

Journal Pre-proof

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PII: S0022-3956(22)00620-3

DOI: <https://doi.org/10.1016/j.jpsychires.2022.10.068>

Reference: PIAT 5419

To appear in: *Journal of Psychiatric Research*

Received Date: 7 April 2022

Revised Date: 16 October 2022

Accepted Date: 28 October 2022

Please cite this article as: Robert Thorpe WJ, Morrison Gutman L, The trajectory of mental health problems for UK emerging adults during COVID-19, *Journal of Psychiatric Research* (2022), doi: <https://doi.org/10.1016/j.jpsychires.2022.10.068>.

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The trajectory of mental health problems for UK emerging adults during COVID-19

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Abstract

Initial COVID-19 restrictions were associated with declining mental health, particularly in UK emerging adults. Prior research has yet to examine changes in mental health in this demographic over the entire course of the three UK national lockdowns. Drawing upon the Understanding Society COVID-19 Survey, this study examined the trajectory of mental health problems for emerging adults (18-29-year-olds) from April 2020-September 2021. Mental health problems were assessed at nine time-points using the General Health Questionnaire. The analytic sample included 1018 participants (304 males, 714 females). Growth curve modelling was used to examine the trajectory of mental health problems and the associated sociodemographic and health covariates. Females, those with fewer household members, lower income, no private garden, and pre-existing mental or physical health diagnoses reported more mental health problems. Gender differences were evident in the rate of change. Females' mental health problems declined from the first lockdown until just after the relaxation of initial restrictive measures (September 2020), increased until April 2021 (constituting lockdowns two and three), and then slightly decreased until September 2021 during the phased exit from restrictions. Males' mental health problems followed a similar trajectory, with a greater rate of increase in mental health problems from July 2020-April 2021, and a greater rate of decline from April-September 2021. Females reported more mental health problems throughout the three national lockdowns than males. These findings can inform public health policies targeted toward young adult populations and highlight sub-populations at greater risk of worsening mental health.

Keywords: Young Adults; COVID-19; Mental health; Socio-demographic; Longitudinal; Gender

The trajectory of mental health problems for UK emerging adults during COVID-19

The COVID-19 pandemic imposed unprecedented disruption to the global population. The UK government mandated three national lockdowns, involving the closure of professional and educational institutions, limitation of exercise opportunities, and banning of social meetings among other restrictive measures (GOV.UK, 2020). While effective at mitigating infection rates, initial restrictions have been associated with aversive mental health outcomes, particularly among emerging adults (O'Connor et al., 2021). Emerging adulthood (18-29 years) represents an exploratory period regarding self-identity, relationships and educational/career prospects (Arnett et al., 2014). Due to the socio-economic and educational uncertainty imposed by the pandemic, the mental health of this demographic has become important for clinical research and intervention (Saunders et al., 2021). However, research examining mental health and its risk factors has predominantly focused on the first lockdown. To our knowledge, no study has examined the mental health of UK emerging adults across the three national lockdowns. Given the potential long-term impacts of the pandemic on mental health, an extended longitudinal investigation is warranted (Pierce et al., 2020). Drawing from a nationally representative, longitudinal UK sample, the present paper examines the trajectory of mental health and associated sociodemographic and health covariates in emerging adults from April 2020-September 2021.

Research Background

Research has shown that the UK population's mental health declined during the first lockdown (March-June 2020; Robinson et al., 2022). Comparative analyses indicate that this decline varied by age, with 18-29-year-old UK adults reporting the greatest decline from March-April 2020 (O'Connor et al., 2021). Despite the initial spike in mental health problems, young adults in England and the UK presented notable improvement upon the easing of initial restrictions (Fancourt et al., 2021; Pierce et al., 2021; Saunders et al., 2021). Comparable trends have been identified across 61 pre-post initial restriction studies conducted in China, North America, and Europe, suggesting the initial increase in mental health problems and successive improvement to be internationally consistent (Robinson et al., 2022). However, it remains unclear whether this trend continued from the second (November 2020) to the third (January-March 2021) UK lockdowns.

