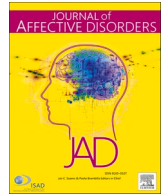




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Research paper

Mental health inequalities during the second COVID-19 wave among Millennials who grew up in England: Evidence from the Next Steps cohort study

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ABSTRACT

Background: There is relatively little evidence on socioeconomic inequalities in mental health among young adults after the end of the first COVID-19 wave in the UK, despite this group having faced the worse mental health and economic shocks across age groups at the start of the pandemic.

Methods: We examined differences in mental health across two points - September 2020 and February 2021 - in a cohort of 4167 Millennials aged 30–31 using life dissatisfaction, psychological distress (GHQ-12), anxiety (GAD-2), and depressive symptoms (PHQ-2). We report adjusted prevalence ratios (aPR) from random-intercept models, testing differences by educational attainment and time-varying conditions (relationship status, living arrangements with adults and children, work status, and financial changes compared with before the outbreak), adjusting for baseline covariates at ages 13–14 and health covariates at ages 25–26.

Results: Only dissatisfaction with life changed between time points (PR = 1.26, 95%CI 1.02–1.55). Educational attainment was not significantly associated with mental health. Being single (aPRs from 1.36 to 1.89) and being financially worse off since the start of the pandemic (aPRs from 1.58 to 1.76) were each associated with worse mental health. These associations did not further vary by educational attainment.

Conclusion: Among Millennials who grew up in England, educational attainment was not associated with mental health whereas negative social and financial conditions were associated with worse mental health during the second COVID-19 wave. Mental health inequalities in this generation are likely to have continued increasing after the end of the first COVID-19 wave.

1. Introduction

The COVID-19 pandemic has been the most recent illustration of the ways in which disasters exacerbate social and health inequalities (Bambra et al., 2020; Blundell et al., 2020; Kawachi, 2020). In the UK, the first year of the pandemic was defined by two infection waves, a first peaking on April 22nd 2020 and a second peaking on December 29th 2020, mitigated by three national lockdowns started on March 26th 2020, November 5th 2020, and January 4th 2021 (UK Government, 2021). This was accompanied by deep social and economic changes, including the risk of massive unemployment and repeated school closures, which the UK government addressed with the creation of a new “furlough” job retention scheme and improvements to welfare programs that each varied in intensity and coverage over the year (Francis-Devine

and Ferguson, 2021).

A large evidence base has demonstrated a dramatic rise in mental health problems in response to the first wave and accompanying lockdown measures (Banks and Xu, 2020; Carr et al., 2021; COVID-19 Mental Disorders Collaborators, 2021; Fancourt et al., 2020; Hotopf et al., 2020; Pierce et al., 2020). Multiple studies noted inequalities in initial responses and subsequent recovery rates. Noted risk factors included being a women, an ethnic minority person, a key worker, the parent of young children, having health issues and fearing infection, already having mental health problems, no longer working and having financial difficulties, and living in a deprived area (Banks et al., 2021; Pierce et al., 2021). Studies also suggested that these effects were likely to be cumulative (i.e., there is a graded relationship between the number of hardships and mental health) and multiplicative (i.e., the presence of

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a hardship exacerbates the impact of other hardships on mental health) (Iob et al., 2020; Wright et al., 2021). While the prevalence of mental health problems declined following this initial shock, estimates remained high compared with pre-pandemic estimates over the next year (Banks et al., 2021; Iob et al., 2020; Pierce et al., 2021).

Young adults, which we define as those in the broad age range in which adult milestones from starting full-time work to having children typically occur, already represented a priority group for population mental health before the pandemic in keeping with the worrisome declines in mental health which have accelerated over the past decade, difficulty in transitions between child and adult mental health care services, and relatively low uptake of mental health care services in this age group (Broad et al., 2017; Gagné et al., 2021c; Kessler et al., 2005; Office for National Statistics, 2019; Pitchforth et al., 2019). Mental health inequalities had also been already documented during this life period, with UK studies finding that men with lower qualifications and those who were unemployed, working part-time, or working in adverse conditions (e.g., shift work, zero-hour contract) were each more likely to report dissatisfaction with life and clinically significant levels of distress in recent years (Gagné et al., 2022; Gagné et al., 2021a; Henderson, 2019).

