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Research paper

The impact of reduced working on mental health in the early months of the COVID-19 pandemic: Results from the Understanding Society COVID-19 study

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ABSTRACT

Background: The COVID-19 pandemic has precipitated an unpredictable economic crisis, currently affecting daily life for millions of workers. We examined the mental health impact of reduced working in a nationally representative sample of employees.

Method: We used Wave one (April 2020) of the Understanding Society UK Household Longitudinal Study (UKHLS) COVID-19 study, with linkage to baseline mental health data from the UKHLS annual survey (January 2017–December 2018). Analysis was based on adults aged 18–65 who were employees in January/February 2020 (n=8,708), with psychological distress assessed using the GHQ-12. Logistic regression examined the mental health impact of reduced working and reasons for the reduction.

Results: Forty two percent of employees reported reduced working by April 2020, with 22% furloughed. There was no evidence of an association between reduced working *per se* and psychological distress in the fully adjusted model (OR=1.06, 95%CI 0.91–1.23). Those permanently laid-off (less than 1% of employees) were most vulnerable to adverse mental health effects in the early months of the pandemic (OR=3.60, 95%CI 1.55–8.37). We also found evidence of higher levels of psychological distress among those sick or self-isolating, and those with reduced working due to caring responsibilities.

Limitations: While the GHQ is a widely used and validated instrument in identifying potential psychiatric disorders, it is important to note that it does not represent a clinical assessment.

Conclusions: Longitudinal examination of employment transitions and mental ill-health related to pandemic outcomes is imperative and should help inform public health responses and ongoing government policy in supporting those adversely affected.

Introduction

Since the outbreak of the global Coronavirus (COVID-19) pandemic daily working life has changed dramatically for millions of workers. The closure of non-essential business in many countries has forced employers across all sectors into rapid decisions about how and where work is conducted, and whether business can continue at all. Employees have experienced fundamental change to their daily lives: many have availed of job retention schemes; others made redundant; face reduced working hours and earnings or precarious and insecure work patterns for the foreseeable future. Additionally, many working families must juggle working from home with home-schooling and childcare demands.

On 23rd March 2020 the United Kingdom (UK) government imposed a strict lockdown of society, including closure of all non-essential businesses. In April an additional 858,000 individuals signed up for job-seekers allowance, representing an increase in the unemployment claimant count of almost 70% in a single month (Office for National Statistics, 2020). By 23rd April, 3.8 million workers were furloughed by 512,000 employers, supported through the government job retention scheme (HM Revenue and Customs, 2020). The putative effects of further redundancy and job insecurity on increasing rates of mental illness is a key public health concern.

Holmes et al. (2020) suggest that the psychological and social effects of the pandemic are pervasive. Their position paper, informed by a

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general population survey (IPSOS MORI, 2020), indicated widespread concerns about mental illness and practical implications - including financial difficulties - of the pandemic response. Such concerns ranked above worries about becoming unwell with COVID-19. In an analysis of the general adult population, Pierce et al. (2020) found evidence of a differential mental health impact of the pandemic according to employment status. Being employed or in retirement before the pandemic were associated with a higher than expected deterioration in mental health. These findings point to particular stressors experienced by those in employment during the early months of the pandemic, which merit a focused analysis on this sub-group.

Studies comparing health status before and after recession generally show an increase in psychiatric disorders. However, cross-sectional studies dominate the evidence-base, limiting the ability to draw conclusions on causality (Frasquilho et al., 2015). People who lose their job in times of recession are more vulnerable to poor mental health outcomes (Drydakis, 2015; Minelli, Pigni, Chiavarini, & Bartolucci, 2014; Price, Choi, & Vinokur, 2002). Similarly, adverse mental health outcomes are associated with precarious work and high job insecurity (Sirviö et al., 2012). The Covid-19 pandemic, however, has resulted in employment transitions that are less well evidenced in terms of the mental health consequences, with little known about the impact among furloughed workers, for example.

The new Understanding Society UK Household Longitudinal Study (UKHLS) COVID-19 study permits examination of the impact of the pandemic and practical responses on work and mental health in the general population. The mental health impact of the pandemic connected with the widespread change in daily working life poses substantial challenges for mental health policy and practice. The monitoring of mental health needs among workers, as well as the wider population, is imperative to help inform government, service providers and employers of groups that should be prioritised in terms of mental health support. In this analysis we test the hypothesis that *reduced working* impacted on mental health in the early months of COVID-19, with further examination of whether different *reasons for reduced working* impacted on mental health, controlling for other individual characteristics.