Research highlights factors that are likely to be significant covariates of mental health during the pandemic. For gender, females reported more mental health problems compared to males at the beginning of the first UK lockdown (March 2020; Fancourt et al., 2021). Despite improvement following

the easing of initial restrictions, this inequality persisted from March-August 2020 (Fancourt et al., 2021). Furthermore, research examining mental health before and during COVID-19 in two longitudinal UK cohort studies reported higher anxiety and depression scores in females than males, even when controlling for pre-pandemic levels (Kwong et al., 2021). This suggests that there may have been a disproportional impact of the pandemic on the mental health of females compared to males.

Living alone was associated with worse mental health outcomes within UK 18–75-year-old adults (Jia et al., 2020), whereas findings from one US sample (18-94 years) revealed in-person familial and romantic household connectedness was associated with better mental health during initial restrictions in April 2020 (Rosenberg et al., 2021). Furthermore, Black, Asian, and Minority (BAME) ethnic groups from the UK experienced accentuated declines in mental health compared to White Caucasians during the first lockdown (Proto & Quintana-Domeque, 2021). However, none of the aforementioned studies measured pre-pandemic levels of mental health, therefore, it cannot be determined whether household composition and ethnicity are notable pandemic-related indicators or general indicators of mental health outcomes.

Research also highlights the importance of economic factors on mental health during the pandemic. For example, Kwong and colleagues (2021) identified that UK individuals with greater socio-economic adversity experienced more depression and anxiety during the pandemic, even after controlling for pre-pandemic levels. Focusing on young UK adults, Stroud and Gutman (2021) revealed that individuals from low-income households reported higher levels of psychological distress than those from high-income households in April 2020. Adversities associated with poor mental health during the pandemic, such as unemployment and decreased contact with nature, were more commonly experienced by economically disadvantaged UK adults (Hubbard et al., 2021; Lopes & Jaspal, 2020).

Moreover, pre-existing physical and mental health problems have been evidenced to predict more aversive mental health outcomes during the pandemic, even after controlling for pre-pandemic levels of mental health (Kwong et al., 2021). COVID-19 studies focusing on young adults with pre-existing physical or mental health conditions have also reported higher rates of mental health problems than those without these conditions (O'Connor et al., 2021; Pierce et al., 2020; Stroud & Gutman 2021). While corroborating this trend for pre-existing physical health conditions, however, one recent multinational meta-analysis identified no significant change in mental health problems for those with pre-existing mental health condition(s) from before versus during the first wave of restrictive measures. The authors suggest this may be due to the structure and protection from external stressors promoted by the “stay at

home” restrictions (Robinson et al., 2022). For physical activity, one COVID-19 study representing 3,121 UK adults revealed a strong association between reduced moderate-vigorous exercise and higher self-reported depression and anxiety, with 18-29-year-olds presenting pronounced declines for each measure (Faulkner et al., 2021). However, Faulkner and colleagues (2021) did not examine pre-pandemic data, therefore, their findings may represent the well-established general association between exercise and psychological wellbeing (Peluso & De Andrade, 2005), rather than exercise as a pandemic-specific indicator of mental health.

Present Study

Drawing upon the Understanding Society COVID-19 Study, the present study used growth curve modelling (GCM) to examine: (1) the longitudinal trajectory of mental health (April 2020-September 2021) in emerging adults and (2) whether age, gender, ethnicity, household income, household composition, access to outdoor space, pre-existing mental or physical health conditions, and exercise were significant covariates. Considering previous research, we hypothesized: (1) mental health outcomes to align with restrictions, declining during the three lockdowns and improving upon the easing of restrictions and (2) higher self-reported mental health problems for females, ethnic minorities, individuals living alone and those with a lower income, lower exercise engagement, pre-existing physical or mental health conditions, and limited or no access to outdoor space.

Method

Data Source

Data were drawn from the Understanding Society COVID-19 Survey - a longitudinal, nationally representative panel study of UK households from the Understanding Society UK Household Longitudinal Study (UKHLS). The Understanding Society COVID-19 Survey assessed the variable impact of the pandemic on participants’ welfare from April 2020-September 2021. Use of participants from the main UKHLS sample permits analysis of a large, diverse, sample with high population generalisability. Ethical approval was granted by the University of Essex Ethics Committee (ETH1920-1271).

