Wellbeing during the COVID-19 pandemic in the UK: a secondary data analysis

Jen Murphy*and Mark Elliot*

21 June 2021

*Department of Social Statistics,School of Social Sciences,University of Manchester, Oxford Road, M13 9PL, Manchester, UK. Address for correspondence: jennifer.murphy@manchester.ac.uk

Abstract

Introduction: In March 2020 in response to the COVID pandemic the UK government declared a national lock down where citizens were required to stay at home. The impact of this lockdown on levels of well-being has been a source of concern for citizens and mental health professionals.

Objectives: We investigated the trajectory of well-being over the course of the first wave and sought to determine whether the change in well-being is distributed equally across the population. Specifically we investigated pre-existing medical conditions, social isolation, financial stress and deprivation as a predictor for well-being and whether there were community level characteristics which protect against poorer well-being.

Methods: Using online survey responses from the COVID-19 modules of Understanding society, we linked 8,379 English cases across five waves of data collection to location based deprivation statistics. We used ordinary least squares regression to estimate the association between deprivation, pre-existing conditions and socio-demographic factors and the change in well-being scores over time, as measured by the GHQ-12 questionnaire.

Results: A decline in well-being was observed at the beginning of the first lock down period at the beginning of March 2020. This was matched with a corresponding recovery between April and July as restrictions were gradually lifted. There was no association between the decline and deprivation, nor between deprivation and recovery. The strongest predictor of well-being during the lock down, was the baseline score, with the counterintuitive finding that for those will pre-existing poor well-being, the impact of pandemic restrictions on mental health were minimal, but for those who had previously felt well, the restrictions and the impact of the pandemic on well-being were much greater.

Conclusion: These data show no evidence of a social gradient in well-being related to the pandemic. In fact, well-being was shown to be highly elastic in this period indicating a national level of resilience which cut across the usually observed health inequalities.

1 Introduction

In early 2020, reports of a novel respiratory virus with a high mortality rate began to emerge from China. The World Health Organisation declared a global pandemic on 11th March 2020 (WHO 2020). To date, the pandemic is recorded as causing over 150,000 deaths in the UK (UK Government 2021), however non-Covid attributable excess mortality has also been observed. Kontopantelis et al. (2020) reported on excess mortality during the first wave of the virus of c. 10,000 excess deaths in England and Wales, unrelated to COVID-19. These data show geographical and social patterns with excess mortality varying from 1 per 100,000 in Wales, to 26 per 100,000 in the West Midlands showing that the pandemic has had a measurably different effect on different regions.

In response to the rising prevalence the disease in the UK, the government declared a 'lock-down' where citizens were required to stay at home beyond a very limited number of sanctioned reasons (UK Government 2020b). Mass gatherings were banned, travel was restricted. Leaving the home was restricted to those working in so-called 'key-worker' roles such as healthcare, education and the food system. Non key-workers were permitted to exercise alone outside of the home once daily, and to make trips for essential supplies. All non-essential services were closed including shops and leisure facilities. Non-emergency care was seriously compromised with many routine care services stopping for several months including cancer diagnostics, chemotherapy, surgery and outpatient clinics.

We hypothesise that as a result of the pandemic and the accompanying lock-down, wellbeing has been impacted and that there are likely to be widespread indirect effects important to policymakers and health professionals as the population recovers. Studies using the UK Household Longitudinal Study show that there has been a deterioration in the average mental health of respondents when comparing data waves before and early in the pandemic. Proto and Quintana-Domeque (2021) report that the extent of the deterioration varies by ethnicity

and by gender. Pierce et al. (2020) explored the trend in UK mental health, demonstrating that there had been a deterioration compared with pre-COVID-19 trends, highlighting greater increases for younger adults, women, and people living with young children. Holmes, O'Connor, et al. (2020) call for resources to be deployed to understand the varied effects, collecting data and conducting multidisciplinary research to ensure efficient targeting of policy mitigations. The authors specifically reference mental health, and the growing threat of virus mitigation measures, alongside the potential physiological effects of contracting the virus on brain function and mental health in patients testing positive with COVID-19.

In this paper we use the UK Household Longitudinal Study, Understanding Society (Understanding Society 2020) to investigate the trajectory of wellbeing over the course of the first wave (defined as April-July 2020) and analyse whether any change in wellbeing is associated with social and demographic factors. In the next section we discuss the background to the pandemic and factors which may affect wellbeing. In section 3, we introduce the dataset used and the methods applied. Results are presented in section 4. Section 5 contains the discussion of findings, followed by an appraisal of the strengths and weaknesses of the work in section 6. We conclude in section 7.

2 Background: factors affecting wellbeing in a pandemic

The global pandemic has been a period of extreme stress and challenge. Communities and individuals have needed to rapidly adapt to the developing situation and in many instances, significant adversity. The ability to adapt to the changing health and social landscape at an individual and community level may affect wellbeing, and the extent to which communities and individuals are resilient to these stresses may influence the nature and duration of this impact.

Morton and Lurie (2013) present domains of community resilience. At an

individual level, physically and mentally well individuals are more resilient, with better underlying population health contributing to this individual resilience. Conversely, individuals with poorer underlying health, or with under-treated chronic conditions, find it more difficult to re-establish a health promoting way of life in the aftermath of adversity and are thus less resilient to any challenges they face. Individual mental resilience enables individuals to adopt positive adaptations in response to (and despite) external stress factors, but this mental resilience can be impaired by changes to the normal social life of an individual, for example through disruption of social networks. This type of disruption impacts all actors within the network and thus also leads to reduced population health at the community level.