Methods

Data

The study is based on the first wave (April 2020) of the UKHLS COVID-19 study (the COVID-19 study) - a new general population survey on the experiences and reactions of the UK population to the pandemic (University of Essex, Institute for Social and Economic Research, 2020). The survey is a representative study of the UK general population and includes all members of the main UKHLS samples, with the *active* sample including everyone in households that participated in at least one of the previous two waves of the main annual survey. The April web-based survey included 17,452 individuals, including 15,835 individuals who had completed wave 9 of the main UKHLS study (January 2017 and December 2018). More information on the COVID-19 study, sample, fieldwork and data content are detailed in the study user guide (Institute for Social and Economic Research, 2020). The COVID-19 data were linked to data from wave 9 of the annual UKHLS survey to obtain baseline information on mental health from before the pandemic (University of Essex, Institute for Social and Economic Research, NatCen Social Research, Kantar Public, 2019). All data were accessed from the UK data service.

Measures

Mental health

The primary outcome measure, *psychological distress*, was assessed based on responses to the GHQ-12, a widely used and validated 12-item

screening tool for assessing mental health within the general population (Goldberg and Williams, 1988; Pevalin, 2000; Pierce et al., 2020). Respondents rated their experience of the symptoms in each item on a four-point scale (less than usual, no more than usual, rather more than usual, and much more than usual); this was summarised bimodally (0-0-1-1), and a total score ranging from 0 to 12 was derived. A score of four or more indicated *caseness*, or *psychological distress*, as used previously by the Office for National Statistics in the Mental Health Survey for England (Morris, Earl & Neave, 2017) and UKHLS Covid-10 study 'Health and Caring' briefing report (Benzeval et al., 2020).

Explanatory variables

The study examined the impact of reduced working (dichotomous indicator) and reasons for reduced working (a series of six dichotomous indicators) on mental health. The COVID-19 survey data included information on pre-pandemic (January/February 2020) and current (April 2020) employment status and working hours. A dichotomous indicator of reduced working identified individuals who were employees in January/February 2020 and either reported working fewer hours, or were not in employment in April 2020. Individuals employed at baseline with reduced working provided reasons for the reduction, with responses: (1) laid off with certain recall date; (2) laid off with prospect of recall; (3) permanently laid off; (4) employer cut hours; (5) on furlough/paid leave; (6) using annual leave; (7) self-isolating/sick with company sick pay; (8) self-isolating/sick with statutory sick pay; (9) self-isolating/sick without sick pay; (10) caring for children or others/parental leave; and (11) other reasons. Because respondents could indicate multiple reasons for the reduction the eleven responses were summarised as six dichotomous indicators: *employer cuts*, *furloughed/paid leave*, *self-isolating/sick*, *permanently laid off*, *caring for children/others*, and *other reasons*.

Individual characteristics known to be associated with mental health and/or working status were controlled for in the models. These included age-group (10-year age bands); sex; living in a couple (yes/no); ethnicity (white (British), white (non-British), mixed ethnicities, Asian, black, and other); baseline household weekly earnings (in quintiles); and subjective assessment of current financial situation (grouped as: comfortable; just about getting by; or finding it difficult/very difficult). Final models controlled for psychological distress at baseline to account for individuals with pre-existing mental conditions, as indicated by GHQ *caseness* derived from the main UKHLS Wave 9 survey (2017/18).

Analysis

Analysis was based on all individuals aged 18-65 years who indicated that they were employees in January/February 2020 ($n=8,708$). Throughout the paper, the term *employees* refers to those who were employees at baseline. Frequencies examined sample characteristics of employees. The prevalence of psychological distress at baseline and April 2020 was estimated across all characteristics. This was determined as the proportion within each group with GHQ scores of four and above. Prevalence estimates presented in tables represent weighted estimates, with weighting of analysis described below. Two-tailed paired-proportions tests examined differences in baseline and April 2020 psychological distress. Mean GHQ scores were also graphed and presented for selected characteristics related to reduced working in supplementary material.

In order to maximise the sample, while taking into account the sample stratification, clusters and weights, a Monte Carlo integration algorithm was used. Model estimates were obtained using a robust maximum likelihood with a logit link function. Logistic regression firstly examined crude associations of each explanatory variable with psychological distress. Likelihood ratio tests assessed for a linear trend for both age-group and baseline weekly household earnings. Based on comparison of models, age was retained as a categorical variable, while a linear trend was assumed for household earnings. Two sets of incrementally developed logistic regression models examined the association

between *psychological distress* in the early pandemic phase with both (a) reduced working, and (b) the six reasons for reduced working. In both: Model 1 adjusted for age, sex, living in a couple and ethnicity; Model 2 additionally including baseline weekly household earnings and subjective assessment of current financial situation; and finally Model 3, adding baseline psychological distress. Results, unless otherwise stated, are based on the reported confidence intervals since these allow for non-normality. This result indicates statistical significance (0.05 level) when the value one lies outside the range of the confidence interval. Given that data on baseline GHQ was collected on different months between 2017 and 2018, sensitivity analyses were conducted for the potential effect of quarterly season (January – December), with the first quarter used as the reference category. The inclusion of a measure of quarterly season had no theoretical effect (statistical) on the model results and there was no difference (0.05 level) between the quarterly seasons.