The Understanding Society COVID-19 Survey was distributed each month from April 2020-June 2020, bi-monthly from September 2020-March 2021, and finally in September 2021. The first four questionnaires were sent to individuals who had participated in Waves 8 or 9 of the UKHLS. Between Waves 5-8, surveys were sent to those who had provided at least one partially complete response in any of the initial four COVID-19 survey waves. Wave 9 surveys were sent to individuals who had been invited

in the previous wave. Participants were compensated £2 for each survey completion. A £10 payment was granted for the final survey.

The present study utilised data from 18-29-year-old-adults. Responses were derived from each of the nine waves (April, May, June, July, September, November 2020; January, March, September 2021; see Figure 1 for the proximity of measurement waves to lockdown periods). Due to the requirements of GCM, the final analytic sample included only participants who provided responses for covariates collected in Wave 1 and responded at least twice to the mental health outcome. The response rate for each wave was: Wave 1=1843; Wave 2=1298; Wave 3=1182; Wave 4=1109; Wave 5=983; Wave 6=865; Wave 7=888; Wave 8=1019; and Wave 9=1076.

Procedure

Eligible participants from the UKHLS were pre-notified of the responsibilities, compensation rate and purpose of the COVID-19 survey by post. For each COVID-19 survey wave, invitations were sent via email or SMS. Participants accessed the surveys using the unique link received in the invitation materials. The survey took approximately 20 minutes to complete.

Measures

Table 1 presents the wave of measurement, ranges, means and standard deviations of measures.

Gender was coded as a dichotomous variable: 1='male'; 0='female'.

Ethnicity was a categorical variable with five ethnic categories: White, Mixed, Asian, Black, and Other. This variable was coded into dichotomous variables with 'White' as the comparator.

Household Income was coded as a 15-interval variable. Each interval represented a £5000 increase in annual income (e.g., 1='up to £5000'; 15='greater than £70,000')

Total Household Composition was a count of the total number of household members.

Living With Partner was a dichotomous variable derived from the question 'are you currently living with a partner?': 1='yes'; 0='no'.

Access to Outdoor Space was a categorical variable based on whether the participant had access to one of the following: a private garden; shared garden; balcony, rooftop garden or terrace; other outdoor space; or no outdoor access. The variable was coded into dichotomous variables with 'no outdoor access' as the comparator.

Mental Health Condition was coded as a dichotomous variable indicating whether the participant had a pre-existing emotional, nervous, or psychiatric problem: 1= 'yes'; 0= 'no'.

Physical Health Conditions was a count of 20 questions, asking whether participants had a pre-existing physical health condition, such as asthma, cancer or malignancy, epilepsy or H.I.V.

Moderate-Vigorous Physical Activity (MVPA) was a continuous variable indicating the total hours spent engaging in moderate and vigorous physical activities over the previous seven days. Moderate activities were those that 'make you breathe *somewhat* harder than normal'. Vigorous activities were those that 'make you breathe *much* harder than normal'. MVPA estimates of 17.5 hours or more ($N=213$) were removed to account for misreporting (Rzewnicki et al., 2003).

Mental Health Problems was measured using the General Health Questionnaire (GHQ-12). The GHQ-12 is a validated unidimensional measure of psychological distress widely used within non-clinical populations with excellent psychometric properties, thus can be deemed appropriate for the present population sample (Goldberg et al., 1997; Pevalin, 2000). The survey is highly accessible, typically taking 2-3 minutes to complete 12 items assessing non-specific symptoms of depression, anxiety, and other domains of mental health on a four-point scale (1='less than usual'; 2='no more than usual'; 3='rather more than usual'; 4='much more than usual'). A score of ≤ 3 is widely accepted as the cut-off point for interpreting distress (Goldberg et al., 1997; Kelly et al., 2008). The mean score was calculated using the 12 items for each wave and the Cronbach's alpha ranged from 0.90 to 0.98 for Waves 1-9.

Data Analysis

GCM was employed to examine the trajectory of mental health (April 2020-September 2021). Analyses were conducted using SPSS 27. Growth curve modelling was selected for the present data set as it allows unequal time interval spacing across measurement waves and accounts for missing data through maximum likelihood estimation.

A time variable was created based on the number of months since the first wave of measurement: Wave 1=0; Wave 2=1; Wave 3=2; Wave 4=3; Wave 5=5; Wave 6=7; Wave 7=9; Wave 8=11; Wave 9=17. To examine the linear slope, this time variable was included in the model, reflecting the linear change in mental health over time. To examine the quadratic slope, this time variable was squared (multiplied by itself) and included in the model. To examine the cubic slope, this time variable was cubed. The quadratic and cubic time components reflect the non-linear rate of change in mental health over time.

