Effects of the COVID-19 lockdown on mental health, wellbeing, sleep, and alcohol use in a UK student sample

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ABSTRACT

The COVID-19 pandemic and the consequent restrictions imposed by governments worldwide have had profound social and psychological effects, particularly for young adults. This study used longitudinal data to characterise effects on mental health and behaviour in a UK student sample, measuring sleep quality and diurnal preference, depression and anxiety symptoms, wellbeing and loneliness, and alcohol use. Self-report data was collected from 254 undergraduates (219 females) at a UK university at two-time points: autumn 2019 (baseline, pre-pandemic) and April/May 2020 (under 'lockdown' conditions). Longitudinal analyses showed a significant rise in depression symptoms and a reduction in wellbeing at lockdown. Over a third of the sample could be classed as clinically depressed at lockdown compared to 15% at baseline. Sleep quality was not affected across the sample as a whole. The increase in depression symptoms was highly correlated with worsened sleep quality. A reduction in alcohol use, and a significant shift towards an 'evening' diurnal preference, were also observed. Levels of worry surrounding contracting COVID-19 were high. Results highlight the urgent need for strategies to support young people's mental health: alleviating worries around contracting COVID, and supporting good sleep quality, could benefit young adults' mental health as the COVID-19 crisis unfolds.

1. Introduction

The coronavirus disease 2019 (COVID-19) pandemic and resultant social restrictions implemented by governments around the world have had profound and wide-ranging social and psychological effects (The Academy of Medical Sciences, 2020). In the UK, the first nationwide 'lockdown' was imposed on March 23rd 2020 to cease all unnecessary social contact. Schools and universities went online only and non-essential businesses closed. Individuals were ordered to remain at home except to purchase essentials. Outdoor exercise was permitted once per day and all social gatherings were prohibited. However, we know few details about how the COVID-19 pandemic and ensuing restrictions have impacted mental health. Survey studies in the general population point to widespread concerns around anxiety and isolation in particular (The Academy of Medical Sciences, 2020). Thorough investigations into the effects of lockdown and social isolation on mental health is a priority to inform strategies that support wellbeing (Holmes et al., 2020), particularly given that another lockdown was imposed in November 2020 and additional lockdowns may need to be imposed as

the situation evolves. Preliminary evidence suggests that younger adults seem to have been particularly affected by the COVID-19 pandemic and ensuing restrictions. This finding is especially concerning given that (even pre-pandemic), prevalence of mental health issues has been rising amongst young adults, with escalating trends in self-reported anxiety symptoms reported and females particularly at risk (Calling et al., 2017). Studies conducted in Spain during the initial stage of the COVID-19 outbreak found that younger adults experienced higher levels of depression and anxiety symptoms compared to older age groups (Gonzalez-Sanguino et al., 2020; Ozamiz-Etxebarria et al., 2020). Similar results were found by studies conducted in China (Ahmed et al., 2020; Huang and Zhao, 2020). A large UK nationwide survey found that mental health (GHQ-12 score) deteriorated significantly between 2018 and 19 and April 2020 (one month into UK lockdown) and this effect was strongest amongst 18–24-year-olds (Pierce et al., 2020). These findings highlight the importance of further work focussed on this age range, to better characterise effects on young people's mental health, and inform possible intervention strategies.