The pandemic has disrupted our social existence and many of the support structures in place to support those with poor underlying mental health and other chronic conditions (Gillard et al. 2021). Outcomes for individuals may therefore have been impacted by not just by their own personal resilience, but also by the adaptation of their community and the resilience of the organisations upon which their communities depend.

Controlling the spread of COVID-19 continues to be a priority to protect the ability of the healthcare system to provide care for those who need it, and to reduce the number of excess deaths attributable to the disease. However, the measures taken have impacted incomes, social contact and job security. These factors are all known to contribute to an individual's ability to live a healthy life and so we can expect to see an impact on long term health (Nicola et al. 2020). The Trussell Trust reported a rise of 122% in emergency food parcels for children during March 2020, compared to 2019 (The Trussell Trust 2020). Those on a low wage, in particular the young, and women, were seven times more likely to work in sectors required to close by the COVID-19 restrictions with a third of employees in the bottom decile of the income distribution working in a closed sector, compared with only 5% of those in the top decile (Institute for Fiscal Studies 2020). Economic contraction is expected to lead to an expected

additional 3.5 million claims for universal credit from the UK welfare system (Benstead 2020). As the Bibby, Jo and Everest, Grace and Abbs, Isabel (2020) have observed, pre-existing inequalities are likely to cause uneven impacts of the virus, and it follows that complex patterns of health inequity will result.

For many people in the UK, the pandemic restrictions have either reduced incomes, or increased the threat of financial stress in the future (Brewer and Gardiner 2021; Bangham and Leslie 2020). This may continue for some time, a recession is underway with large scale unemployment (Banks, Karjalainen, and Propper 2020). Unemployment is associated with excess mortality (Roelfs et al. 2011). Individuals need money to meet their material needs and to participate and engage in health promoting activities, or being able to afford fresh goods and the time to prepare meals using them. Having insufficient money is stressful, and living with disadvantage can make a person more likely to engage in unhealthy behaviours. A systematic literature review by Benzeval et al. (2014) has shown that the effect that having insufficient financial resources has on health, can further impede individuals' education and employment causing an ill-health and income negative feedback loop.

Age can be a factor in mental health. A study of older adults in Hong Kong showed that during the 2003 Severe Acute Respiratory ("SARS") pandemic, suicides in the age 65+ age group increased by 30%. This increase was attributed to fears of being a "burden" to family during the outbreak, but also social disengagement, mental stress and anxiety (Yip et al. 2010).

For patients living with a long term condition, social engagement and access to informal healthcare services such as support groups is part of ongoing self management. For example, Reeves et al. (2014) studied 300 patients with diabetes or chronic heart disease living in deprived areas of the North West of England. The authors found that self management, and physical and mental health were supported by social involvement with groups and people. Patients increased their use of their social networks as their care needs increased, showing a dynamic effect that was reflected in financial savings to the care providers.

Social networks act for this cohort as a support to and a substitute for more formalised health care services.

This social network effect may have been significantly disrupted by the COVID-19 pandemic leading to increased social isolation and potentially loneliness. At a time when care services were stretched by patients requiring care for COVID-19, patients living with a long term care need may have needed to draw more on this social network for their own self-management as access to formalised healthcare settings became restricted (Thornton 2020). Access to groups, socialising and networks including family and friends was at the same time restricted for all, and particularly for those living with significant co-morbidities who were instructed to "shield" for a period of three months (UK Government 2020a). Support for self-management of long term conditions is a networked and collaborative construct, as opposed to merely based on the action of individuals, and so a time of significant social isolation may well have caused a break down in self-management of health and wellbeing for those with longer term care needs (Von Korff et al. 1997; Vassilev et al. 2013; Mossabir et al. 2015). Not everyone who experiences social isolation, feels lonely and indeed loneliness may occur without social isolation, however Emerson et al. (2021) demonstrated that loneliness was also associated with wellbeing for a representative sample of people with and without a disability. Coyle and Dugan (2012) studied older adults, showing that loneliness is associated with poorer mental health.

The highly infectious nature of the COVID-19 virus necessitated significant organisational changes for health care services on a global scale. In a multinational survey, resource reallocation from chronic disease to COVID-19 disrupted the continuity and the quality of care across all countries, with specific impact on diabetes, chronic obstructive pulmonary disease and hypertension (Chudasama et al. 2020). Elective surgeries and outpatient clinics were cancelled with many care appointments postponed and most care moving to remote provision by teleconsulting (Spinelli and Pellino 2020). In the early stages of the first wave,

evidence of risk factors for infection and mortality had not yet emerged and a crisis in demand for respiratory care de-prioritised other areas of the health care system. Health care service overcrowding affected the resourcing and facilitation of ongoing treatment and palliative care for conditions such as cancer (Spicer, Chamberlain, and Papa 2020). Diagnoses were reported to be delayed as services for screening and testing were suspended and many patients were reticent to engage with healthcare services for fear of contracting the virus in a hospital or other setting (Richards et al. 2020). Maringe et al. (2020) predict over 3,000 excess cancer deaths in the next five years as a result of delays to diagnostic and treatment services, in a sample of 93,607 patients suffering from one of four specific tumour types. In the case of diabetes care, the strain on emergency health care services required many medical staff to be seconded to alternative roles, further compromising the availability of specialist services. Nagi et al. (2020) report a reduction in acute admissions for diabetes and related endocrine disorders and a reduction in investigations. Standard outpatient clinics were closed and cancellation of face to face clinics alongside a reduction in availability of services, caused the care to be delivered to be sub-standard in addition to there being concerns of "important unmet clinical need".

