

The role of the COVID-19 pandemic in altered psychological well-being, mental health and sleep: An online cross-sectional study

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Abstract

Coronavirus disease 2019 (COVID-19) is a global pandemic. Measures to reduce transmission of the virus have altered usual activities, routines, and livelihoods, and have had a significant impact on mental health. The current study aims to examine the potential alterations in psychological wellbeing, mental health, sleep and diurnal preference due to the COVID-19 pandemic. A cross sectional online questionnaire-based study with n=200 participants (aged 18-62; 7.86.0% female, 93.0% white, 92.5% UK-based, 73.5% students). Data were collected between 15th April and 8th June 2020. Participants answered questions on lifestyle changes and their concerns and worries about COVID-19, and completed the SCI, PHQ9, GAD7, PWB18, UCLA3 and MEQ. Results showed self-isolation was linked to lower psychological well-being, and increased loneliness, anxiety and depression. Home-working was related to a shift in diurnal preference. Reduced work/income was related to decreased psychological well-being and sleep quality and increased anxiety, depression, loneliness and. Intensity of worried thoughts and concerns about COVID-19 were positively correlated with anxiety, depression and negatively with sleep quality. In conclusion, the social, occupational and economic disruption due to COVID19 has had a negative impact on psychological well-being. However, the transition to home-working may have been somewhat beneficial for some individuals in terms of sleep. These findings should be taken into account by policy makers during the transition to the 'new normal' post-pandemic.

Keywords: COVID-19, psychological wellbeing, mental health, sleep, loneliness, diurnal preference

Introduction

Coronavirus disease 2019 (COVID-19) is a global pandemic. More than 118million cases have been reported worldwide with 4million in the UK (Worldometers, 2021). To reduce the global transmission of COVID-19 governments conditionally enforced lockdowns, encouraging people to self-isolate, work from home and engage in social distancing. On March 23, 2020 the UK prime minister announced the first lockdown, ordering people to “stay at home”.

The pandemic has been catastrophic for psychological well-being and mental health. Certainly, fear concerning the increasing death rate, general uncertainty about the nature of the virus and significant disruptions to daily life have accentuated symptoms of anxiety and depression, disturbed sleep and exacerbated pre-existing psychiatric difficulty (Banks & Xu, 2020; Dawson & Golijani-Moghaddam, 2020; González-Sanguino et al., 2020; Huang & Zhao, 2020). The economic disruption has also placed major strains on mental health (Gratz et al., 2020).

Social restrictions have reduced social interaction and led to increased reports of loneliness (Killgore et al., 2020), a significant precursor of poor mental health. Furthermore, circadian disruption may emerge in those confined to the home environment for prolonged periods, which is also related to the onset of psychiatric difficulty (Karatsoreos, 2012; Salgado-Delgado et al., 2011).

Given the unprecedented nature of the pandemic, examining potential alterations in psychological wellbeing and related factors is necessary. Therefore, the aim of this study was to explore how social, economic and occupational disruption and appraisal of the COVID-19 pandemic may have influenced psychological well-being, anxiety, depression, loneliness, insomnia and diurnal preference.

Method

Sample and Procedure

A cross-sectional online questionnaire-based study was conducted using Qualtrics survey platform. The study was approved by [blinded for review] Research Ethics Committee. All participants provided online informed consent. Data were collected between 15th April and 8th June 2020. The only inclusion criterion was age (18+). Participants were recruited through social media (Twitter and Facebook) and university course participation schemes where students were remunerated with course credit. N=243 individuals began the survey and N=200 (Mean age=24.74,[7.20], 86.0% female, 93.0% white, 92.5% UK-based, 73.5% students, 70.5% employed, 91.5% co-habiting) provided sufficient data to be included in analysis.

Measures

Shift in lifestyle

An in-house set of questions were developed to gauge whether participants were 1) self-isolating; 2) social distancing; 3) working from home and 4) faced reduced work hours/income. Responses were *Yes*, *No* or *N/A* (Qs 3&4) and participants were split into groups accordingly. See Appendix for questions.