While young adults have been highlighted as a key risk group for elevated distress at the start of the pandemic, evidence on the extent to which new mental health inequalities may have emerged among those in this age group remains relatively small (Gagné et al., 2021c; Pierce et al., 2020). In the UK, Gagné et al. (2021b) examined responses between April and November 2020 among those aged 16–24 in the UK Household Longitudinal Study (UKHLS) and found that those who had significantly reduced work hours compared with before the outbreak reported higher levels of distress and this explained a meaningful portion of differences by area deprivation (Gagné et al., 2021a). Another analysis of this dataset found no changes in distress across income groups after April 2020, suggesting that inequalities likely rapidly emerged in response to the first shock and did not recede over the following months (Stroud and Gutman, 2021).

Studies outside the UK found similar results. Marmet et al. (2021) examined a cohort of young Swiss men (mean age 29) and found that mental health in May–June 2020 had further declined among those who were already financially insecure and experienced negative changes in employment in response to the pandemic (Marmet et al., 2021). Similarly, Preetz et al. (2021) examined change scores in a cohort study of German young adults who started university in 2017 (mean age 24) and found that increased financial insecurity and returning to live with parents were associated with worse mental health in June–July 2020 (Preetz et al., 2021). In the United States, Hoyt et al. (2021) found that college students living in a low-income household were more distressed in April 2020; however, they also found that income was not associated with subsequent changes between April and July 2020 (Hoyt et al., 2021).

1.1. Objective

The inequalities that have been identified so far in response to the COVID-19 pandemic in the general population are likely to only partially apply to younger adults as older age groups have had more time to establish themselves in the labor market and become financially secure. Indeed, young adults have been the age group most impacted by negative economic changes over the course of the pandemic (e.g., losing employment, entering more precarious employment) (Blundell et al., 2020). Making matters worse, they are in a life stage where these negative experiences have both short- and long-term “scarring effects” over the rest of the life-course (Bell and Blanchflower, 2011).

This study builds on current evidence to better understand mental health inequalities after the start of the pandemic among younger adults who grew up in England. Contrasting with the body of work focussed on the first months of the pandemic, we examine whether inequalities

further changed across two points capturing the start and end of the second COVID-19 infection wave in September 2020 and February 2021. To do so, we make use of a longstanding cohort study with data collected before the pandemic to disentangle the inequalities that may have been already present before the pandemic and the inequalities that may have emerged since the start of the pandemic. The participants were aged 30–31 in 2020–21, capturing the most frequent ages in which young adults may be having children, getting married, and buying their first home in the UK (Office for National Statistics, 2019).

A life-course approach to health inequalities requires taking into account the social role transitions expected to be achieved during this life period. Given the dynamic nature of early work and income trajectories, epidemiologists have often focussed on educational attainment as the most relevant socioeconomic indicator for this life period (Galobardes et al., 2006). Education, however, shapes the timing and meaning of social role transitions, i.e., starting a full-time job, leaving the parental residence, entering a relationship, and having children, and it is through their configuration that we can understand wellbeing and mental health trajectories across social groups (Gagné et al., 2022; Gagné et al., 2021b). Therefore, we expect that – beyond pre-pandemic differences and early responses – circumstances such as being single and living alone, taking care of children, not working, and being in financial difficulties will have led to worse mental health during the second wave of the pandemic, and have had a larger impact among those with the lowest qualifications.

The analytic strategy is therefore done in two steps: 1) examine the role of educational attainment and circumstances measured during the pandemic on mental health in this age group in 2020–21; 2) examine the different role of these circumstances on mental health in 2020–21 across education categories (i.e., effect modification).