Using questionnaire responses from the COVID-19 modules of Understanding Society (Understanding Society 2020), we examine the change in wellbeing for a sample of respondents in England[1] during the lock down period associated with the UK's 'first wave' of COVID-19 infections using the twelve question General Health Questionnaire as a proxy measure for wellbeing.

We ask the following research questions:

1. Is the reported initial decline in wellbeing distributed equally across all groups regardless of deprivation?

2. Is the reported initial decline in wellbeing the same for those with pre-existing medical conditions?

[1]Non-English cases were excluded from the analysis as deprivation index data is not comparable across the home nations.

3. Did wellbeing change overall during the course of the first wave?

4. Has any overall change in wellbeing been experienced equally across those in deprived areas or with pre-existing medical conditions?

5. Are there community level characteristics which are protective against poorer wellbeing?

3 Data and Methods

The data are taken from the first four waves of the Understanding Society COVID-19 survey, with wave nine data used as a baseline (Understanding Society 2020). The outcome variable is the General Health Questionnaire (GHQ-12) caseness score for each survey. Valid cases are selected as those who responded to all five waves of data[2].

The longitudinal response rate to waves 1 through 4 of the COVID-19 survey is 21.8%, representing 9,603 valid cases UK wide. 58.3% of respondents were female, compared with 53.2% in the survey sample. Of these 8,379 resided in an English Lower Super Output Area during the wave 1 COVID-19 data collection and were included in the analysis (1).

The mean age of respondents in England is 55.4 years (SD 15.6) compared with the overall Understanding Society sample mean age of 49.1 years (SD 19.3) (2, 3,).

Logistic modelling of longitudinal response across the four waves of data collection, identified sex, ethnicity, age and baseline GHQ-caseness (as recorded in wave 9 of the main survey) as predictors of response.

[2]There are 8,379 valid cases from 6,010 unique households. 4,553 responses came from respondents where another person in their household also responded to the survey. 3,826 respondents were the only respondent in their household - this may be because of non-response or because of them being a sole individual household. We randomly sampled the respondents to create a dataset containing no duplicated households (6,010 valid cases) and repeated the modelling. There was no substantive change in the results or findings and so the models are reported here for the full set of valid cases (8,379). Household effects are deemed to be negligible in respect of this research although we acknowledge that there may be a household level effect within response rates but this is not captured nor investigated as part of this work.

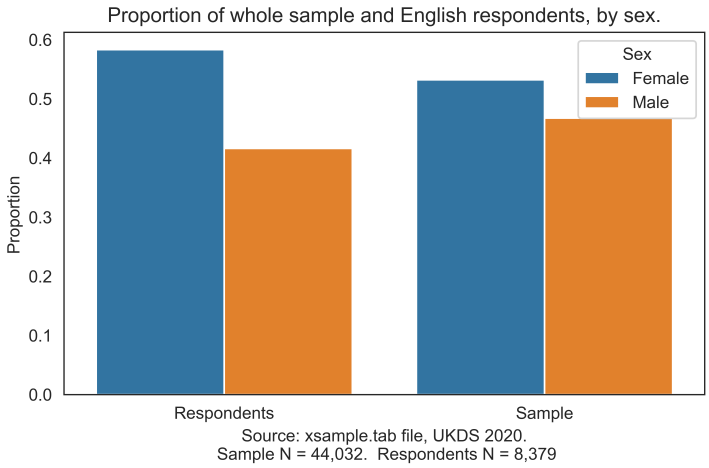

Figure 1: Sex of valid cases for analysis, compared with sex of sample.

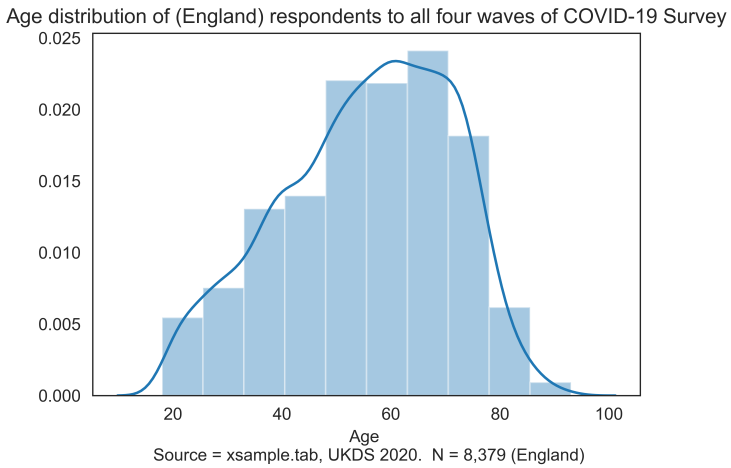

Figure 2: Age distribution of valid cases for analysis N = 8,379

There are only 786 valid English non-white respondents (9.4%). In the overall sample 20.3% are non-white ethnicities suggesting an non-random missingness and an under representation of BIPOC communities within the data. This is accounted for in the models by including ethnicity as a co-variate regardless of its effect.