The model was constructed by incorporating the linear, quadratic, and cubic time components and significant covariates. Insignificant covariates were excluded for the sake of parsimony. Interaction

terms between significant covariates and the time components were individually added to assess their association with the rate of change in mental health.

Results

The final analytic sample included 1018 participants: 82% White, 4% Mixed Race, 11% Asian, 2% Black, and 1% Other. Females comprised 70% of the sample. One-way ANOVA were performed to examine differences between those who were included ($N=1018$) in the final analytic sample and those who were excluded ($N=1228$) due to missing data. As shown in Table 2, those who were excluded were younger; more likely to be Black, Asian, or Other; had fewer household members; were less likely to live with a partner; reported lower moderate-vigorous physical activity at Wave 1; had less access to private gardens, shared gardens, and a higher proportion of inaccessible garden space at Wave 2; and had a lower mental health score at Wave 6 compared to the final analytic sample.

The final growth curve model for the mental health outcome is presented in Table 3. At the intercept, lower income, female gender, lower total household composition, and pre-existing mental and physical health conditions were associated with higher GHQ scores (more self-reported mental health problems). For example, those with two pre-existing physical health conditions reported a GHQ score that was .20 higher compared to those with no conditions; while those with low income (up to £5000/per year) had a GHQ score that was .14 higher compared to those with a high income (over £70,000/year). Those with access to a private garden also had a lower GHQ score compared to those with no outdoor access. There were no significant differences in mental health problems for any of the other outdoor access variables, ethnicity, living with a partner, and MVPA at the intercept.

There were significant negative linear, positive quadratic and negative cubic slopes (see Table 3). There were also significant interactions between gender and both the linear and quadratic slopes, showing that the trajectory of mental health varied according to gender. As shown in Figure 2, females' trajectory showed decreasing mental health problems from the first lockdown (April 2020) to just after the relaxation of initial restrictive measures (September 2020), a slight increase until April 2021, and a slight decrease to September 2021, following the phased exit from restrictions. Males, despite being below the female trajectory, experienced a marginally greater rate of increase in mental health problems between the relaxation of initial restrictive measures to around lockdown three (July 2020-April 2021), followed by a greater rate of decline from April-September 2021. The interaction between gender and the

cubic slope was not significant and none of the other covariates were significant at the linear and/or quadratic slopes.

Discussion

Using the Understanding Society COVID-19 Survey, the present study examined the trajectory of mental health problems (April 2020-September 2021) for emerging adults using socio-demographic and health-related variables as covariates. As predicted, growth curve modelling revealed that mental health problems aligned with restrictions, increasing during the three lockdowns and declining during periods of relaxed restrictive measures. Females, those with fewer household members, a lower income, no outdoor access, and pre-existing mental or physical health diagnoses reported more mental health problems than males and those with more household members, a higher income, a private garden and no pre-existing mental or physical health diagnoses. Gender differences were evident in the rate of change in mental health problems.

Confirming our first hypothesis, mental health problems appeared to fluctuate from April 2020 to September 2021 in alignment with the enforcement and relaxation of restrictions. Supporting and extending prior research (e.g., Fancourt et al., 2021), this suggests that the current sample was more vulnerable to mental health problems during the three national lockdowns, and conversely, benefited from the easing of initial restrictions (July 2020), and the phased exit from lockdowns two and three (March 2021-July 2021). However, it should be noted that the current paper did not examine pre-pandemic GHQ-12 scores, warranting further longitudinal pre-post-pandemic analytical designs to affirm this assertion.

As expected from previous research (Stroud & Gutman, 2021), females reported more mental health problems than males. From the highest level in April 2020 (lockdown one), females' mental health problems declined until just after the relaxation of initial restrictive measures (September 2020), slightly increased until around the phased exit from lockdowns two and three in April 2021, and then presented a slight decrease until September 2021. Males' mental health problems followed a similar but lower average trajectory, with a marginally greater rate of increase in mental health problems between the relaxation of initial restrictive measures to lockdown three (July 2020-April 2021), and a greater rate of decline from the period during until after the phased exit from restrictions (April 2021-September 2021). One possible explanation is that females were more vulnerable to the collapse of support networks during the pandemic given their greater reliance on social circles than males (Etheridge & Spantig, 2021).