COVID Concerns

Participants completed a bespoke 7-item measure about COVID-19 concerns and worries. Response choices ranged from 0=*not at all* to 5=*very much*. Questions were analysed both separately and as a summated total. Cronbach's alpha=.725. (See Appendix for questions.)

Psychological well-being

The Psychological Well-being Scale (PWB18; Ryff & Keyes, 1995) is an 18-item tool which assesses six aspects of wellbeing and happiness). Respondents are asked how much they agree with 18 statements from 1=*strongly agree* to 7=*strongly disagree*. Positively worded items are reverse-scored and total scores range from 18-126. Higher scores indicate better psychological well-being. Cronbach's alpha=.828.

Anxiety

The 7-item Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006) was used to assess anxiety levels. The scale asks how often in the previous 2 weeks, the respondent has been bothered by 7 core symptoms of anxiety. Responses choice range from 0=*not at all* to 3=*nearly every day*. Total scores range from 0-21 with higher scores indicating increased anxiety. Cronbach's alpha=.911.

Depression

The 9-item patient health questionnaire (PHQ-9; Kroenke et al., 2001) assessed depressive symptoms. Respondents indicate their experience of 9 symptoms on a scale of: 0=*not at all*, to 3=*nearly every day*. Scores range from 0-27 with higher scores indicating increased depression. Cronbach's alpha=.870.

Loneliness

The UCLA loneliness scale (UCLA3; Russell, 1996) is a 20-item scale designed to measure feelings of loneliness. Participants rate each item on a scale from 1=*Never* to 4=*Often*. Ten positively worded items are reverse scored. Scores range from 20-80 with higher scores indicating increased loneliness. Cronbach's alpha=.910.

Diurnal preference

The Morning eveningness questionnaire (MEQ; Horne & Östberg, 1976) is a 19-item scale used to gauge diurnal preference. Questions ask about daily sleep-wake habits and time-of-day preferences. Total scores range from 16-86. Lower scores indicate 'eveningness' and higher scores indicate 'morningness'. Cronbach's alpha=.780.

Insomnia

The Sleep Condition Indicator (SCI; Espie et al., 2014) is an 8-item scale assessing sleep problems, in line with the DSM-5 (APA, 2013) criteria for insomnia disorder. Items are scored 0-6. Total scores range between 0-32 with higher scores indicating better sleep. Cronbach's alpha=.875.

Participants were also asked if their reported sleep difficulties, anxiety, depression and loneliness were higher than usual. Response options were *Yes*, *No* or *Not sure*. They were also asked if their sleep-time preference had changed, including the nature of the change.

Statistical Analyses

Statistical analyses were conducted using IBM SPSSv26.0. 'Shift in lifestyle' questions were used to allocate participants to groups. One-way ANOVAs and independent t-tests were conducted to assess for differences on the outcomes between groups. Linear regression analyses were conducted to assess potential mediation. Pearson's bivariate correlations assessed relationships between 'COVID concerns' questions and the outcomes. Missing data were treated using listwise deletion. ($\alpha = .005$)

Results

N=196(98%) reported social distancing, 94(47.0%) working from home; and 52(26%) were facing reduced work hours/income. N=85(42.5%) reported worse sleep; 117(58.5%) increased anxiety; 102(51%) increased depressive symptoms; and 72(36.0%) greater loneliness. N=141(74.6%) participants reported a change in diurnal preference, with 111(58.7%) attributing this to a delay in sleep/wake times.

Self-isolating individuals reported significantly higher GAD7, PHQ9 and UCLA3 scores, and significantly lower PWB18 scores (Table 1). A linear regression model with self-isolation predicting PWB18 scores was significant [$F(1,186)=20.53, p<.001$] and remained significant with the addition of GAD7, PHQ9 and UCLA3 scores [$F(4,183)=43.91, p<.001$] predicting an additional 39.0% of the variance, however self-isolation($\beta=-.162, p=.004$) and UCLA3 scores($\beta=-.596, p<.001$) were the only significant predictors.