The extent of decline in wellbeing is measured by the change in GHQ caseness score between wave 9 of the main survey and wave 1 of the COVID-19 survey. The progression of wellbeing during the first pandemic wave is defined as the

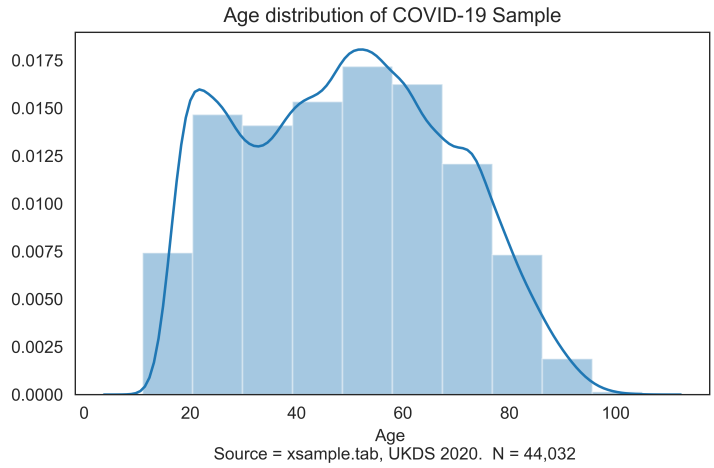

Figure 3: Age distribution of sample N = 44,032

change in this score between waves 1 and 4 of the COVID-19 survey. The base line is selected as wave 9 of the main survey as this was the most recent dataset available at the time, and data collection occurred well before the emergence of the pandemic.

The response to a question about loneliness is used in different forms in both models. Modelling the decline, we compared the loneliness response for wave 1 of the COVID data collection with the baseline and constructed a categorical variable to capture the trajectory of loneliness for respondents with four responses:

- remaining lonely (having been lonely previously),
- becoming lonely (having not felt lonely before),
- no longer feeling lonely (having felt lonely before),
- not having experienced loneliness either before or at the beginning of the lock-down.

Using this variable as a series of dummies within the model provided the same result as simply using the response to the first wave of covid data collection and therefore – for reasons of parsimony – we use the variable ca_lone in the model.

The recovery model uses a cumulative score to capture persistent or frequent loneliness over time.

Using respondent geography, each response was assigned a deprivation decile corresponding to home location for wave 1 of the COVID-19 data collection using the 2019 updated English Indices of Multiple Deprivation (IMD) (McLennan et al. 2019).

In 129 cases Lower Super Output Area (LSOA) changed during the period. 5 cases changed more than once, of which 4 reflected a move away and then back to an LSOA of origin. LSOA of origin is defined as the relevant LSOA for determining deprivation. Respondents are skewed towards areas of lower deprivation. 2,206 respondents live within LSOA's ranked in the bottom two deciles for deprivation, compared with 5,150 in the top two deciles. The mean IMD decile for a respondent was 6.3 (SD 2.7) where 10 reflects the least deprived areas (4).

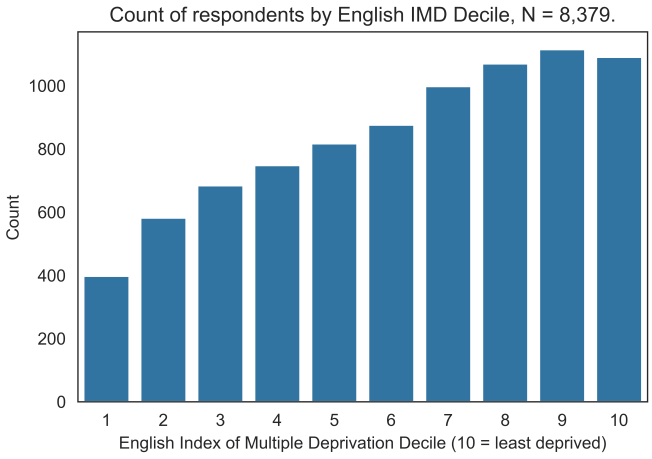

Figure 4: Distribution of respondents by IMD Decile

43% of the men (N = 1,523) and 47% of the women (N = 2.287) in the analysis had no underlying health conditions. Of those reporting an underlying health condition, 57% were women (N = 2,602) in line with the overall sex distribution of respondents.

The outcome variable was modelled using ordinary least squares regression, using R^2 as a measure of model fit.

Variables in the analysis are given in Table 1.

Variable	Mean	Std	Missing	Notes
w9_ca_ghqchange	1.01	3.38	0	Change in GHQ-12 caseness score from wave 9 of the main survey to wave 1 of the COVID-19 survey
w9_ghq_caseness	1.57	2.88	0	GHQ-12 caseness score from wave 9 of the main survey
recovery	0.78	3.0	0	Change in GHQ-12 caseness score from wave 1 to wave 4 of the COVID-19 survey. Positive values indicate a reduction in the score, an improvement in wellbeing
age_birthy	55.4	15.6	0	Age in years, calculated from birth year
sex_dv			0	Sex, binary. 1 = Female, 0 = Male.
cc_cohesion	14.8	2.7	20	Variable derived from questions on neighbourhoods.
imd_dec_2019	6.2	2.7	0	English Indices of Multiple Deprivation decile for the respondent's LSOA as at wave 1 data collection
eth_min			26	Binary variable to indicate white and non white ethnicities. 0 = White 1 = Black, Asian and Minority Ethnic
cd_ff_hcondhas			0	Binary variable to indicate underlying health conditions. 0 = no health condition, 1 = health condition. Taken at July data collection as those diagnosed during the COVID-19 survey period are likely to have been living with symptoms and accessing care for an undiagnosed condition during the period.
ca_lone			0	Binary variable to indicate experience of loneliness in the 4 weeks prior to the wave 1 data collection. 0 = has not experienced loneliness, 1 = experienced loneliness some times or often.
always_lonely	1.3	1.6	2	Sum of binary variables over waves 1 to 4 to give a score for persistent loneliness. Max = 4, min = 0.
cd_financial_crisis			3	Binary variable to indicate acute financial crisis at Wave 4. 1 = has accessed a food bank in the prior 4 weeks, 0 = has not.
incchange_ca_cd_bin			0	Binary variable to indicate worsening financial situation. 1 = house hold equalised income has reduced from wave 1 to wave 4, 0 = income is the same or greater.