Descriptive statistics were produced using Stata version 14 (Stata-Corp 2015). Monte Carlo integration and logistic regression models, including sensitivity analyses were produced using Mplus version 8.4 (Muthén & Muthén, 1998-2017). Analysis accounted for the clustered and stratified nature of the survey design and were weighted to adjust for unequal selection probabilities and differential response bias. The weighting variable within the COVID-19 survey data is a product of the main UKHLS Wave 9 cross sectional analysis weight, with an additional adjustment for differential non-response to the April COVID-19 study. In-depth information on weighting procedures is provided in the study user guide (Institute for Social and Economic Research, 2020).

Missing data

Analysis of patterns of missing GHQ data show 8% of the sample had missing data for the outcome variable, with the majority (7%) missing across all 12 GHQ items. Where data was missing on all GHQ response items, these respondents were excluded from the analysis. Where data was missing on the covariates, the variance of the variable was used in the estimation of models under an assumption of normality. Missing data was assumed to be missing at random (Bollen, 1989; Little & Rubin, 2002) and a robust maximum likelihood approach was used as the default with a model-based estimation strategy to address missing data (Finney & DiStefano, 2013). Covariate measures were explicitly brought into the model in order to deal with missingness in the covariate variables. This is possible if the covariates being brought into the model are given a distributional assumption (Muthén, Muthén, & Asparouhov, 2016).

Results

Sample characteristics

Among all adults aged 18-65, 67.1% (n=8,708) were employed, 9.3% self-employed, 2.4% both employed and self-employed and 21.2% not in employment in January/February 2020. Among employees (n=8,708): 54.1% were female (Table 1); 67.6% were living as part of a couple; 87.9% were white (British) (with 4.3% white (non-British), 1.4% mixed ethnicity, 4.1% Asian, 1.9% Black and 0.4% other); 6.4% were in the lowest earnings quintile (with 25.3% in the highest); 77.2% assessed their current financial situation as *comfortable*; 17.7% as *just about getting by*, with 5.2% *finding it difficult/very difficult*. Over two-fifths of employees (42.2%) reported reduced working at April 2020, indicating reasons - 21.7% furloughed/on paid leave; 12.2% reported other reasons, for example using annual leave or no longer working overtime. Smaller proportions reported reductions due to employer cuts (4.4%), self-isolation or sickness (2.6%), permanent lay-off (0.9%), and caring for children or others (2.5%).

Prevalence of psychological distress at baseline and at April 2020

Psychological distress (as indicated by a GHQ score of four or more) increased amongst all employees between baseline and April 2020,

Table 1
Sample characteristics of persons employed at baseline aged 18-65 years.