However, as restrictive measures were relaxed - and normal modes of socialization became legally permitted - this negative effect may have subsided, accounting for the observed periods of improvement to females' mental health. It should, however, be considered that the pandemic brought unique stressors to all members of the UK young adult population, including the closure of workplaces, educational institutions and exercise outlets (GOV.UK, 2020), which may account for the trajectory of mental health problems in males within the current sample. Albeit, females experienced more mental health problems throughout the pandemic than males, in line with pre-pandemic research showing that UK young adult females have higher GHQ-12 scores than young adult males (Furnham & Cheng, 2019).

Support for the other sociodemographic covariates was mixed. Living with a partner did not appear to be associated with better mental health. However, individuals living with fewer household members appeared to present more mental health problems, corroborating previously demonstrated associations between psychological well-being and social support (Jia et al., 2020; Rosenberg et al., 2021). This further emphasises the importance of enhancing social support services to mitigate pandemic-related psychological distress, especially for those living alone.

In line with previous research (Kwong et al., 2021; Stroud & Gutman, 2021), the current study evidenced a relationship between low-income and poorer mental health in young adults. Young adulthood represents a time of psychiatric vulnerability due to perceived insecurities regarding one's prospects (Arnett et al., 2014). Thus, instability of the global economy and higher rates of unemployment, which may have been particularly heightened for those from lower income households, could account for the high rate of mental health problems in this demographic (Ganson et al., 2021).

No associations between ethnicity and mental health emerged in the present study. However, as the majority of the current analytic sample comprised white participants, mental health variation across specific minority groups may have been underrepresented. Future research employing more diverse samples is warranted.

Finally, the presence of a private garden was associated with fewer mental health problems compared to not having access to any outdoor space, reaffirming the relationship between nature and positive mental health during the early pandemic in young UK adults (Hubbard et al., 2021). By contrast, having access to a shared garden, rooftop garden or terrace, or other outdoor spaces was not associated with lower mental health problems in comparison to having no access. Given that the usage of communal outdoor spaces was prohibited, except for one daily instance of exercise (GOV.UK, 2020), it is possible

that shared and other outdoor spaces were insufficiently utilised to exert the positive effect on mental health observed for private garden usage. As for rooftop gardens and terraces, our findings are discordant with recent literature demonstrating a relationship between positive mental health and access to a rooftop, terrace or balcony (Anaya et al., 2022). However, as the number of respondents with this type of outdoor access was low ($N=57$), the data may not have captured the heterogeneity of responses for this category across the wider population. Future research may consider exploring the influence of these garden categories on mental health outcomes within a more representative participant sample.

In corroboration of previous studies (Kwong et al., 2021; Pierce et al., 2020; Stroud & Gutman, 2021), individuals with a pre-existing emotional, nervous, or psychiatric condition presented significantly more mental health problems compared to those with no pre-existing condition. Moreover, having pre-existing physical health conditions among the 20 examined (e.g., asthma and H.I.V) related to greater mental health problems, perhaps due to increased concerns of mortality in individuals with chronic health conditions compared to physically healthier individuals (Treskova-Schwarzbach et al., 2021). However, the present study failed to discern the relative risk contribution of different medical and/or psychiatric conditions which should be considered in future research.

Exercise and mental health presented no association in the present study. However, this may be explained by the constraints of the available data. For instance, research suggests that while outdoor exercise disengagement is associated with depressive and anxious related symptoms, the relationship between home workouts and mental health is often minor or absent (White et al., 2017). Exercise context was not examined in the current questionnaire, which given the increased popularity of home work-out routines during COVID-19 (Ding et al., 2020), could account for the absence of association revealed. Alternatively, it is possible that MVPA had less bearing on mental health problems compared to the multidimensional system of stressors posed to livelihood and well-being. For instance, COVID-19 has worsened young adults' uncertainty surrounding living arrangements, employment and financial status (Cao et al., 2020; Zhai et al., 2020), in addition to eliciting fears of viral infection and transmission (Bao et al., 2020).