Table 1: Variables in the analysis

The model was optimised by stepwise removal of variables from the regression model that were non-significant.

We note that using the same GHQ-12 questions from the Understanding Society survey and its predecessor the British Household Panel Survey from 1999 to 2016, Brown et al. (2018) showed that under reporting bias for mental health was greater for men. For this reason we elected to produce separate models for men and women.

Missing data within the valid cases were imputed with the mean value for the variable, with the exception of ethnicity where "white" was imputed. Sensitivity analysis was conducted by re-running the regression models after dropping all cases with missing values, and comparing to the models with missing values imputed. The models were stable with minimal change in the magnitude or direction of estimated coefficients. (Initial model specifications are given at 1,2.)

$$\begin{aligned}(\text{w9\_ca\_ghqchange}) = \beta_0 + \beta_1(\text{w9\_ghq\_caseness}) \\ + \beta_2(\text{ca\_lone}) + \beta_3(\text{age\_birthy}) \\ + \beta_4(\text{cc\_cohesion}) + \beta_5(\text{imd\_dec\_2019}) \\ + \beta_6(\text{cd\_ff\_hcondhas}) + \beta_7(\text{eth\_min})\end{aligned} \tag{1}$$

$$\begin{aligned}(\text{recovery}) = \beta_0 + \beta_1(\text{w9\_ghq\_caseness}) \\ + \beta_2(\text{w9\_ca\_ghqchange}) + \beta_3(\text{age\_birthy}) \\ + \beta_4(\text{cc\_cohesion}) + \beta_5(\text{imd\_dec\_2019}) \\ + \beta_6(\text{eth\_min}) + \beta_7(\text{cd\_ff\_hcondhas}) \\ + \beta_8(\text{always\_lonely}) + \beta_9(\text{cd\_financial\_crisis}) \\ + \beta_{10}(\text{incchange\_ca\_cd\_bin})\end{aligned} \tag{2}$$

4 Results

Mean wellbeing scores show a clear peak and decline with the peak occuring in April during the first wave of data collection. Mean scores have recovered to almost the baseline (main wave 9) by July (COVID wave 4) when an end to shielding was announced and much of the economy reopened, albeit with restrictions in place to ensure continued social distancing. The increase in scores between the baseline and July 2020 are consistent with the trend in scores over time reported elsewhere (5) (Pierce et al. 2020).

The difference between men and women in the mean figures for the baseline is statistically significant ($t = 8.8$, $p(two - tailed) < 0.05$) as is the difference in the mean change for men and women between the baseline and April data collection ($t = 9.3$, $p < 0.05$).

Women suffered, on average an increase of 1.3 in the GHQ caseness score (72% increase on baseline) between wave 9 and the first COVID-19 wave, compared with 0.61 for men (51% increase on baseline). This indicates a difference in the impact of the pandemic on women's wellbeing consistent with reports that women have been unequally impacted (Group 2020; Paton et al. 2020).

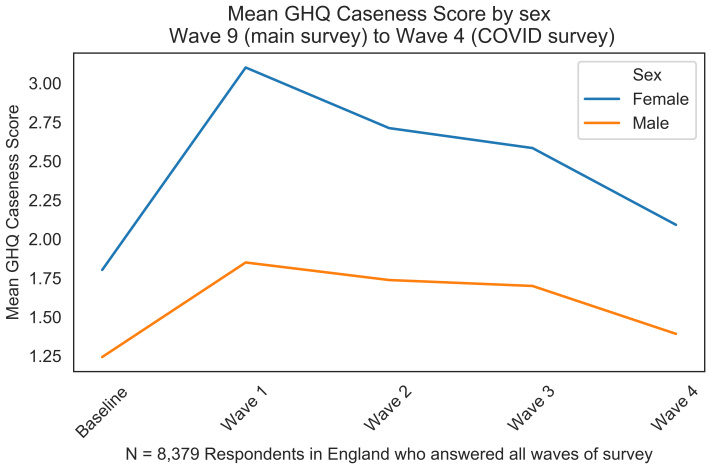

Figure 5: Mean GHQ Caseness Score over time, by Sex

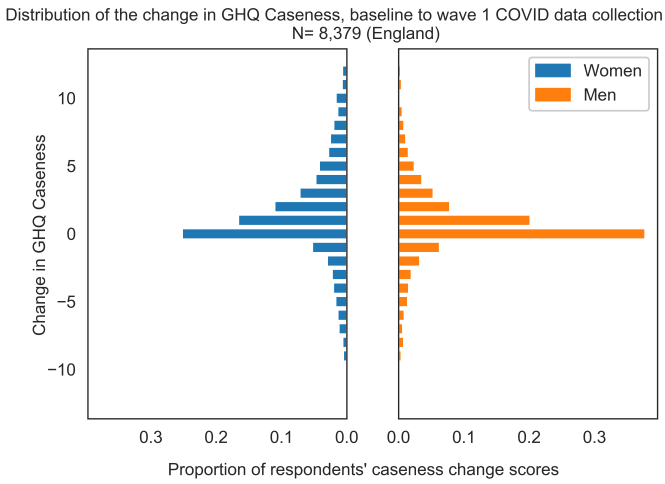

Figure 6: Distribution of the change in GHQ Caseness from baseline to wave 1, by sex.