Sleep quality could be an important factor and potential target for

interventions. Evidence suggests a very strong link between sleep quality and mental health. For example, about three-quarters of individuals with clinical depression show insomnia symptoms, and insomnia is itself a clear risk factor for later development of depression (Nutt et al., 2008). Poor quality sleep is common amongst university students and this has been linked to heightened anxiety levels (Norbury and Evans, 2019). Further, non-pharmacological sleep interventions can have a strong effect on relieving depression symptoms (Gee et al., 2019). Also, of relevance to mental health is diurnal preference - an individual's preferred timing of daily activity, wake-up, and bedtimes. The distribution of diurnal preference follows a continuum between two extremes: morning types who prefer to sleep and wake up early, and evening types who prefer to sleep and wake up later (Horne and Ostberg, 1976; Kerkhof, 1985). Eveningness has been associated with higher anxiety symptomology and a higher prevalence of minor psychiatric disorders in young adult samples (Kivela et al., 2018; Schneider et al., 2011). Thus, the impact of the pandemic and lockdown on sleep quality and diurnal preference merit careful study, because these factors are closely interlinked with mental health particularly in young adult populations. Cross-sectional studies have pointed to high sleep disorder prevalence post-pandemic. In Greece, Voitsidis et al. (2020) found that nearly 40% of participants scored above the cut-off score for insomnia: this was associated with loneliness and depressive symptoms with younger age groups and females at higher risk. In France, Kokou-Kpolou et al. (2020) found that nearly 20% met criteria for clinical insomnia; pre-existing mental health issues, COVID-19-related worries, and loneliness were contributing factors. Likewise, Huang and Zhao (2020) found that nearly 20% of respondents reported poor sleep quality (scoring above 7 on the PSQI). Thus, sleep quality and diurnal preference measures were included in the present study, as well as measures of depression/anxiety symptoms, and wellbeing. This allowed us to quantify the impact of the pandemic and lockdown on mental health, and explore links to sleep.

Changes in alcohol use before and after lockdown is also an important area of study, since information is lacking regarding effects of the pandemic and lockdown on alcohol drinking behaviour. The World Health Organization (WHO) cautioned against the potential risks of increased alcohol consumption during social isolation, which might increase future incidence of alcohol use disorders. In the months following the lockdown imposed by the UK government, an increase in purchase of alcoholic beverages was reported (Office of National Statistic, 2020) although how this translated into actual consumption is not clear. A cross-sectional survey study in the German general population found that 20% of respondents reported drinking less, but 35% reported drinking more or much more alcohol since the start of the lockdown: those with higher levels of perceived stress were more likely to fall into the latter group (Anne et al., 2020). Enhancement (i.e., increasing positive affect) and coping (i.e., reducing negative affect and anxiety) motives (Cox and Klinger, 1988) for alcohol use could explain increases. Enhancement and coping motives are strong drivers of heavy alcohol use in young adults (Kuntsche et al., 2005). On the other hand, because lockdown conditions significantly curtailed social opportunities for alcohol use, a decline in alcohol use might also be predicted. This could be especially the case for student populations, amongst whom patterns of alcohol use strongly correlate with socialising activities (Del Boca et al., 2004). Given the long-term health risks associated with heavy drinking, it is important to ascertain how the COVID-19 situation has affected alcohol consumption, and whether changes reflect alcohol being used as a coping strategy amongst those whose mental health has been most impacted.

In sum, the effects of lockdown on young people's mental health, sleep and alcohol use are key variables worthy of detailed scrutiny. Evidence suggests that young adults have been more affected than older age groups, emphasising the importance of characterising these effects. To address this, the current study collected data on depression and anxiety symptoms, wellbeing, loneliness, sleep quality, diurnal preference, and alcohol use, in an undergraduate sample at a UK university. Baseline data (Oct 2019) was compared to a second data point collected soon after the COVID-19 situation had emerged and lockdown conditions imposed (April/May 2020), to investigate within-subject change in these variables. In contrast to most of the studies outlined above, this study benefits from use of a longitudinal design, thus allowing change in these variables under lockdown to be quantified. Correlations between changes in these variables were also assessed to determine relationships between them. Based on the evidence above, we hypothesised an increase in depression and anxiety symptoms, reduced wellbeing, greater loneliness and reduced sleep quality under lockdown; we also predicted associations between depression and sleep quality. The current study also sought to clarify whether the pandemic and lockdown has led to an increase or decrease in alcohol use amongst students. To gather further information and inform interpretation of effects, the second data collection point also questioned participants about how they felt they had been affected by, and adapted to, the COVID-19 situation, and their extent of worry surrounding contracting the virus (both for themselves and family members).

2. Method

2.1. Design and data source

Data were collected as part of a longitudinal survey study investigating university undergraduates' health and behaviour. The study was approved by the University of Surrey Ethics committee and informed consent procedures were followed throughout. All research was performed in accordance with the Declaration of Helsinki (World Medical Association, 2013). Participants completed a questionnaire (as part of a lecture) at time point 1 (baseline) in October 2019. They were then invited to complete the same questionnaire again (with some additional questions) after the UK lockdown began (time point 2; lockdown). Participants were invited to complete the second questionnaire via email. This questionnaire was completed online via the Qualtrics platform (https://www.qualtrics.com/uk/) and was available to be completed from 1st April to 30th May 2020.