	n	Sample characteristics (%; 95%CI)	Prevalence of psychological distress at baseline(%; 95%CI)	Prevalence of psychological distress April 2020(%; 95% CI)
Age-group:				
18-24	717	11.1 (10.1, 12.3)	27.8 (23.3, 32.9)	46.2 (40.6, 51.9)
25-34	1,469	12.3	32.9	51.9
35-44	2,061	19.7 (18.5, 21.1)	21.8 (18.8, 25.1)	39.9 (36.1, 43.9)
45-54	2,498	21.1	25.1	43.9
55-65	1,963	22.3 (21.1, 23.5)	19.1 (16.7, 21.6)	32.0 (29.1, 35.0)
Sex:				
Male	3,479	23.5	21.6	35.0
Female	5,229	25.2 (24.0, 26.4)	18.2 (16.2, 20.4)	35.2 (22.9, 27.6)
Living as a couple:				
Yes	6,375	21.7 (20.6, 22.8)	18.1 (16.0, 20.4)	25.6 (23.2, 28.2)
No	7,015	22.8	20.4	28.2
Yes	395	45.9 (44.4, 47.4)	15.8 (14.1, 17.6)	23.4 (21.4, 25.6)
Ethnicity:				
White (British)	650	54.1 (52.6, 55.6)	23.9 (22.2, 25.6)	38.9 (37.0, 40.9)
White (Non-British)	234	32.4 (30.9, 33.9)	25.7 (23.2, 28.3)	39.8 (36.9, 42.8)
Mixed	1,314	67.6 (66.1, 69.1)	17.5 (16.2, 18.9)	28.0 (26.5, 29.6)
Asian	1,620	69.1	18.9	29.6
Black	2,012	87.9 (86.8, 88.8)	20.4 (19.1, 21.7)	31.2 (30.2, 33.3)
Other	2,012	88.8	21.7	33.3
Weekly baseline earnings (£):				
0-	6,607	4.3 (3.7, 5.0)	14.9 (10.5, 20.6)	32.0 (25.3, 39.5)
1-363	1,363	1.4 (1.1, 1.8)	20.6	39.5
402	402	4.1 (3.6, 4.7)	26.9 (17.6, 38.7)	35.2 (23.7, 48.6)
5,143	5,143	1.9 (1.5, 2.4)	38.7	48.6
165-	3,565	0.4 (0.3, 0.7)	19.9 (15.0, 25.9)	34.2 (27.5, 41.6)
438-	8,294	6.4 (5.6, 7.2)	25.9	41.6
692-	407	19.8 (18.5, 21.2)	19.9 (11.8, 31.5)	26.5 (16.8, 39.3)
950-	7,046	21.2	31.5	39.3
Subjective financial situation:				
Comfortable	1,655	22.7 (21.4, 24.1)	23.1 (7.8, 51.7)	46.9 (22.2, 73.3)
Just about getting by	8,468	24.1	51.7	73.3
Finding it difficult/very difficult	233	25.9 (24.5, 27.3)	32.1 (26.2, 38.8)	37.6 (31.2, 44.5)
Comfortable	8,630	27.3	38.8	44.5
Just about getting by	71	25.3 (24.0, 26.7)	22.5 (19.4, 25.9)	33.7 (30.1, 37.6)
Finding it difficult/very difficult	8,459	26.7	25.9	37.6
242	242	77.2 (75.8, 78.5)	20.6 (18.0, 23.4)	33.5 (30.3, 36.8)
7,601	7,601	78.5	23.4	36.8
1,100	1,100	17.7 (16.5, 18.9)	18.4 (16.1, 20.9)	28.0 (25.3, 30.8)
Reduced working:				
No	5.2 (4.5, 5.9)	16.2 (14.0, 18.7)	30.0 (27.1, 32.8)	32.8
Yes	59.2	17.9 (16.7, 19.3)	27.7 (26.2, 29.3)	27.7 (26.2, 29.3)
Employer cuts:				
No	42.2 (40.8, 43.7)	24.4 (21.3, 27.7)	40.2 (36.5, 44.1)	44.1
Yes	95.6 (94.9, 96.1)	38.8 (32.9, 47.1)	66.5 (59.2, 73.1)	73.1
Furloughed/paid leave:				
No	4.4 (3.9, 5.1)	47.1	29.3 (27.5, 31.2)	29.3 (27.5, 31.2)
Yes	79.6	20.6	35.0 (32.8, 37.4)	37.4
Self-isolating or sick:				
No	21.7 (20.4, 23.0)	21.8 (19.9, 23.8)	31.6 (30.2, 33.1)	33.1
Yes	97.5 (96.9, 97.9)	19.8 (18.6, 21.1)	36.2 (29.6, 43.4)	43.4
Permanently laid off:				
No	99.2 (98.8, 99.4)	20.6 (19.3, 22.0)	31.7 (30.1, 33.4)	33.4
Yes	0.9 (0.6, 1.2)	22.0	32.3 (29.2, 35.6)	35.6
Caring for children/others:				
No	97.5 (97.0, 97.9)	18.6 (16.1, 21.3)	31.5 (30.1, 33.0)	33.0
Yes	2.5 (2.1, 3.0)	19.9 (18.7, 21.1)	43.5 (34.4, 53.0)	53.0
Other reasons:				
No	87.8 (86.8, 88.8)	31.3 (23.1, 40.9)	69.4 (51.2, 83.0)	83.0
Yes	12.2 (11.24, 13.2)	20.1 (18.9, 21.4)	31.5 (30.1, 33.0)	33.0
Other reasons:				
No	23.7 (11.7, 42.4)	19.8 (18.6, 21.1)	31.5 (30.0, 32.9)	32.9
Yes	42.4	32.9 (24.8, 42.4)	46.2 (37.1, 55.3)	55.3

(continued on next page)

Table 1 (continued)

n	Sample characteristics (%; 95%CI)	Prevalence of psychological distress at baseline(%; 95%CI)	Prevalence of psychological distress April 2020(%; 95% CI)
		42.3)	55.5)
		19.9 (18.6, 21.2)	31.4 (29.9, 33.0)
		22.1 (18.7, 25.8)	34.8 (30.6, 39.2)

Frequencies represent true n values (unweighted). Percentages and prevalence rates are weighted estimates, with a cut-off GHQ score of 4 or more indicating psychological distress.

95% CI, 95% confidence interval

Prevalence rates presented are based on all available data at baseline and April 2020 respectively.

Two-tailed paired-proportions tests (based only on those with GHQ data at both time-points) show a significant difference between baseline and April 2020 psychological distress at the 5% level across all characteristics, with the exception of those of mixed ethnicity.

increasing from 20.1% to 31.8%, with prevalence similarly higher across all sample characteristics over time (Table 1). For those with reduced working, 35% reported psychological distress in April compared with 21.8% at baseline, while distress increased from 23.7% at baseline to 69.4% in April for those who were permanently laid off. Graphs showing mean baseline and April 2020 GHQ scores for employment-related characteristics are available in Supplementary Material Figures 1-7.