2. Methods

2.1. Data

The Next Steps cohort study, previously known as the Longitudinal Study of Young People in England (LSYPE), is a nationally representative longitudinal cohort study that has followed 15,770 individuals born in 1989–90 in England. Initially developed by the Department of Education, the study included all young people in Year 9 in state or independent schools (ages 13–14). After the baseline survey in 2003–04, cohort members were interviewed six more times every year until ages 19–20 in 2010. In 2015, the cohort was restarted by the UCL Centre for Longitudinal Studies (CLS) to find out how the lives of Millennials represented by cohort members had turned out at age 25. In this last wave (2015–16), 7707 participants responded, representing a 51 % response rate (RR) among eligible cases (Calderwood, 2018).

In 2020–21, CLS invited cohort members to take part in a COVID-19 substudy to gather information about the impacts of the COVID-19 pandemic (UCL CLS, 2021). Wave 1 took place in May 2020 to capture responses following the peak of the first COVID-19 infection wave, Wave 2 took place in September–October 2020 to capture how participants' lives had changed from May 2020, and Wave 3 took place in February–March 2021. Compared to age 25, another analysis of this dataset found a higher level of distress in women participants in May 2020, no subsequent changes in October 2020 and March 2021, and no differences in these trajectories by education or ethnicity (Patel et al., 2022). Other analyses of this dataset also found that: 1) 53 % of participants had experienced at least one disruption in health care, finances, or housing by October 2020, and their mental health at age 25 was associated with the risk of having experienced loss of income up to this point; 2) among men participants, fathers reported a higher level of psychological distress in October 2020 and March 2021 if they had multiple children or were working with a child aged 0–2 (Chen et al., 2022; Di Gessa et al., 2022).

Whereas contact with cohort members in Wave 1 was made only by

email over a short period of time, contact in Waves 2 and 3 also used mail and phone, financial incentives, and a longer fieldwork period to ensure better response rates. At the end of each fieldwork period, 3664 participated in Wave 2 (RR = 32 %) and 4239 participated in Wave 3 (RR = 34 %) (Brown et al., 2021). In this paper, the analytic sample focusses on data in Waves 2 and 3, and includes all those who participated in Wave 3 and had a valid weight value to account for the survey design and non-response ($n = 4179$, 98.3 %). The exact overlap of fieldwork periods and daily COVID-19 infection rates is detailed in Supplementary Fig. 1.

2.2. Measures

2.2.1. Mental health outcomes in the COVID-19 Waves 2 and 3 (time-varying)

The pandemic influenced mental health in nuanced ways (Banks and Xu, 2020; Gagné et al., 2021c; Niedzwiedz et al., 2021). We used four measures to capture this, using life dissatisfaction, psychological distress, anxiety symptoms, and depressive symptoms. Life dissatisfaction was measured with a single 11-point Likert-type item asking “Overall, how satisfied are you with your life nowadays?” and recoded into two categories around the response scale mid-point: dissatisfied with life (0–4) versus not dissatisfied (5–10). Psychological distress was measured using the 12-item General Health Questionnaire (GHQ-12), a validated screening tool for identifying non-psychotic and minor psychiatric disorders in the general population (Goldberg et al., 1997). Each item uses a 4-point Likert-type scale (0–3) to assess the severity of a mental problem over the past few weeks. Participants were defined to be distressed (yes/no) if they selected one of the two bottom response options on four or more out of the 12 items. Anxiety and depressive symptoms were measured through the 2-item General Anxiety Questionnaire (GAQ-2) and 2-item Patient Health Questionnaire (PHQ-2). The GAQ-2 and PHQ-2 are validated screening tools for generalized anxiety disorder and major depressive disorder (Kroenke et al., 2003, 2007). Each item also uses a 4-point Likert-type scale (0–3) to assess the severity of a mental problem over the past few weeks. Participants were defined to be reporting significant symptoms of anxiety or depression (yes/no) if they scored 3 or more out of 6. Item labels are presented in the Supplementary Table 1.