2.2. Participants

Participants were first- or second-year undergraduate psychology students. Three hundred and two participants completed the baseline measures, 48 of these did not complete the measures at follow-up. Attrition was not related to participant characteristics: preliminary between-groups analyses showed that the subset of 48 who did not respond at follow-up did not differ from those who did, on any the baseline measures collected. Only participants who provided data at both time points were included in the analyses presented here ($N = 254$). There were 32 males, 219 females, and 3 who preferred not to say. Their age (recorded at time point 1) ranged from 18 to 31 ($M = 19.76$, $SD = 1.28$). One hundred fifty-two were first years, and 112 were second years. Self-reported ethnicity was: "White British/Irish or Irish Traveller/White Other (65.2%)", "Mixed/multiple ethic group, e.g. White and Black Caribbean or White and Asian (8.2%)", "Asian/Asian British (18%)", "Black/African/Caribbean/Black British (5.5%)", "Other (3.1%)"; 1.2% preferred not to say.

2.3. Measures

Alcohol use was estimated using the AUDIT-C, which takes the first three questions of the AUDIT questionnaire (Bush et al., 1998). Questions focus on the frequency and number of units of alcohol, and the number of binge drinking occasions, and is well-used for evaluating alcohol use amongst young adult populations e.g. Davoren et al. (2015). High reliability has been shown (α =0.98), (Osaki et al., 2014). Scores were summed to create a total score which was entered into analyses.

Diurnal Preference was measured using the 5-item Reduced Morningness-Eveningness Questionnaire (rMEQ) (Adan and Almirall, 1991). This measure instructs participants to rate their responses on a 4-point scale (e.g., "During the first half-hour after you wake up in the morning, how do you feel?" "Very tired", "fairly tired", "fairly refreshed", and "very refreshed"). Lower scores indicate greater evening preference. The rMEQ is reported to have satisfactory reliability ($\alpha = 0.69$–0.73), test-retest reliability ($\alpha = 0.76$–0.79) and high correlation with the original Morningness-Eveningness Questionnaire ($\alpha = 0.87$–0.90) (Di Milia et al., 2013).

Sleep quality was assessed with the Pittsburgh Sleep Quality Index (PSQI), a 19-item measure which considers 7 components of sleep: quality, latency, duration, efficiency, disturbance, sleeping medication, and daytime dysfunction. Scores can range from 0 to 21 with higher scores indicating worse sleep quality. Test-retest reliability has been reported as $\alpha = 0.87$ (Backhaus et al., 2002). A score >5 reflects poor quality sleep (Buysse et al., 1989), and this criterion has a sensitivity of 98.7 and specificity of 84.4 for differentiating insomnia patients from controls (Backhaus et al., 2002).

Anxiety and Depression Symptoms were measured using the Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983) which asks about symptoms in the past week. It measures anxiety symptoms (7 items, e.g. 'I feel tense or 'wound up'') and depressive symptoms (7 items, e.g. 'I still enjoy the things I used to enjoy') using 4-point Likert scales; higher scores indicate higher levels of symptoms The HADS is validated for use in student samples (Bjelland et al., 2002). For detecting generalized anxiety disorders a score of ≥ 8 on HADS-A has sensitivity 0.89, specificity 0.75; for detecting major depression, a score of ≥ 8 on HADS-D has sensitivity 0.80 and specificity 0.88 (Olssøn et al., 2005). Reasonable test–retest reliability ($r = 0.31$–0.86) has previously been reported in young adult groups (Spielberger et al., 1983).

Mental wellbeing was evaluated using the short (7-item) form of the Warwick Edinburgh Mental Well-being scale (WEMWBS) which has high test-retest reliability ($r = 0.83$) (Tennant et al., 2007). High internal consistency and convergent/ discriminant validity have been demonstrated for this scale (Ng Fat et al., 2017). Scores are summed and a higher total indicates better mental wellbeing.