4.1 Modelling the decline in wellbeing

An increase in the GHQ caseness score equates to a decline in wellbeing. Model 1 explains 38.6% of the variance in the wellbeing decline for women, and 37.8% for men (2). Variables which were not significant at the $p < 0.05$ level were removed stepwise to produce the final models. Variance inflation factors were below two for all variables and all permutations of the model, indicating no problematic multi-colinearity. Pearson's correlations for all variable pairs showed no correlations over 0.5.

Loneliness, the presence of a long term health condition, age and the baseline caseness score were predictive of the extent of any decline for both sexes. Women experienced greater increases in the score, with the impact of age, loneliness, baseline score and health conditions having a greater effect on women than for men. Older people found the pandemic to be less detrimental to their wellbeing, as did those with higher baseline scores. Those who reported experiencing loneliness in the first wave showed a bigger decline in wellbeing. A pre-existing long term health condition was also predictive of a worse decline in wellbeing. Ethnicity was statistically significant in the model for males, with a minority ethnic heritage increasing the extent of the wellbeing decline in men, but not

	Female		Male	
Intercept	2.739	*	1.2189	*
	(079)		(0.165)	
w9_ghq_caseness	-0.7331	*	-0.6792	*
	(0.014)		(0.015)	
ca_lone	2.5740	*	2.0772	*
	(0.089)		(0.094)	
age_birthy	-0.0160	*	-0.0069	*
	(0.003)		(0.003)	
cc_cohesion	-0.0419	*		
	(0.016)			
imd_dec_2019	0.0389	*		
	(0.016)			
cd_ff_hcondhas	0.2216	*	0.1720	*
	(0.089)		(0.084)	
eth_min	-0.1492		0.3389	*
	(0.147)		(0.134)	
R^2	38.6%		37.8%	

Table 2: Model 1, parameter estimates for the increase in GHQ-Caseness score, by sex. N = 8,379. Standard error given in brackets. * indicates significant at the $p < 0.05$ level.

for females.

For women, living in a more cohesive community, was protective against a decline in wellbeing, but living in a less deprived community, had the opposite effect. Effect sizes for these variables were small, and they were not found to be significant in the male respondent group.

26.2% (females) and 28.2%(males) of the explained variance can be attributed to the baseline score in both groups; those with poorer initial mental health experienced a smaller increase in GHQ caseness score at the onset of the pandemic, and this is the most important predictor in the model. Combining this with the experience of loneliness, explains 38.1% and 37.8% of the variance in the female and male groups respectively (3). The remaining variables in the analysis therefore explain less than an additional 1% of variance for each group.

	Female		Male	
Intercept	1.5317	*	0.9323	*
	(0.056)		(0.046)	
w9_ghq_caseness	-0.7202	*	-0.6771	*
	(0.014)		(0.015)	
ca_lone	2.6737	*	2.1619	*
	(0.087)		(0.093)	
R^2	38.1%		37.8%	

Table 3: Model 1A, parameter estimates for the increase in GHQ-Caseness score, by sex. N = 8,379. Standard error given in brackets. * indicates significant at the $p < 0.05$ level.

4.2 Modelling the bounce back

The model for the recovery included further variables reflecting ongoing loneliness, and the onset of any acute financial crisis, as well as a measure of income stability. Women recovered a mean score of 1.0 (std 3.3), men to a mean of 0.46 (std 2.5). Compared with the baseline figure, the mean score had increased by 0.23 (std 3.3) but there was no statistically significant difference between men and women in this increase, at the 95% confidence level.

Model 2A explains 33.8% (female) and 26.9% (male) of the variance seen in recovery including just the baseline measure, the extent of the decline, and a measure of loneliness. The analysis showed that 23.8% (female) and 16.8% (male) of the variance could be explained just using the change in the GHQ caseness score between the baseline and the first wave of data collection ("w9_ca_ghqchange"). This indicates that the most important factor in the size of a person's 'bounce back' is in fact the size of the original decline. Loneliness and acute financial crisis were statistically significant for both men and women, age and reduced income was significant for women but not men. These additional variables explained very little additional variance in model 2, over model 2A.

	Female		Male	
Intercept	0.6199		-0.0888	
	(0.166)		(0.016)	
w9_ghq_caseness	0.4510	*	0.4147	*
	(0.017)		(0.019)	
w9_ca_ghqchange	0.6567	*	0.5891	*
	(0.014)		(0.017)	
always_lonely	-0.3685	*	-0.4362	*
	(0.028)		(0.030)	
cd_financial_crisis	-1.6505	*	-1.9128	*
	(0.399)		(0.516)	
age_birthy	-0.0118	*	0.0015	
	(0.003)		(0.003)	
incchange_ca_cd_bin	-0.3579	*		
	(0.117)			
eth_min	-0.0776		0.2252	
	(0.133)		(0.130)	
R^2	34.3%		27.1%	

Table 4: Model 2, parameter estimates for the recovery, by sex. N = 8,379. Standard error given in brackets. * indicates significant at the $p < 0.05$ level.