Further Strengths and Limitations

A number of limitations require consideration prior to the application of the current findings. Firstly, covariate data was derived from the initial assessment waves. Several of these factors were subject to change over the course of the pandemic, such as household composition and income, in light of

changes to living situations and the ongoing economic recession, respectively. Therefore, the dynamic influence of these predictors on mental health may not have been captured. Although, interaction terms for significant covariates and the time components were added to the models. Extending existent research, this allowed the association between risk factors identified in April 2020 and the rate of change in mental health outcomes over the three national lockdown periods to be examined. To provide a more temporally sensitive assessment, further research should consider plotting the trajectories of dynamic covariates and assessing their association with the trajectory for mental health.

Additionally, a substantial number of participants were not included in the final analytic sample due to attrition and missing data. Consequently, differences in participant characteristics between the included and excluded samples emerged, which, if better represented, may have yielded significant associations. Furthermore, participants with poor mental health may be more prone to attrition at follow-up (Dupuis et al., 2019), which may have contributed to the observed decreases in mental health problems. Moreover, respondents were predominantly white and female, thereby under-representing the extent of mental health variation among BAME groups and males. Nevertheless, the final sample was large ($N > 1000$) and derived from UKLHS, thus can be considered nationally representative. Further research employing the use of larger, more diverse samples is warranted.

Lastly, the questionnaire limits the scope of the present findings. While the GHQ-12 is a well-validated measurement tool for psychological distress (Gnambs & Staufenbiel, 2018), it provides a non-specific assessment of mental health and is primarily used for screening. Further research should examine data derived from dedicated scales, such as the PHQ-12 or the GAD-9, to understand the pandemic's influence on clinically diagnosable rates of domain-specific mental health problems. Moreover, data were collected via self-report and participants may have misreported their mental health problems. That said, the GHQ-12 has a high level of internal reliability and construct validity (McCabe et al., 1996).

Conclusions

Despite these limitations, the current study provides insight into the trajectory and associated sociodemographic and health-related factors of mental health for UK emerging adults during the COVID-19 pandemic. The findings highlight the importance of improved access to mental health services for young adults with existing physical or mental health problems. Resources may also be directed towards governmental kick-starter job schemes for young adults to promote positive mental health through

improved prospective employment and financial security. Our findings elucidate the variable impact COVID-19 has had on young adult mental health, contributing to the growing body of COVID-19 literature, providing direction for further research, and informing the development of immediate and future interventions.

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Table 1
Characteristics of the measures

Measure	Wave of measurement	Min.	Max.	Mean	SD
Age	1	18	29	24.27	3.41
Household Income	1	1	15	7.15	4.15
Total Household Composition	1	0	9	2.42	1.53
Living With Partner	1	0	1	0.39	0.49
Private garden	2	0	1	0.80	0.40
Shared Garden	2	0	1	0.06	0.24
Balcony, Rooftop Garden or Terrace	2	0	1	0.04	0.20
Other Outdoor space	2	0	1	0.04	0.19
No Outdoor Access	2	0	1	0.08	0.28
Mental Health Condition	1	0	1	0.07	0.26
Physical Health Conditions	1	0	20	0.08	0.26
Moderate-Vigorous Physical Activity	1	0	17.5	3.51	3.98
Mental Health Problems April 2020	1	1	4	2.20	0.55
Mental Health Problems May 2020	2	1	4	2.18	0.55
Mental Health Problems June 2020	3	1	4	2.14	0.53
Mental Health Problems July 2020	4	1	4	2.07	0.51
Mental Health Problems September 2020	5	1	4	2.08	0.51
Mental Health Problems November 2020	6	1	4	2.18	0.55
Mental Health Problems January 2021	7	1	4	2.18	0.58
Mental Health Problems March 2021	8	1	4	2.15	0.55
Mental Health Problems September 2021	9	1	4	2.09	0.53

Note. Min.=Minimum; Max.=Maximum; SD=Standard deviation; Household income unit=£; Moderate-Vigorous Physical Activity=total hours for 7 days prior to assessment.