Loneliness was assessed using the 6-item De Jong Gierveld Loneliness Scale, a well-used and validated instrument for loneliness. Satisfactory reliability ($\alpha = 0.70$–0.76) has been shown for this scale (Gierveld and Tilburg, 2006). Scores are summed and a higher total indicates higher loneliness.

2.2.1. Lockdown-specific questions

At the lockdown data collection point only, the following 3 questions were asked to assess the subjective impact of Covid-19 and how well the participant felt they have adapted to the lockdown situation: (a) "Do you feel that your mental health has been impacted by Covid-19?" (possible answers: (1)Not at all (2)Not very much (3)Quite a lot (4)Very much indeed); (b) "How well do you feel you have adapted to isolation and social distancing?" (possible answers: (1)Not at all (2)Not very well (3) Quite well (4)Very well indeed); (c) "How well do you feel you have been able to follow the rules set by the Government for isolation and social distancing?" (possible answers: (1)Not at all (2)Not very well (3) Quite well (4)Very well indeed).

In addition, the following 3 questions were asked to assess specific worries: (a) "I've been worried about developing Covid-19″; (b) "I've been worried about my family members (who live inside my household) developing Covid-19″; (c) "I've been worried about my family members (who live outside my household) developing Covid-19″ (possible answers: (1) None of the time (2) Rarely (3) Some of the time (4) Often (5) All of the time).

2.4. Analyses

Repeated measures ANOVA were conducted to investigate within-

subject change between baseline and lockdown data collection points in all variables of interest. Age, gender, ethnicity and year of study were included as covariates. To investigate changes in the proportion of participants meeting criteria for clinical depression, the number of individuals scoring ≥ 8 on HADS-D were calculated at each time point and compared using McNemar's Test. Follow-up correlational analyses then explored relationships between the amount of within-subject change scores in each variable, which used partial correlations (age, gender, ethnicity and year of study as covariates). Missing or incomplete data meant that a subset of data from some participants had to be discarded; final Ns for each measure are in Table 3.

3. Results

3.1. Lockdown-specific questions

The distribution of responses can be seen in Tables 1 and 2. When asked "Do you feel that your mental health has been impacted by Covid-19?", only 6.6% of participants answered, 'Not at all'. 41.3% answered "Not very much", while 38.4% and 13.8% answered "Quite a lot" and "Very much indeed", respectively.

In response to the question "How well do you feel you have adapted to isolation and social distancing?" 21.5% answered 'not at all' or 'not very well' while the remainder felt they had adapted "quite well" or "very well indeed". When asked "How well do you feel you have been able to follow the rules set by the Government for isolation and social distancing?", the overwhelming majority (96.3%) reported they had been able to follow them "quite well" or "very well indeed".

Regarding specific worries around Covid-19 (Table 2), when asked "I've been worried about developing Covid-19″, 70.5% answered that they worried about this "some of the time", "often, or "all of the time". When asked if they have been worried about family members inside/ outside their household developing Covid-19, 83.6% (for inside)/ 82.6% (for outside) indicated that they worried about this "some of the time", "often, or "all of the time".

3.2. Baseline vs. lockdown comparisons

Within-subject comparisons (repeated-measures ANOVA) between baseline and lockdown revealed a significant increase in depression scores at lockdown compared to baseline ($p < .001$). Significantly decreased wellbeing was also reported ($p < .001$). A significant decrease in alcohol use was seen at lockdown ($p < .001$). There was also a significant change in diurnal preference ($p = .012$); rMEQ scores were lower at lockdown indicating a shift towards eveningness. There were no significant changes in anxiety, loneliness, or sleep quality (Table 3).

For detecting clinical depression a score of ≥ 8 on HADS-D has been

Table 1
Responses (%) to lockdown-specific questions regarding the subjective impact of Covid-19 and how well the participant felt they adapted to the lockdown conditions ($N = 254$).

	Not at all	Not very much	Quite a lot	Very much indeed
Do you feel that your mental health has been impacted by Covid-19?	6.6	41.3	38.4	13.8
	Not at all	**Not very well**	**Quite well**	**Very well indeed**
How well do you feel you have adapted to isolation and social distancing?	1.6	19.9	63.0	15.5
How well do you feel you have been able to follow the rules set by the Government for isolation and social distancing?	0.3	3.4	40.4	55.9

Table 2

Responses (%) to lockdown-specific questions regarding specific worries around Covid-19 (*N* = 254).

