1%)
Occasionally	217 (24.3%)	73 (21.9%)	144 (25.9%)	163 (24.9%)	43 (21.6%)
Some of the time	194 (21.7%)	58 (17.4%)	133 (23.9%)	118 (18.0%)	69 (34.7%)
Often/Always	116 (13.0%)	41 (12.3%)	75 (13.5%)	59 (9.0%)	52 (26.1%)
COVID-19 Worry					
No worry (n, %)	210 (23.5%)	119 (35.7%)	90 (16.2%)	168 (25.6%)	32 (16.1%)
Occasional worry (n, %)	538 (60.3%)	183 (55.0%)	354 (63.7%)	404 (61.6%)	112 (56.3%)
Much worry (n, %)	117 (13.1%)	24 (7.2%)	91 (16.4%)	63 (9.6%)	48 (24.1%)
Most worry (n, %)	28 (3.1%)	7 (2.1%)	21 (3.8%)	21 (3.2%)	7 (3.5%)

[a] PHQ-9, the 9-item Patient Health Questionnaire (Kroenke et al., 2010); GAD-7, the 7-item Generalized Anxiety Disorder Scale (Spitzer et al., 2006); PSS-4, the 4-item Perceived Stress Scale (Cohen et al., 1988). Other measures were listed in supplementary appendix Table S1.
[b] Mean scores were significantly higher ($p<0.001$) than published population normative data for PHQ-9 (mean=2.3, SD=3.3, Kocalevent et al., 2013) and GAD-7 (mean=2.8, SD=3.5, Löwe et al., 2008), but not for PSS-4 (mean=6.7, SD=32, Warttig et al., 2013).

Conclusions

Our findings from a university student cohort indicated that during the first four weeks of autumn term during

the second surge of COVID-19 in the UK, students perceived themselves at moderate risk of COVID-19. They

also reported levels of depression and anxiety that significantly exceeded pre-pandemic norms, but these

levels compared favourably with levels of anxiety and depression reported by young adults earlier in the

pandemic.[1]

Several issues worthy of discussion emerge from these findings. The first concerns our mental health findings.

Academic concerns, difficulty with concentration, restricted social interaction, and disrupted lifestyle resulting

from remote learning and assessment caused by the pandemic may all have contributed to these poor mental

health outcomes.[2, 6] However, these challenges may have become more predictable and manageable at the

time of survey, and this may have led students to appraise the situation as less stressful than earlier in the

pandemic, thus resulting in the attenuated distress observed in this cohort.[7] It is also possible that students

perceived more available resources to cope with the stressful situation.[7] Although the majority of teaching

was delivered online at the time of the research, most facilities at the participating university (including

classrooms, libraries, cafes, sports facilities etc.) remained accessible. The campus environment might,

therefore, have provided the context and opportunities for supporting positive mental wellbeing, despite the

increased risk of COVID-19 infection.

Second, we identified demographic and psychological factors associated with increased risk of depression,

anxiety, and stress. For the former, female students and those with pre-existing mental health disorders were

more likely to report higher levels of depression, anxiety, and stress. This is consistent with findings from other

cohorts.[2, 3, 11] For the latter, we observed associations between adverse mental health outcomes and

greater loneliness and worry, and reduced positive mood with large proportion of the variance explained

(24%-31%), in addition to the effect of gender and mental health history (10%-22%). These findings suggest

future interventions to investigate whether reduced loneliness and worry, and improve mood, can benefit

students' overall mental well-being.

We also acknowledge several limitations. First, the cross-sectional design and absence of pre-pandemic mental

health data for the same cohort prevent us from examining causal relationships. Second, our participants were

from a single institution in the UK with a high proportion of female and undergraduate students, which limits

the generalisability of our findings. Nonetheless, our data do indicate that the mental health of students

returning to University compared favourably with the prevalence of mental health difficulties seen in a comparable age group earlier in the pandemic. However, with the means scores still substantially exceeding established norms in this population, the prevalence of depression and anxiety should remain a concern. Having students safely returning to universities requires adequate support for students' mental health. Robust social support from the universities and wider community, with safety measures, should be offered to help students cope with loneliness and improve their mood during term-time. Finally, universities should be aware of the likely increase in the demand for counselling services, particularly amongst those with previous mental health concerns.

References

1.	Jia R, Ayling K, Chalder T, et al. Young people, mental health and COVID-19 infection: the canaries we put in the coal mine. *Public Health.* 2020;189:158-61.
2.	Odriozola-González P, Planchuelo-Gómez Á, Irurtia MJ, et al. Psychological effects of the COVID-19 outbreak and lockdown among students and workers of a Spanish university. *Psychiatry Research.* 2020;290:113108.
3.	Shanahan L, Steinhoff A, Bechtiger L, et al. Emotional distress in young adults during the COVID-19 pandemic: evidence of risk and resilience from a longitudinal cohort study. *Psychological Medicine.* 2020:1-10.
4.	Yamey G, Walensky RP. Covid-19: re-opening universities is high risk. *BMJ.* 2020;370:m3365.
5.	Packham A. I just sat in my room all day. The Guardian. 2020 10.20.
6.	Son C, Hegde S, Smith A, et al. Effects of CoViD-19 on college students mental health in the US: an interview-survey study. *Journal of medical internet research.* 2020;ePub(ePub):ePub-ePub.
7.	Folkman S, Chesney M, Ironson G, et al. The social context of coping:Translating coping theory into an intervention: Springer; 1991.
8.	Kocalevent R-D, Hinz A, Brähler E. Standardization of the depression screener Patient Health Questionnaire (PHQ-9) in the general population. *General Hospital Psychiatry.* 2013;35(5):551-5.
9.	Löwe B, Decker O, Müller S, et al. Validation and Standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the General Population. *Medical Care.* 2008;46(3):266-74.
10.	IAPT. IAPT Manual - Appendices and Helpful Resources (rcpsych.ac.uk) 2019.
11.	Van Rheenen TE, Meyer D, Neill E, et al. Mental health status of individuals with a mood-disorder during the COVID-19 pandemic in Australia: Initial results from the COLLATE project. *Journal of Affective Disorders.* 2020;275:69-77.