Table 2*Differences between participants included in the analytic sample and those excluded due to missing data*

Measure	Analytic Sample Mean (SD)	Missing Sample Mean (SD)	degrees of freedom (between groups, within groups)	F-statistic
Age	24.27(3.41)	22.97(3.45)	F(1, 2244)	79.61***
Asian	0.11(0.32)	0.17(0.38)	F(1, 2244)	17.02***
Black	0.02(0.13)	0.04(0.19)	F(1, 2244)	7.73**
Other	0.002(0.04)	0.007(0.09)	F(1, 2244)	3.28**
Total Household Composition	2.43(1.53)	3.07(1.69)	F(1, 2244)	88.99***
Living With Partner	0.39(0.49)	0.25(0.43)	F(1, 2244)	53.71***
Moderate-Vigorous Physical Activity	3.51(3.98)	2.31(3.88)	F(1, 2244)	48.52***
Private Garden	0.80(0.40)	0.88(0.32)	F(1, 1312)	9.61**
Shared Garden	0.06(0.24)	0.01(0.12)	F(1, 1312)	10.28***
No Outdoor Access	0.08(0.28)	0.05(0.21)	F(1, 1312)	4.13*
Mental Health Problems Nov 2020	2.18(0.55)	2.31(0.57)	F(1, 863)	9.27**

Note. Moderate-Vigorous Physical Activity=total number of hours for 7 days prior.

***p < .001, **p < .01, *p < .05.

Table 3
Growth curve model predicting mental health trajectory

Measure	Coef.	SE
For Intercept		
Intercept	2.32***	0.05
Gender	-0.18***	0.01
Household Income	-0.01***	0.00
Total Household Composition	0.02*	0.01
Private Garden	-0.11*	0.04
Shared Garden	0.01	0.06
Balcony, Rooftop Garden or Terrace	0.07	0.07
Other Outdoor space	-0.06	0.07
Mental Health Condition	0.30***	0.05
Physical Health Conditions	0.10***	0.02
For Linear Slope		
Intercept	-0.05***	0.00
Gender x Linear Time	0.02**	0.01
For Quadratic Slope		
Intercept	0.007***	0.00
Gender x Quadratic Time	-0.0009*	0.00
For Cubic Slope		
Intercept	-0.0003***	4.11
Residual Variance		
For Intercept	0.14***	0.00
For Linear Slope	0.0003***	0.00

Note. Coef.=Coefficient; SE.=Standard Error; ***=p < .001; **= p < .01; *=p < .05.

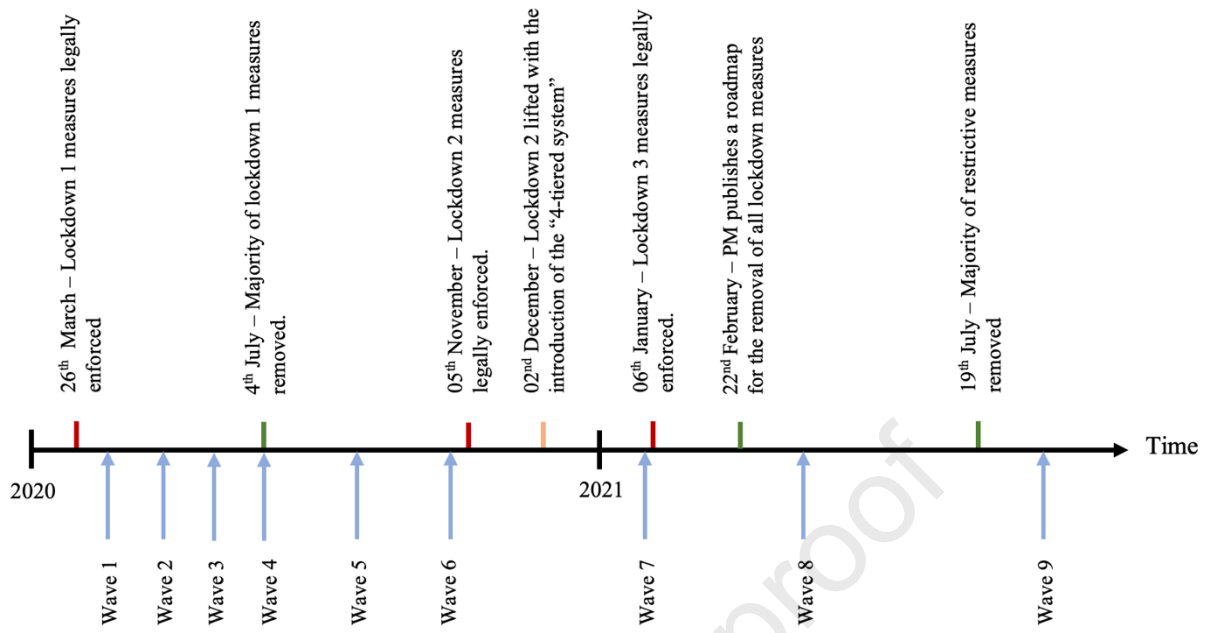


Figure 1. Timeline of measurement waves in relation to the enforcement and removal of the three national lockdown periods.