	None of the time	Rarely	Some of the time	Often	All of the time
I've been worried about developing Covid-19	3.7	25.8	45.0	21.4	4.0
I've been worried about my family members (who live inside my household) developing Covid-19	2.8	13.7	34.5	37.3	11.8
I've been worried about my family members (who live outside my household) developing Covid-19	4.3	13.0	29.5	38.8	14.3

determined to be optimal (Olssøn et al., 2005). At baseline, 13.8% of the sample met this criterion. At lockdown, this percentage rose to 34.3%. From the entire sample (*N* = 254), 25 individuals scored ≥8 on HADS-D at both time points, 62 at lockdown but not baseline, 10 at baseline but not lockdown. This difference was statistically significant (McNemar's Test, *p*<.001).

3.3. Correlational analyses

To examine how the change in depression symptoms related to change in the other variables measured, partial correlation analyses were conducted (Table 4). Within-subject differences were calculated for each variable (lockdown-baseline) and correlations between these examined. The increase in depression symptoms correlated significantly with an increase in anxiety (*p*<.001), reduced wellbeing (*p*<.001), and reduced sleep quality (*p*=.001) at lockdown compared to baseline. Fig. 1 illustrates the correlation between change in depression and sleep quality scores.

4. Discussion

This study provides valuable data on young people's mental health and other related variables, measured before and after the COVID-19

pandemic and ensuing lockdown (which commenced March 2020). Just over half the sample reported that they felt the situation had impacted their mental health 'quite a lot' or 'very much indeed', while 70% of respondents reported that they worried about contracting the virus at least some of the time. Worry around family members contracting the virus was reported to be even more prevalent. Encouragingly, however, around 80% felt they had adapted quite or very well to isolation and social distancing, and nearly all respondents reported being able to follow Government rules for isolation and social distancing. The impact on mental health was evident in the longitudinal analyses. A significant increase in self-reported level of depression symptoms was seen at 1–2 months into the UK lockdown compared to 7 months previous, significantly decreased wellbeing was also reported. The scale of the effect on depression symptoms was particularly evident when the clinical criterion for detecting major depression using HADS-D (score ≥8) was applied. The percentage of participants meeting this criterion more than doubled from baseline to lockdown; under lockdown just over a third of the sample could be classed as clinically depressed on this basis. No overall effects were seen on anxiety levels (despite high levels of COVID-related worries being reported), or loneliness scores. However, changes in depression scores correlated strongly with changes in anxiety symptoms and wellbeing, but not loneliness scores. Thus, the restrictions imposed by the lockdown did not translate into increased self-rated loneliness amongst this population, and loneliness did not appear to be related to the rise in depression. This contrasts with a report by Benke et al. (2020) who found that the degree of reduction of social contacts under lockdown associated with higher mental health complaints. However, the study by Benke et al. (2020) was cross-sectional and included adults across the age range (18–95, mean age 40.5); the impact of social isolation and loneliness might thus be more pronounced in older individuals. Since respondents indicated good adaptation to the restrictions, but high levels of worry surrounding catching the virus (both for themselves and for family members) we could speculate that COVID-related worries might be contributing more than the social restrictions to the observed effects on depression.

Despite some previous evidence that alcohol consumption might have increased under lockdown, we observed a significant decrease in alcohol use between time points. This offers some reassurance that young people might not be using alcohol as a coping strategy in response to the COVID situation. Given the restrictions in place at the point of data collection, the reported decrease in alcohol use presumably reflects

Table 3

Within-subject comparisons between baseline and lockdown. Significant effects were found for depression scores (from HADS-D), wellbeing (from WEMWBS), diurnal preference (from rMEQ), and alcohol use.