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Individuals working from home reported significantly higher MEQ scores. Participants experiencing reduced working hours/income reported significantly higher GAD7, PHQ9 and UCLA3 scores, and significantly lower SCI, MEQ and PWB18 scores (Table 1). A linear regression model with reduced hours/income predicting PWB18 scores was significant [$F(1,114)=7.77, p=.006$]. The addition of GAD7, PHQ9, UCLA3, MEQ and SCI scores was also significant [$F(6,109) = 15.24, p<.001$] predicting an additional 42.6% of the variance. Loneliness ($\beta=-.595, p<.001$) was the only significant predictor.

Table 2 shows significant but small negative correlations between the COVID concerns and SCI scores, and moderate positive correlations with GAD7 and PHQ9. Given the correlations with anxiety and depression are in the expected direction, this is initial evidence of the construct validity of the COVID concerns measure.

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Discussion

The aim of the study was to examine how social and economic disruption due to the COVID19 pandemic may have altered psychological well-being, mental health and sleep. Findings show self-isolating individuals reported reduced psychological well-being and increased anxiety, depression and loneliness. Loneliness was found to partially mediate the relationship between self-isolation and psychological well-being. Loss of work hours and income was also related to reduced psychological well-being and increased anxiety, depression, loneliness and sleep difficulties, and loneliness fully mediated the relationship. This supports consistent links between social isolation, loneliness and reduced psychological health (Muyan et al., 2016; Weeks et al., 1980) in addition to previous COVID studies (Groarke et al., 2020; Killgore et al., 2020) and those considering the economic impact(Gratz et al., 2020).

COVID concerns were significantly related to increased anxiety, depression, and insomnia. Taken together, these outcomes indicate wider implications of the pandemic as being particularly stressful, leading to poorer mental health and sleep-related outcomes as per previous research (Banks & Xu, 2020; Huang & Zhao, 2020).

Individuals working from home reported a diurnal shift towards 'eveningness preference' and better sleep, although the latter only approached significance. This may tentatively suggest that home-working encouraged sleep behaviour which compliments diurnal preference and endogenous circadian rhythms, subsequently improving sleep. However, further research is needed in this area.

A number of limitations must be acknowledged. First, the current sample was predominately white and female, limiting generalisability to the wider general population. Next, additional unexamined factors may have influenced the current outcomes, including participant's health status. The dynamic nature of the pandemic, and the lifting of lockdown restrictions throughout data collection (see figure 1) are also issues, however data collection was terminated before lockdown measures, other than schools reopening, were lifted. Finally, the usual limitations associated with conducting research online using self-report measures should also be considered, including self-selection and social desirability. However, in-person research was not permitted at the time of data collection.

In summary, individuals self-isolating and/or facing reduced income reported greater deficits in psychological well-being, whereas those working from home reported a potential behavioural shift towards later diurnal preference. Concerns about the pandemic were also associated with poorer mental health and sleep. These findings highlight the need to tackle psychological well-being and loneliness as priority in the aftermath of the pandemic and the potential positive effect of remote-working on sleep should be considered by employers and policy makers during the transition to the 'new normal'.