	Female		Male	
Intercept	-0.1221		0.0160	
	(0.057)		(0.047)	
w9_ghq_caseness	0.4561	*	0.4109	*
	(0.017)		(0.019)	
w9_ca_ghqchange	0.6598	*	0.5901	*
	(0.014)		(0.016)	
always_lonely	-0.3540	*	-0.4406	*
	(0.028)		(0.029)	
R^2	33.8%		26.9%	

Table 5: Model 2A, parameter estimates for the recovery, by sex. N = 8,379. Standard error given in brackets. * indicates significant at the $p < 0.05$ level.

5 Discussion

There has been much concern in the media about the mental health and wellbeing impact of the COVID-19 crisis on people who have undergone an unprecedented change and restriction to their lives. These data suggest that although the first wave was associated with an overall decline in wellbeing, the removal of lock down restrictions was also associated with a recovery.

This research set out to uncover potentially hidden differences in the extent of the decline in wellbeing and the ability to recover. We predicted that more deprived areas would in fact suffer a lower decline in wellbeing and be more resilient to the pandemic in this regard. The removal of services and support networks for those with long term health conditions was expected to cause a greater decline in wellbeing and a reduced ability to recover. We also considered if there would be effects attributable to ethnicity and sex.

We expected the trajectories to differ along sex, ethnicity, deprivation and underlying health lines, and that some of these differences would be explained by the impact of stress (specifically financial crisis), the level of community support experienced (community cohesion) and the extent of social isolation experienced by respondents (measured by loneliness).

The models here do not show the expected differences between groups. For this sample, wellbeing declined, but then gradually improved over the course of the first wave, returning nearly to the baseline level by July. wellbeing can therefore be considered to be elastic, that is to say that although there appear to have been negative impacts on wellbeing at the beginning of the first lock down, these impacts were lessened over time as restrictions reduced demonstrating a bounce back effect and a capacity for rapid recovery.

Deprivation appeared to show no impact on wellbeing. The sample was skewed towards the less deprived deciles and so this may be a non-response issue, with those suffering the greatest deprivation, least able to engage with the survey, through poor mental health, or simply through having the means

to respond online. Deprivation was assigned to respondents at the LSOA level which is in itself problematic as each LSOA represents approximately 1500 individuals and thus may encompass a wide range of deprivations within any one geographical unit.

The expected negative association of deprivation and health is not one that has been found universally in previous studies eg (Tunstall et al. 2007; Doran, Drever, and Whitehead 2006; Cairns, Curtis, and Bambra 2012). The results of studies into health outcomes in deprived areas can sometimes be counter-intuitive and several investigations have shown that communities record better health outcomes than might be predicted from socio-demographic factors. These communities can be said to display 'health resilience' that is to say, they outperform expectations on certain measures.

No effect was detected here so it is possible that the expected social gradient in health has been cancelled out by additional resilience in the poorest communities. The social gradient implies that wealthier areas would experience less of a decline in well being but in fact many people in these communities were subjected to a level of stress to which they would be unaccustomed given their usual level of financial comfort and position of privilege in society. The threat of furlough, home working, home schooling and removal of a normal social life, may have been a sufficiently adverse effect on the better off that the mental health impact of the crisis has in fact been felt more equally than is usually the case for many other health measures. This observation may align with Holmes and Rahe (1967) work on stress which proposes that life changes are the primary driver for reductions of wellbeing.

Women experienced a greater drop in wellbeing (a rise in the caseness score) than men, however at the end of the first wave there was no difference in the change in wellbeing between men and women. Self reported health is a combination of underlying health and reporting behaviour. Self reported mental health metrics are affected by misreporting, a potential impact of the continued stigma around mental health. Studying the same GHQ-12 questions from the

Understanding Society survey and its predecessor the British Household Panel Survey from 1999 to 2016, Brown et al. (2018) showed that this under reporting bias was greater for men. This may mean that the signal in these data showing a worse decline for women, is actually a factor of reporting bias. The baseline of the scores showed lower mental wellbeing for women than for men, the change was then greater for women than men, matched with a greater improvement. The uniformity of the elasticity across the sexes and the lack of lasting difference would tend to support a theory that the difference seen here can be attributed to reporting.

There was a low response rate amongst ethnic minority members of the panel with only half the expected number of respondents coming from an ethnic minority background of any type (approximately 10% from ethnic minorities in this sample, compared with 20% in the underlying survey panel). This necessitated the collapse of the detailed ethnicity variable to a binary ethnic minority/white measure. This is problematic because clearly people from different ethnic minority backgrounds are not homogeneous and may well have had experiences of the pandemic which varied by ethnicity for example due to the differing experiences of and relationships to family and community within different ethnic groups. The use of a binary variable also necessitates the categorisation of people with dual heritage into either "minority" or "white" and confounds british ethnic minority respondents with immigrant populations. Use of binary variables for ethnicity is problematic where the dominant research narrative considers the white perspective as central, and the ethnic minority perspective as "other". Ethnicity was significant in the recovery model for men (model 2), An ethnic minority background was associated with a bigger "bounce back". This may be because ethnic minority males suffered a greater decline in wellbeing which was not detected in the modelling, or there maybe a resilience factors at play. However, the effect size and the overall contribution towards the explanation of variance were small.