Reduced working and psychological distress

Logistic regression models examining the association between reduced working and psychological distress are presented in Table 2. In the univariable analysis: reduced working was associated with greater psychological distress (OR=1.30, 95%CI=1.14-1.49); females and those not living in a couple were also more likely to report psychological distress (OR=2.09, 1.82-2.40 and OR=1.70, 1.47-1.96 respectively); older age appears protective; and those with higher baseline weekly

Table 2

Logistic regression models showing the association between reduced working and psychological distress among employees aged 18-65

	Univariable association with psychological distress		M1: adjustment for socio-demographic characteristics		M2: M1 + adjustment for socio-economic characteristics		M3: M2 + adjustment for baseline psychological distress	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Reduced working hours (reference: no)								
Yes	1.30	1.14, 1.49	1.21	1.06, 1.40	1.05	0.91, 1.22	1.06	0.91, 1.23
Age category (reference: 18-24)								
25-34	0.55	0.42, 0.71	0.71	0.54, 0.95	0.63	0.46, 0.85	0.66	0.48, 0.89
35-44	0.39	0.30, 0.51	0.50	0.38, 0.67	0.42	0.31, 0.56	0.44	0.33, 0.59
45-54	0.40	0.31, 0.52	0.51	0.39, 0.67	0.45	0.33, 0.60	0.47	0.35, 0.64
55-65	2.09	1.82, 2.40	2.04	1.77, 2.35	2.15	1.86, 2.49	2.05	1.77, 2.37
Sex (reference: male)	1.70	1.47, 1.96	1.33	1.13, 1.57	1.24	1.04, 1.49	1.21	1.001, 1.46
Living in a couple (reference: yes)	1.01	0.73, 1.41	1.07	0.77, 1.48	1.03	0.74, 1.43	1.09	0.79, 1.52
Ethnicity (reference: white (British)):								
White (non-British)	1.17	0.68, 2.02	0.97	0.54, 1.76	0.89	0.49, 1.64	0.86	0.47, 1.56
Mixed	1.12	0.82, 1.52	1.06	0.75, 1.49	0.97	0.69, 1.37	1.01	0.71, 1.42
Asian	0.78	0.43, 1.40	0.68	0.38, 1.24	0.52	0.29, 0.91	0.52	0.28, 0.96
Black	1.90	0.57, 6.36	1.56	0.50, 4.88	1.77	0.56, 5.57	1.68	0.53, 5.35
Other	0.92	0.86, 0.97			1.06	0.99, 1.14	1.08	1.01, 1.17
Baseline household earnings (reference: <£165)	1.76	1.47, 2.11			1.97	1.62, 2.39	1.90	1.56, 2.31
Subjective financial situation (reference: comfortable)	5.20	3.78, 7.15			5.69	4.03, 8.04	5.03	3.51, 7.19
Just about getting by	3.32	2.83, 3.91					2.85	2.41, 3.38
Finding it difficult/very difficult								
Baseline psychological distress (reference: no)								

Sensitivity analysis examining potential seasonal effects is included in supplementary material.

OR, odds ratio; 95% CI, 95% confidence interval.

Significant associations at the 5% level are shown in bold.

household earnings were also less likely to report distress (OR=0.92, 0.86-0.97). In relation to current financial situation - when compared to workers who were *comfortable*, those *finding it difficult/very difficult* were more likely to report distress (OR=5.20, 3.78-7.15).

After adjusting for socio-demographic characteristics (Table 2, M1) higher likelihood of psychological distress among those with reduced working remained (OR=1.21, 95%CI=1.06-1.40), but was slightly attenuated compared to the crude association. Following adjustment for baseline household earnings and subjective assessment of current financial situation (M2), which had a particularly strong confounding affect, the association with reduced working diminished, with no further change recorded following adjustment for baseline mental health (M3).

Other individual characteristics associated with psychological distress

In the final model with adjustment for baseline psychological distress, female employees were more than twice as likely as males to have psychological distress in April 2020 (OR=2.05, 1.77-2.37). There was also strong evidence of higher likelihood of distress among those who reported experiencing financial difficulties (OR=5.03, 3.51-7.19 for those *finding it difficult/very difficult*). There was weaker evidence of poorer mental health among employees not living in a couple (OR=1.21, 1.001-1.46) and, in a reversal of the trend from univariable analysis, among those with higher income levels (OR=1.08, 1.01-1.17). The protective effects at older ages remained (OR=0.44, 0.33-0.59 for those aged 45-54), while there was also evidence of reduced likelihood of psychological distress among employees of black ethnicity (OR=0.52, 0.28-0.96).