2.2.2. Educational attainment at ages 25–26

This measure was derived at ages 25–26 by the data management team using the National Vocational Qualification (NVQ) scheme, created to standardise qualifications across England, Wales, and Northern Ireland with levels ranging from 1 (e.g., lower high school) to 8 (e.g., doctorate) (UK Government, 2023). Less than 2 % of the sample reported being “in full-time education” as their main activity in Waves 2 and 3. We recoded these into three categories representing: 1) no post-secondary education (no qualifications or NVQ 1–2); 2) post-secondary education below higher education degree (NVQ 3–4); 3) higher education degree (NVQ 5+). The comparison of estimates in this sample with an analysis of the ONS Labour Force Survey for degree-level qualifications suggested that these were relatively representative of the Millennial population (Gustafsson, 2019).

2.2.3. Conditions in the COVID-19 Waves 2 and 3 (time-varying)

These included: 1) living with no other adults (yes/no); 2) being single (yes/not); 3) living with children (yes/no); 4) not working (yes/no); and 5) being financially worse off compared with before the pandemic (yes/no).

2.2.4. Covariates at ages 13–14 and 25–26

We considered seven baseline variables: at ages 13–14, 1) sex (Male/Female); 2) ethnicity (White/Asian/Black/Mixed or other); 3) having at least one parent with a degree (NVQ5) (yes / no); 4) parental home ownership (yes / no); 5) having a longstanding health condition (yes /

no); 6) having at least one parent with a longstanding health condition (yes / no); at ages 25–26, 7) sexual orientation (heterosexual / non-heterosexual). Participants' health condition at ages 13–14 was reported by one parent based on the question: “Does (he/she) have any longstanding illness, disability or infirmity? By long standing I mean anything that has troubled (him/her) over a period of time or that is likely to affect him/her over a period of time.” We then considered four variables at ages 25–26 to capture physical and mental health differences before the pandemic: 1) self-rated health (reporting fair or poor health); 2) life dissatisfaction (scoring 2 or less on a 5-point likert-type scale); 3) psychological distress (scoring 4 or more on the GHQ-12 item scale); and 4) reporting a longstanding mental health condition (yes / no). Participants' mental health condition at ages 25–26 was measured based on the questions: “Do you have any physical or mental health conditions or illnesses lasting or expected to last 12 months or more?” and “Do any of these conditions or illnesses affect you in any of the following areas ... Mental health?”. The distribution of covariates across education categories is reported in Supplementary Table 2.

2.3. Statistical analysis

Descriptives are first presented in the full sample and across education categories. Cross-sectional bivariate tests were conducted to examine differences in variables across education categories in each wave.

Main analyses examining the role of educational attainment and circumstances during the pandemic on mental health were done using the same sequence of random-intercept Poisson models, a common approach to the study of binary outcomes which has been previously used in this context (Barros and Hirakata, 2003; McNutt et al., 2003; Niedzwiedz et al., 2021; Zou, 2004). A strength of this model is that, by incorporating a variance term representing each individual's propensity to have poor mental health in the regression equation (i.e., the “random-intercept”), its estimates can capture the “subject-specific” or “within-person” effect of a change in a time-varying predictor on a time-varying outcome (if there is no confounding) (Gibbons et al., 2010). We used the following model strategy: Model 1 = educational attainment + time + baseline covariates; Model 2 = Model 1 + health covariates at ages 25–26; Model 3 = Model 2 + time-varying negative conditions in 2020–21. After Model 2, we considered if differences in mental health between time points varied by educational attainment by testing the two-way interaction between time and education. After Model 3, we tested the two-way interactions between educational attainment and each time-varying negative condition in separate models. A summary of results from these interaction tests is reported in Supplementary Table 3.