Age was significant for men and women in the initial decline of wellbeing, and

for women in the recovery, but with a small effect size. Older people suffered a smaller decline in their wellbeing, and then a smaller recovery as the wave progressed. The impact of age on the decline in wellbeing for women was double that for men. The mean age of respondents was skewed towards the older members of the panel. This may have reflected older people having more time on their hands relieved of their normal social lives and also perhaps the care burden for grandchildren, whereas younger adults were more likely to be juggling full time work from home whilst also caring for and schooling children. Poorer wellbeing in younger groups may also have contributed to non response.

Experiencing loneliness was predictive of a decrease in wellbeing in April for men and women and was a main contributor to the variance explanation in model 1 and model 1A. Ongoing loneliness was statistically significant in model 2 and model 2A. People who experienced continued loneliness using this measure, recovered less well as the pandemic progressed. There may be a stigma related to admitting that you are experiencing loneliness and so a bias in the response variable. The difference emerging between those who are lonely and those who are not is also potentially indicative of the different ways in which people experienced the progressive loosening of restrictions. Some people opted to remain isolated, out of concern for their health, or because of shielding advice, whilst others made the most of new "freedoms".

Health inequalities follow a social gradient. Although the IMD decile was statistically significant for females in model 1, the effect size was very small and deprivation did not feature in other models. The social gradient for health was not therefore replicated in these data when considering mental well being. This may be due to an overriding community effect which was present at the national level during the first wave. Many impacted directly by COVID-19 as a disease have suffered a devastating impact, through loss of their own physical health or bereavement. Indirect effects of the pandemic will take some time to uncover, but will include long term unemployment, and projected adverse outcomes in other health conditions as discussed in the introduction. These are likely to

follow a social gradient but as the data used here were collected during the earliest stage of the crisis, the longer term impact of the pandemic's duration and severity will not have impacted upon the mood of those responding.

We expected that in communities where people are more likely to speak to each other and where respondents report having neighbours they can rely on for help, the negative impact of the pandemic would be reduced. The measure of community cohesion showed only a very weak effect for women in the model for the decline in wellbeing, and no effect in the recovery models. People's experience is influenced by the narrative of how they should react and process the tragedy around them. Not for the first time in a British tragedy, media and politicians made reference to the "Blitz Spirit" and the rhetoric of survival, courage, fortitude and being 'in this together', using collective actions such as the "Clap for Carers" to further emphasise a message of solidarity. This cultural environment of resilience, may have been a universal protective factor at a national level, facilitating the observed elasticity of mood and thus overriding the impact of any more localised community cohesive effects.

6 Strengths and Limitations

The sample does not include care home residents and non-response was greater amongst younger people and people from ethnic minority backgrounds. The finding of elasticity cannot therefore be generalised to the whole population. Poor mental well being may well have contributed to the non response and therefore those who were most adversely affected by the pandemic, may have been structurally excluded from the data.

The research uses only those responses submitted online and so this may also exclude certain groups. For many families during the school closures, devices were shared between parents working from home, and children completing online learning. This may have created an additional barrier to completion. For many working from home, even in the absence of competition for access to an

appropriate device and with a stable home internet connection, screen fatigue from long hours spent working remotely may have reduced the response rate amongst certain types of workers. Those who do not have an internet connection through choice, or through a lack of means are also excluded here. We have no direct data on these issues but recent work by Schaurer and Weiss (2020) did find evidence of selection bias in online survey data collected during the pandemic and so this could have had an impact on our results.

In care homes, many residents live with dementia. To reduce infection risk in this vulnerable population, many in homes and in the community were confined to quarters as quarantine measures took place and there is evidence that this has hastened an irreversible decline in speech, social skills, functional skills and memory (Suarez Gonzalez, Comas-Herrera, and Livingston 2021). These people are excluded from the analysis and as such the finding that people "bounced back" as restrictions were lifted may not to apply in these contexts.

The remains a stigma around mental health and as such a form of social desirability bias exists within mental health self reporting. This may have impacted on the reliability of the measure used here and there may be some under-reporting within the data. Under-reporting behaviour has been shown to differ between groups and this may therefore have masked signals within the models.

More detailed and targeted data collection is needed to understand the experience of people from ethnic minority backgrounds. The increased non response rate in these data suggest some kind of systematic bias during the COVID-19 data collection. No signal has been found to suggest a differing experience of mental health during the pandemic but this may simply be due to missing responses.

7 Conclusion

This analysis of the COVID-19 survey datasets from the first wave of global pandemic in 2020, show interesting and counterintuitive results. We found no

evidence of a social gradient in wellbeing related to the pandemic. In fact, although mental health and wellbeing certainly suffered during the lock down, wellbeing was shown to be highly elastic in this period indicating a national level of resilience which cut across the usually observed health inequalities.

Further research is needed to target those groups who may be excluded from this dataset, but the data would suggest that national efforts to "raise our spirits" may in fact in this context have been useful and effective. This may lend weight to arguments for other nationally led initiatives to improve mood in times of crisis, for example additional national holidays. Critically, over the time period that the COVID datasets were collected a recovery took place. That duration coincided with the first national lock down and the eventual removal of most restrictions for most places in the UK. It would therefore follow that the best policy to improve the nation's mental well being and to protect vulnerable people from the worst mental illness, is to pursue policies which suppress the pandemic such that the domestic economy can in the widest possible spheres, reopen and people's pre-pandemic work and social existences can resume.

Acknowledgements

This project was funded by the Economic and Social Research Council, grant ref: ES/P000401/1

Statement on Conflicts of Interest

The authors have no conflicts of interest to declare.

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