Reasons for reduced working and psychological distress

Table 3 examines the association between psychological distress and the reasons specified for reduced working. Univariable analysis indicates that employees self-isolating/sick, permanently laid-off or in caregiving roles were more likely than other employees to be distressed (OR=1.67, 95%CI=1.13-2.47; OR=4.93, 2.24-10.87; OR=1.87, 1.28-2.73 respectively). Three multivariable logistic regression models are presented, adjusting for other individual characteristics. Redundancy was consistently associated with poorer mental health. Although

Table 3

Logistic regression models showing the association between reasons for reduced working and psychological distress among employees aged 18-65

	Univariable association with psychological distress		M1: adjustment for socio-demographic characteristics		M2: M1 + adjustment for socio-economic characteristics		M3: M2 + adjustment for baseline psychological distress	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Employer cuts (reference: no)	1.23	0.90, 1.67	1.24	0.91, 1.70	1.10	0.80, 1.52	1.05	0.76, 1.46
Furloughed/paid leave (reference: no)	1.03	0.87, 1.21	1.03	0.86, 1.22	0.88	0.73, 1.05	0.91	0.76, 1.09
Self-isolating or sick (reference: no)	1.67	1.13, 2.47	1.68	1.11, 2.52	1.56	1.03, 2.35	1.44	0.93, 2.24
Permanently laid off (reference: no)	4.93	2.24, 10.87	5.27	2.34, 11.90	3.52	1.56, 7.95	3.60	1.55, 8.37
Caring for children/others (reference: no)	1.87	1.28, 2.73	1.72	1.17, 2.52	1.57	1.06, 2.33	1.44	0.94, 2.19
Other reasons (reference: no)	1.16	0.95, 1.43	1.09	0.88, 1.34	1.07	0.86, 1.33	1.06	0.85, 1.33
Age category (reference: 18-24)			0.94	0.70, 1.26	0.82	0.61, 1.12	0.87	0.64, 1.18
25-34			0.69	0.51, 0.92	0.60	0.44, 0.83	0.64	0.47, 0.87
35-44			0.49	0.37, 0.65	0.40	0.30, 0.55	0.43	0.32, 0.58
45-54			0.50	0.37, 0.66	0.44	0.32, 0.59	0.46	0.34, 0.63
55-65			2.03	1.76, 2.34	2.13	1.85, 2.47	2.04	1.76, 2.36
Sex (reference: male)			1.33	1.13, 1.58	1.24	1.03, 1.50	1.21	1.00, 1.46
Living in a couple (reference: yes)			1.02	0.73, 1.41	0.97	0.70, 1.35	1.05	0.75, 1.45
Ethnicity (reference: white (British)):			0.99	0.55, 1.79	0.90	0.49, 1.65	0.86	0.47, 1.57
White (non-British)			1.00	0.71, 1.41	0.92	0.65, 1.31	0.96	0.67, 1.35
Mixed			0.68	0.38, 1.22	0.51	0.29, 0.90	0.51	0.28, 0.95
Asian			1.55	0.51, 4.76	1.76	0.58, 5.40	1.70	0.53, 5.46
Black					1.06	0.99, 1.14	1.08	1.003, 1.16
Other					1.96	1.61, 2.38	1.88	1.54, 2.30
Baseline household earnings (reference: <£165)					5.67	4.01, 8.01	4.96	3.47, 7.08
Subj financial situation (reference: comfortable)							2.81	2.37, 3.33
Just about getting by								
Finding it difficult/very difficult								
Baseline psychological distress (reference: no)								

Sensitivity analyses examining seasonal effects is available in supplementary Material

OR, odds ratio; 95% CI, 95% confidence interval.

Significant associations at the 5% level are shown in bold.

adjustment for socio-economic characteristics (M2) reduced the effect size (OR=3.52, 1.56-7.95), evidence of increased likelihood of psychological distress among those permanently laid off remained following adjustment for baseline psychological distress in M3 (OR=3.60, 1.55-8.37). Evidence of an association between psychological distress among employees due to self-isolation/sickness and caring responsibilities remained after adjusting for socio-demographic and socio-economic characteristics (OR=1.56, 1.03-2.35 and OR=1.57, 1.06-2.33). These associations attenuated however after controlling for baseline psychological distress in M3. There was no evidence of an association of employer cuts, being furloughed or other reasons for reduced hours with psychological distress. In the fully adjusted model, employees who were furloughed had lower likelihood of psychological distress, but this association was not statistically significant.

Given that month of baseline data collection varied across the sample, while the outcome was measured in April, 2020, sensitivity analyses examined potential seasonal effects based on fully adjusted models presented in Tables 2 and 3 - these showed no evidence of association of psychological distress in April 2020 with yearly quarter of baseline interview or changes in the associations of any of the characteristics considered. Results from sensitivity analyses are included in supplementary material.

Discussion

While the mental effects of economic crises have been well documented (Barr et al., 2015; Evans-Lacko et al., 2013; Frasquilho et al., 2015; Jahoda, 1988; Katikireddi et al., 2012; Modrek et al., 2013) the COVID-19 pandemic crisis has impacted population mental health across multiple dimensions. This study reports on the mental health impact of reduced working among employees aged 18-65 in the UK population in the early months of the COVID-19 pandemic.