References

- Banks, J., & Xu, X. (2020). *The mental health effects of the first two months of lockdown and social distancing during the Covid-19 pandemic in the UK.*
- Dawson, D. L., & Golijani-Moghaddam, N. (2020). COVID-19: Psychological flexibility, coping, mental health, and wellbeing in the UK during the pandemic. *Journal of contextual behavioral science, 17*, 126-134.
- Espie, C. A., Kyle, S. D., Hames, P., Gardani, M., Fleming, L., & Cape, J. (2014). The Sleep Condition Indicator: a clinical screening tool to evaluate insomnia disorder. *BMJ open, 4*(3).
- González-Sanguino, C., Ausín, B., ÁngelCastellanos, M., Saiz, J., López-Gómez, A., Ugidos, C., Muñoz, M. J. B., Behavior,, & Immunity. (2020). Mental health consequences during the initial stage of the 2020 Coronavirus pandemic (COVID-19) in Spain.
- Gratz, K. L., Tull, M. T., Richmond, J. R., Edmonds, K. A., Scamaldo, K. M., & Rose, J. P. (2020). Thwarted belongingness and perceived burdensomeness explain the associations of COVID-19 social and economic consequences to suicide risk. *Suicide and Life-Threatening Behavior, 50*(6), 1140-1148.
- Groarke, J. M., Berry, E., Graham-Wisener, L., McKenna-Plumley, P. E., McGlinchey, E., & Armour, C. (2020). Loneliness in the UK during the COVID-19 pandemic: Cross-sectional results from the COVID-19 Psychological Wellbeing Study. *PLoS one, 15*(9), e0239698.
- Horne, J. A., & Östberg, O. (1976). A self-assessment questionnaire to determine morningness-eveningness in human circadian rhythms. *International journal of chronobiology.*
- Huang, Y., & Zhao, N. (2020). Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. *Psychiatry research, 112954.*
- Karatsoreos, I. N. (2012). Effects of circadian disruption on mental and physical health. *Current neurology neuroscience reports, 12*(2), 218-225.
- Killgore, W. D., Cloonen, S. A., Taylor, E. C., & Dailey, N. (2020). Loneliness: A signature mental health concern in the era of COVID-19. *Psychiatry research, 113117.*
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine, 16*(9), 606-613.
- Muyan, M., Chang, E. C., Jilani, Z., Yu, T., Lin, J., & Hirsch, J. K. (2016). Loneliness and negative affective conditions in adults: is there any room for hope in predicting anxiety and depressive symptoms? *The Journal of psychology, 150*(3), 333-341.
- Russell, D. W. (1996). UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. *Journal of personality assessment, 66*(1), 20-40.
- Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of personality social psychology, 69*(4), 719.
- Salgado-Delgado, R., Tapia Osorio, A., Saderi, N., & Escobar, C. (2011). Disruption of circadian rhythms: a crucial factor in the etiology of depression. *Depression research & treatment, 2011.*
- Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of internal medicine, 166*(10), 1092-1097.
- Weeks, D. G., Michela, J. L., Peplau, L. A., & Bragg, M. E. (1980). Relation between loneliness and depression: A structural equation analysis. *Journal of personality & social psychology, 39*(6), 1238.
- Worldometers. (2021). *COVID-19 Coronavirus Pandemic.* Retrieved 03/08/2020 from <https://www.worldometers.info/coronavirus/>

Appendix A

A) Questions on lifestyles changes:

1. Are you engaging in self-isolation due to the COVID-19 Pandemic?
2. Are you engaging in social distancing due to the COVID Pandemic?

Response choices were: Yes/No

3. Are you having to work from home due to the COVID-19 Pandemic?
4. Are you facing reduced work hours and reduced income due to the COVID-19 Pandemic?

Response choices were: Yes/No/Not applicable

B) Questions on COVID related thoughts and feelings:

1. How worried are you about the COVID-19 epidemic?
2. How likely is it that you could become infected with COVID-19?
3. How likely is it that someone you know could become infected with COVID-19?
4. How quickly do you think that COVID-19 contamination is spreading throughout your country?
5. How much exposure have you had to information about COVID-19?
6. If you became infected with COVID-19, how concerned are you that you will become severely ill?
7. To what extent has the COVID-19 pandemic influenced your safety behaviours (e.g., hand washing, using hand sanitizers)?

Response choices were: 0=not at all to 5 = very much.