To make full use of the longitudinal dataset, analyses were done in the sample of 8334 observations (from the analytic sample of 4167 participants) across 20 imputed datasets using Stata's implementation of multiple imputation with chained equations (Royston and White, 2011). The distribution of missing cases is reported in Supplementary Table 4. Analyses included the clustering, stratification, and weight variables to account for the sampling design and non-response over time. As a sensitivity analysis, we reproduced the main analyses using population-averaged models (pooled logistic with clustered standard errors) instead of subject-specific models, and found results to be extremely close (Supplementary Tables 5.1–5.4). We also tested gender differences in associations with additional interactions by sex for educational attainment and conditions during the pandemic. Whereas none of the interactions were statistically significant, being single had a slightly stronger association among women and being worse off financially had a slightly stronger association among men across outcomes (Supplementary Tables 6.1–6.4). Analyses were done in Stata 17 (Statacorp, 2019).

3. Results

3.1. Sample characteristics

Table 1 presents descriptive results for mental health outcomes and conditions in September 2020 and February 2021. Two mental health indicators showed a slight increase over time: life dissatisfaction increased from 14.6 % to 18.3 % and psychological distress increased from 24.2 % to 28.3 %. The measures of anxiety and depressive symptoms, however, did not vary meaningfully over time (8.8 % and 9.5 % for GAD-2; 8.0 % and 7.8 % for PHQ-2). While those without post-secondary education almost systematically reported worse mental health outcomes compared with those with higher education, bivariate differences within waves were not statistically significant.

Circumstances during the pandemic also showed relatively little

Table 1

Description of main variables. Next Steps COVID-19 substudy, ages 30–31, England, Sep 2020 to Feb 2021. *N* = 4167.

Variable	Time	Full sample	No PS educ	PS below degree	Degree	Difference
			NVQ 0–2	NVQ 3–4	NVQ 5	
		100 %	38.5 %	46.0 %	15.5 %	
		W%	W%	W%	W%	<i>p</i>
Mental health during the pandemic						
Life dissatisfaction (0–4 out of 10)	Sep 2020	14.6	18.1	12.3	12.4	.291
	Feb 2021	18.3	20.8	16.1	18.1	.369
Psychological distress (GHQ-12)	Sep 2020	24.2	24.4	24.6	22.2	.896
	Feb 2021	28.3	28.0	28.8	27.3	.933
Anxiety symptoms (GAD-2)	Sep 2020	8.8	10.3	8.3	6.5	.559
	Feb 2021	9.5	12.8	8.0	5.5	.066
Depressive symptoms (PHQ-2)	Sep 2020	8.0	8.8	7.5	7.5	.886
	Feb 2021	7.8	9.1	7.1	6.1	.563
Conditions during the pandemic						
Living with no other adults	Sep 2020	19.8	21.7	19.1	17.0	.631
	Feb 2021	21.9	24.6	20.6	19.1	.413
Being single	Sep 2020	29.3	32.2	27.5	27.3	.494
	Feb 2021	28.5	32.7	26.2	24.6	.148
Living with children	Sep 2020	34.8	43.8	31.0	23.4	.001
	Feb 2021	36.9	43.9	34.1	27.6	.009
Being worse off financially	Sep 2020	29.2	34.4	26.6	23.8	.113
	Feb 2021	31.7	38.1	29.5	22.0	.002
Not currently working	Sep 2020	24.6	31.1	22.3	14.9	.006
	Feb 2021	28.9	39.7	24.9	14.1	<.001

Estimates are weighted using the COVID-19 wave 3 survey weight and produced in 20 imputed datasets. Bolded estimates are statistically significant at the *p* < .05 level.