Our findings show that the prevalence of psychological distress was higher in April 2020 than pre-pandemic levels across all characteristics of employees, reflecting findings from other early studies during the

pandemic showing a decrease in psychological wellbeing (Vindegaard & Benros 2020). We found, however, that following adjustment for socio-economic characteristics and baseline psychological distress, reduced working *per se* was not associated with psychological distress in April 2020. Assessment of current financial situation had a particularly strong confounding effect, suggesting that reduced working was not associated with psychological distress in the early months of the pandemic over and above the experience of financial difficulties. Notwithstanding, our study suggests that deterioration in mental health is not evenly distributed among employees, and most strongly associated with redundancy. To a lesser degree, reduced hours due to caring responsibilities and self-isolation or sickness may be risk factors, with the experience of financial difficulties again having strong confounding effects.

Reduced working due to redundancy

Deterioration of mental health after redundancy is well documented (Frasquilho et al., 2015; Evans-Lacko et al., 2013; Modrek et al., 2013; Olesen, Butterworth, Leach, Kelaher, & Pirkis et al., 2013; Thomas, Benzeval, & Stansfield, 2007). Evidence from recent global recessions (McKenzie, Gunasekara, Richardson, & Carter, 2014; Olesen et al., 2013) highlight the impact of debt, financial strain, increased uncertainty, loss of structure and loss of purpose and identity, previously noted as key contributors to positive mental wellbeing (Bakke, 1940; Jahoda, 1981). Several studies underline the complex association between mental health and job loss, noting that poor mental health may be a risk factor for job loss, as well as a consequence (Evans-Lacko et al., 2013; Olesen et al., 2013). In a cross-sectional study of 27 European countries before and after the 2007/08 economic crisis, Evans-Lacko (2013) noted that individuals with pre-existing mental health problems were more vulnerable to redundancy. However, in our study, the adverse impact of job loss on mental health remained after controlling for baseline psychological distress. It is important to note that those who were permanently laid off represent a very small proportion of

employees and findings should therefore be treated with caution. Nonetheless, as the jobless figure in the UK and elsewhere continues to rise, longitudinal tracking of this at-risk group is necessary to inform both the healthcare response and government policy in supporting these individuals.

Reduced working due to caring responsibilities

Our study found some evidence of a higher risk of poorer mental health among individuals with reduced working hours due to caring responsibilities – although effect size diminished following adjustment for baseline psychological distress. Lockdown has had a dramatic impact on daily lives of working families, with many workers accumulating additional home-schooling, childcare and other caring responsibilities. These additional demands coupled with the pressure of continued remote working and the demands of maintaining productivity levels can increase stress and mental health problems. Our study did not consider the differential impact of reduced working on lone parents, which merits a further more focused investigation. Findings from a COVID-19 study briefing paper show that psychological distress increased with the number of hours spent home-schooling or doing housework for both men and women (Benzeval et al., 2020). Family disruption is noted elsewhere as having negative impact on mental health problems (WHO, 2011). Our finding is also consistent with the ‘role strain’ model alluded to by Oomens, Geurts and Scheepers (2007), which purports that individuals occupying multiple social roles experience role conflict, resultant stress and adverse mental health.

Reduced hours due to self-isolation or sickness

We also found weak evidence of poorer mental health among workers who had reduced working hours due to self-isolation or sickness. A rapid review (Brooks et al., 2020) found consistent evidence on the negative effects of quarantine, with particular stressors during including longer duration of quarantine, fear of infection, financial loss and stigma. The stay at home and social distancing policies are likely to increase loneliness and isolation (Holmes et al., 2020; The Academy of Medical Sciences, 2020)- risk factors for more serious mental health disorders (Cacioppo, Hughes, Waite, Hawkey, & Thisted, 2006; Leigh-Hunt et al., 2017; Losada et al., 2012).

Impact on furloughed employees

The World Health Organization (WHO) suggests that active labour market programmes aimed at helping people retain and quickly regain employment can be an effective government response in mitigating the adverse mental health effects of recession (WHO, 2011). Such programmes may include public employment services, labour market training or specific programmes aimed at youth. Our study found no evidence of poorer mental health among furloughed employees in the early months of the pandemic. While the government furlough scheme is qualitatively different from such programmes, it may have alleviated financial strain in the short term and potentially mitigated the adverse impact of employment transitions on mental health. However, many industries face an uncertain future. While furloughed workers in some sectors may have genuine prospects of return to work, for others the furlough scheme may be postponing inevitable redundancy. A report assessing the ‘near-term’ impact of the COVID-19 on United States workers suggests that up to one third of jobs may be ‘vulnerable’ (Lund, Ellingrud, Hancock, Manyika, & Dua, 2020). As lockdown continues and job security among those on furlough becomes more precarious, thus undoing the relative protective effect, it is important that employment transitions and related mental health outcomes among this group are monitored.