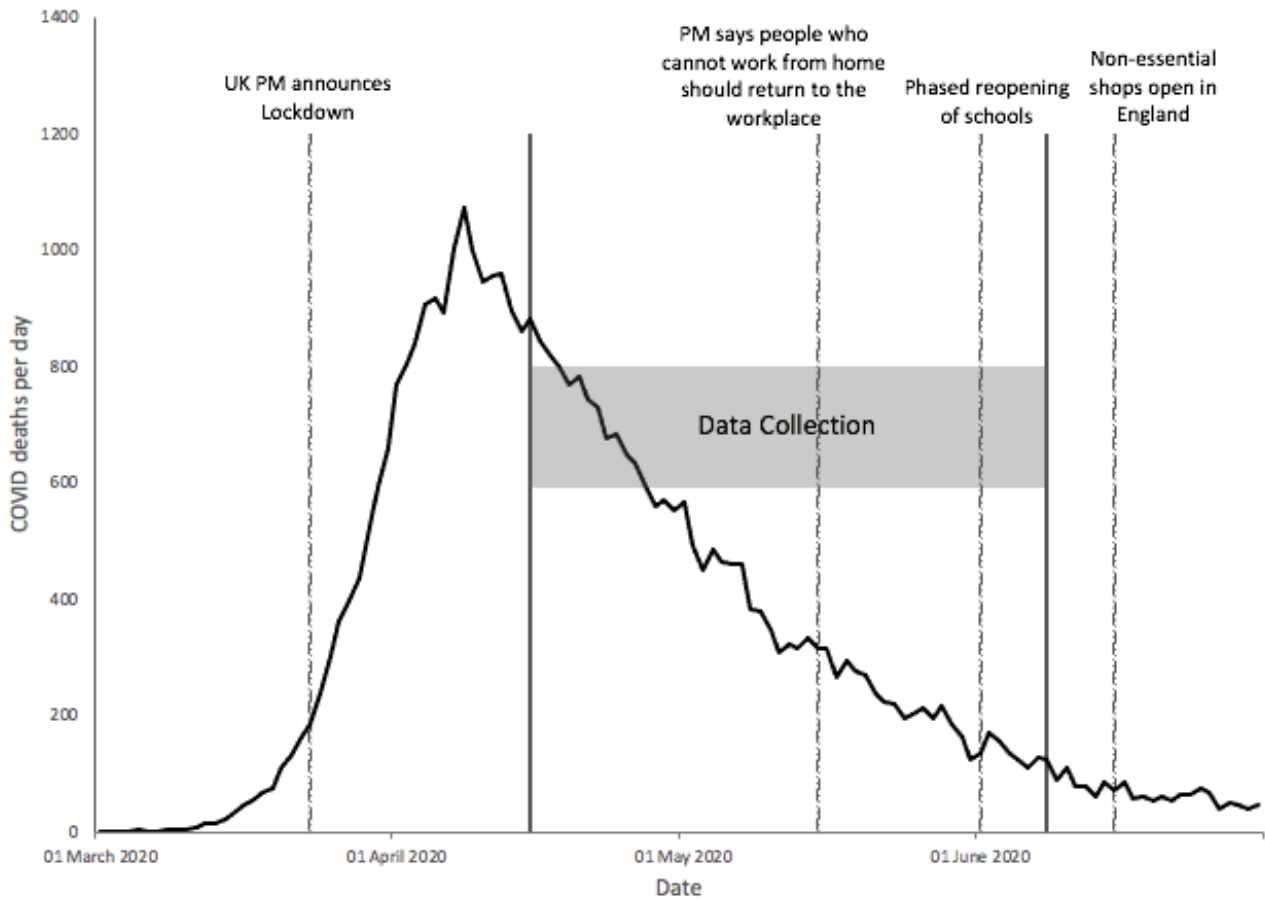


Figure 1. Timeline of key dates and daily Covid-19 deaths relative to data collection during the first UK lockdown after it was announced on 23rd March 2020. Data was collected between 15th April 2020 and 8th June. Data on Covid-19 deaths was sourced from <https://coronavirus.data.gov.uk/details/deaths>