Variable	N	Baseline (*M*±SD)	Lockdown (*M*±SD)	L-B (M)	F	p	η^2_p
Anxiety	251	9.35±4.28	9.42±4.47	0.072	0.076	0.782	0
Depression	259	4.33±3.26	6.31±3.74	1.972**	84.236**	<0.001	0.25
Alcohol use	246	4.53±2.85	3.96±2.58	−0.569**	28.080**	<0.001	0.1
Wellbeing	251	23.04±4.96	21.12±4.87	−1.920**	33.282**	<0.001	0.12
Loneliness	251	4.23±1.10	4.45±1.06	0.22	0.541	0.463	0
Sleep quality	238	6.58±3.35	6.60±3.16	0.017	0.009	0.925	0
Diurnal Preference	249	12.03±3.26	11.62±3.47	−0.402*	6.444*	0.012	0.03

Note: Means and s.d. for each timepoint and results (F, p (two-tailed), η^2_p) of repeated-measures ANOVA. Age, gender, and year of study were included as covariates.
** *p*<.01
* *p*<.05.

Table 4

Partial correlations between change (lockdown-baseline) in depression symptoms and change (lockdown-baseline) in other variables. The change in each participants' depression symptoms under lockdown was significantly correlated with their change in anxiety, wellbeing and sleep quality.

Depression	Anxiety	Alcohol use	Wellbeing	Loneliness	Diurnal Preference	Sleep quality
r	0.499**	0.032	−0.501**	0.056	−0.014	0.224**
p	<0.001	0.622	<0.001	0.382	0.833	0.001

Note: Pearson's r and associated p values (two-tailed) are shown, covariates were age, gender and year of study.
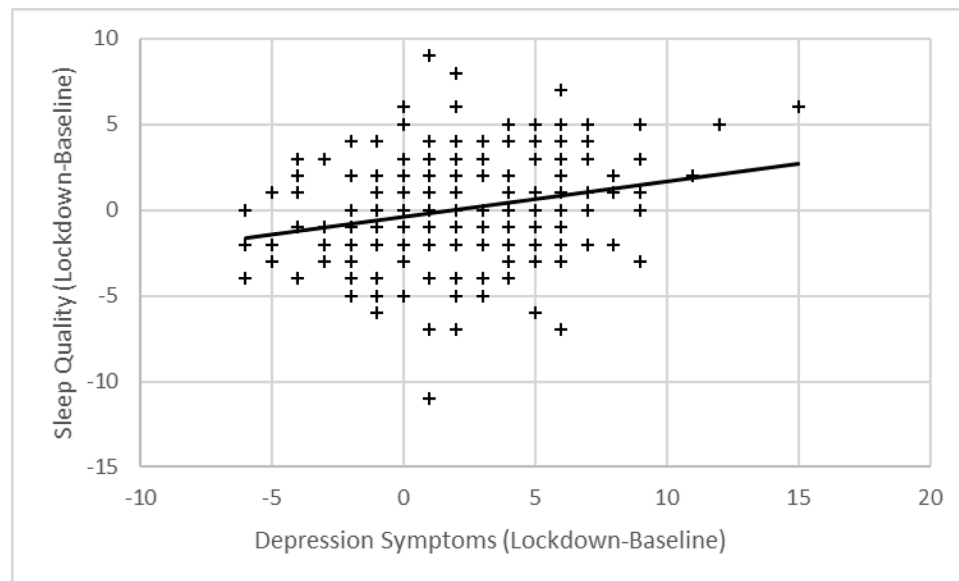** *p*<.01.

Fig. 1. Scatterplot of change in Depression Symptoms (Lockdown-Baseline) against change in Sleep Quality (Lockdown-Baseline) with linear fit line illustrating the significant positive relationship.

the lack of social opportunities for alcohol consumption, which is an important factor influencing alcohol use patterns amongst undergraduates (Del Boca et al., 2004). However, it should be noted that the baseline data collection was conducted early in the new academic year, at which point high levels of alcohol consumption might be expected. Some (Dierker et al., 2008) but not all (Hoeppner et al., 2012) studies have reported declining alcohol use patterns as the academic year progresses; current results should be considered in this context. Also, our findings showing decreased alcohol consumption do not mean that those who persisted in using alcohol were not using it as a coping strategy. Although we found no correlation between change in depression scores and alcohol use, further longitudinal studies are required to explore these issues, assessing how the pandemic and lockdown have influenced alcohol consumption (and links to mental health) over the longer term.