Other characteristics associated with poorer mental health

Our study found that increasing age was associated with better mental health, while female sex and not living in a couple were associated with poorer mental health during the early months of the pandemic. The greater adverse mental health impact on female employees reflects evidence of elevated risk among females from other early studies on the mental health consequences of the pandemic (Vindgaard et al., 2020; Pierce et al. 2020) and highlights the need to prioritise the mental health needs of women during a pandemic. The challenge faced by women managing multiple roles during the pandemic is highlighted by Benzeval and colleagues (2020) who estimated that, regardless of employment status, UK women spend more weekly hours on childcare and home-schooling. Etheridge and Spantig (2020) however, examining the gender gap in mental wellbeing during the pandemic, found that the bulk of the gap was explained by social factors, including increased loneliness among women following the pandemic onset.

Consistent with findings relating to the general population reported by Pierce et al. (2020), we found a lower risk of psychological distress among black employees after adjusting for socio-economic factors and baseline GHQ. It may be that black and minority ethnic workers are more likely to be employed in precarious sectors of the economy, relative to their white counterparts (Catney & Sabater, 2015) and are, consequently, more inured to the psychological effects of employment transitions. In contrast, we found a deterioration in mental health among employees in higher income households, following adjustment for baseline psychological distress, reflecting greater levels of *change* in mental health status among higher earners. It is important to note that for some people, reduced working hours and lower salary may be offset during the lockdown by substantially reduced travelling costs, lower tax and less personal and household expenditure. The differential responses among black and high earners adds to the importance of the subjective assessment of current financial situation, with strong evidence both associating it with poorer mental health, but also its role in attenuating the effects of reduced working. Thomas et al. (2007) specifically examined the role of subjective financial position as a mediator in the effects of employment transitions on psychological distress in a longitudinal analysis of the British Household Panel Survey. Their study found that both negative effects of transitions such as unemployment and beneficial effects of reemployment were partially mediated by financial position, findings in line with those presented here.

Strengths and Limitations

In this study, psychological distressed was determined using a threshold score of four or more on the GHQ-12. While the GHQ is a widely used and validated instrument in identifying potential psychiatric disorders, it is important to note that it does not represent a clinical assessment. With a focus on *caseness*, and by controlling for baseline psychological distress in final models, our study provides insight into *changes* in levels of psychological distress. Our study does not provide evidence on the extent to which mental health among workers with pre-existing mental conditions may have been exacerbated by the pandemic, findings evidenced, however, in other studies (Van Rheenen et al., 2020). A further limitation of our study is the exclusion of those who were self-employed at baseline. These individuals were asked tailored follow-up questions on reasons for reduced working - different to those asked of employees. Early research on the economic impact of the pandemic indicates that the self-employed are more likely to work in ‘at risk’ sectors and therefore more vulnerable to adverse effects (Henley and Reuschke, 2020). The particular mental health effects of the pandemic on the self-employed merit further dedicated analysis of this heterogeneous group. A further limitation is associated with aggregation of the 11 original ‘reasons for reduced working’ into six categories. For example, employees that indicated reasons for reduced working as ‘laid

off with certain recall date'; 'laid off with prospect of recall' or 'employer cut hours' were grouped into the 'employer cuts' category. A more nuanced analysis of all 11 items would have been preferable, but not possible given small numbers.

These limitations are balanced by some notable strengths. This study presents one of the first analyses - based on a nationally representative sample - of the mental health impact of employment transitions following the COVID-19 pandemic. While analysis is based on the first monthly wave of the new US COVID-19 study, baseline information on employment status prior to the pandemic and mental health from the most recent wave of the main UKHLS annual survey, allows inferences to be made about the temporal relationship between mental health and employment changes in the early months of COVID-19.

Conclusion

Our study provides an important insight into the early mental health consequences of the COVID-19 pandemic on people in employment before the onset of the pandemic. We show that the effects of reduced working are heterogenous, depending on the reasons behind the reductions - with strong evidence of redundancy and some evidence of reductions in working due to sickness/ self-isolation and caring responsibilities being deleterious. While our study found no evidence of adverse mental health effects among furloughed workers, winding down of job retention schemes and further redundancies in vulnerable sectors will have ongoing implications for mental health. Longitudinal examination of employment transitions and mental ill-health related to pandemic outcomes is imperative and should help inform public health responses and ongoing government policy in supporting those adversely affected.

Authorship contribution statement

Dr Ferry designed the study, conducted analyses and drafted the manuscript. Professor Bunting also conducted analyses and drafted the manuscript. Dr Rosato, Dr Curran and Professor Leavey assisted with study design, including the analytic strategy and reviewed and edited all sections of the manuscript.

Conflicts of Interest

None.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.jad.2021.03.042](https://doi.org/10.1016/j.jad.2021.03.042).

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