Color to be used for figure 1

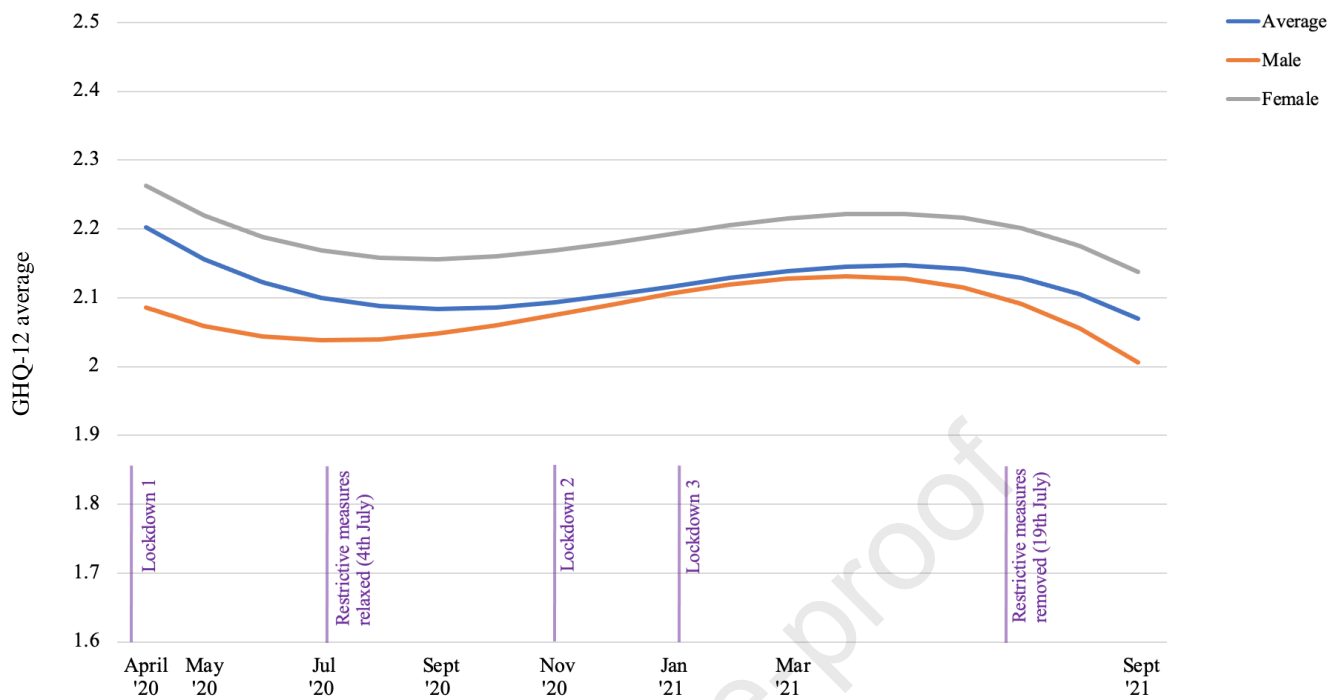


Figure 2. Growth curves showing the trajectory of mental health problems for males, females and the sample average from April 2020 to September 2021.

Color to be used for figure 2

Highlights

- The trajectory of mental health for young UK adults aligned with restrictive measures
- Females experienced comparatively more self-reported mental health problems than males
- Further socio-demographic and health-related factors predicted poor mental health
- Our findings pose utility to immediate and future interventions for at risk groups

Journal Pre-proof

Declarations of interest: none

Journal Pre-proof

William Thorpe: Conceptualization, Formal Analysis, Writing-Original Draft
Preparation. Leslie Gutman: Methodology, Writing-Review and Editing, Supervision.

Journal Pre-proof