An encouraging finding was that, across the whole cohort, self-reported sleep quality was not seen to decline. Some cross-sectional studies have reported a high prevalence of self-reported sleep disturbance post-lockdown; the current longitudinal findings suggest that sleep quality might not have been profoundly impacted overall. However, the correlational analyses did point to an important link between the increase in depression symptoms and a worsening of sleep quality between time points: within-subject change in depression scores correlated strongly with within-subject change in sleep quality. This is unsurprising given that there exists a bidirectional relationship between sleep and depression; sleep disturbance is known to be an important factor in the aetiology of depression and these factors are closely intertwined (Nutt et al., 2008). Causality cannot be inferred from the correlation identified here, and future work using objective sleep measures would be beneficial, but this finding suggests that public health advice emphasizing the importance of maintaining sleep quality and good sleep hygiene (and access to interventions where necessary) could have some efficacy in supporting mental health as the COVID-19 crisis continues to develop. However, this should form part of a more comprehensive public health approach that might also seek to address worries directly related to contracting COVID (which data showed were highly prevalent in the sample studied here).

Another finding was the significant change in diurnal preference between time points. An increase in MEQ score under lockdown indicated that, overall, participants reported a shift towards 'eveningness' (a preference to sleep and wake up later) in their diurnal preference.

Although sometimes conceptualised as a trait-like construct, diurnal preference is somewhat flexible as demonstrated by the fact it can be modified by behavioural and pharmacological interventions (Hasler et al., 2016). Greater eveningness is associated with a heightened risk of poor mental health (Kivela et al., 2018; Schneider et al., 2011) and this association appears to exist independent of sleep quality (Cox and Olatunji, 2019; Evans and Norbury, 2020). Here, we could not identify a link between change in diurnal preference and the increase in depression symptoms, but the move towards eveningness in this sample deserves further study to determine the reasons why this shift in diurnal preference has occurred and its potentially adverse consequences over the longer term.

Some important limitations should be noted. The study population consisted of predominantly female psychology students from a single university. If possible, further studies are needed to determine whether the current findings are broadly generalisable to other students, and young adults in general, as the experiences of those outside an educational setting would likely differ substantially. Further, the sample was predominantly female and while gender was controlled for in all analyses, insufficient males precluded an analysis of gender effects. Since gender impacts depression and anxiety risk (Calling et al., 2017) further work is needed to elucidate potential gender differences in relation to the current findings. Also, the data collection techniques and settings differed between the two time points. At baseline, questionnaires were completed in a lecture setting and therefore more susceptible to social desirability bias, compared to the online data collection at follow-up. This might mean that (for example) depression scores were under-reported at baseline. Social desirability bias might also have influenced responses to the COVID-related questions, possibly exaggerating for example the reported levels of compliance with the lockdown restrictions. Further, these questions were fairly non-specific and could have been miscomprehended: more in-depth investigations into how well young adults adapted (along specific dimensions) and complied to the restrictions are warranted. Also, it should be noted that 43 participants did respond at follow-up and were thus excluded from the analyses: although baseline characteristics did not differ in these individuals, they might have included those with worse mental health at follow-up, potentially causing an underestimation of the mental health impact of the pandemic/lockdown. Finally, we did not control for changes in mental health status that might have occurred across the academic year independent of the effects of lockdown. Although studies

are scarce, there is some evidence that depression might peak mid-semester in some students (Wang et al., 2018). As the second data collection point occurred mid-semester (while baseline was at the beginning of a semester) this might have influenced results.

In sum, this longitudinal study highlights the impact of the COVID-19 pandemic on the mental health of a student sample, with depression symptoms and wellbeing significantly affected. Results point to the need for comprehensive public health approaches to support young people's mental health as the crisis continues to evolve. Results suggest that promoting good sleep and addressing the observed high levels of worry around contracting COVID-19 might be useful elements in this. Alcohol use was seen to decrease; alcohol thus did not appear to be being employed as a coping strategy. However, it should be noted that these data were collected in the early stages of the lockdown, future work should assess how the effects identified here evolve as the crisis continues to unfold.

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Declaration of Competing Interest

The authors declare no competing interests.

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