PS = Post-secondary education. NVQ = National Vocational Qualifications. W% = Weighted proportion.

variation across time points. In September 2020, 19.8 % were living with no other adults, 29.3 % were single, 34.8 % were living with children, 29.2 % reported being financially worse off compared with before the outbreak, and 24.6 % were not currently working. In February 2021, 21.9 % were living with no other adults, 28.5 % were single, 36.9 % were living with children, 31.7 % reported being financially worse off compared with before the outbreak, and 28.9 % were not currently working. In February 2021, the probabilities of living with children, being worse off financially compared with before the outbreak, and not currently working were each significantly higher in those without post-secondary education (*p* < .01). There was some evidence that those without post-secondary education had become more likely to not work (39.7 % in 2021 versus 31.1 % in 2020) compared with those with a degree (14.1 % in 2021 versus 14.9 % in 2020) between September 2020 and February 2021.

3.2. Mental health inequalities at ages 30–31 between September 2020 and February 2021

3.2.1. Life dissatisfaction

Educational attainment was not associated with life dissatisfaction when controlling for baseline covariates (PR of having a degree vs no post-secondary education = 0.79, 95%CI 0.49–1.28) (see Table 2).

Table 2

Inequalities in life dissatisfaction during the second COVID-19 wave. Next Steps cohort study, England, September 2020–February 2021.

Variable	Model 1 + baseline covariates		Model 2 + health at ages 25–26		Model 3 + conditions in 2020–21	
	PR	95%CI	PR	95%CI	PR	95%CI
Educational attainment						
No post-secondary education (ref.)	–	–	–	–	–	–
Post-secondary education below degree	0.75	0.53–1.07	0.83	0.61–1.14	0.91	0.66–1.25
Degree	0.79	0.49–1.28	0.96	0.63–1.47	1.13	0.75–1.71
Time (ref. = Sep 2020)	1.26	1.02–1.55	1.26	1.02–1.55	1.23	0.99–1.52
Conditions in 2020–21 (time-varying)						
Living with no other adults	–	–	–	–	1.02	0.72–1.44
Being single	–	–	–	–	1.62	1.19–2.23
Living with children	–	–	–	–	0.95	0.67–1.34
Being worse off financially	–	–	–	–	1.73	1.28–2.33
Not currently working	–	–	–	–	1.26	0.95–1.66

N participants = 4167; *N* observations = 8334.

Estimates are prevalence ratios (PR) from weighted random-intercept Poisson models in 20 imputed datasets. Bolded estimates are statistically significant at the *p* < .05 level. Model 1 baseline covariates at ages 13–14 include: sex, ethnicity, presence of longstanding health condition, parental home ownership, parent with a degree, parent with a longstanding health condition, and sexual orientation (ages 25–26). Model 2 health covariates at ages 25–26 also include: fair or poor self-rated health, life dissatisfaction, psychological distress, and longstanding mental health condition.

CI = confidence interval.

While average increases in life dissatisfaction over time were significant (PR = 1.26, 95%CI 1.02–1.55), they did not differ by education (interaction $p = .737$). In the final model also controlling for health covariates at ages 25–26 and time-varying covariates, two conditions were significantly associated with life dissatisfaction. Compared to the reference category: 1) being single was associated with a higher risk of dissatisfaction (PR = 1.62, 95%CI 1.19–2.23); 2) being worse off financially was associated with a higher risk of dissatisfaction (PR = 1.73, 95%CI 1.28–2.33).

3.2.2. Psychological distress (GHQ-12)

Educational attainment was not significantly associated with psychological distress when controlling for baseline covariates (PR of having a degree vs no post-secondary education = 0.98, 95%CI 0.69–1.38) (see Table 3). Average changes in distress over time were not significant (PR = 1.17, 95%CI 0.99–1.38), and did not further differ by education (interaction $p = .961$). In the final model, compared to the reference category: 1) being single was associated with a higher risk of distress (PR = 1.36, 95%CI 1.11–1.67); 2) being worse off financially was associated with a higher risk of distress (PR = 1.58, 95%CI 1.31–1.91).

3.2.3. Anxiety symptoms (GAD-2)

Educational attainment was not significantly associated with anxiety when controlling for baseline covariates (PR of having a degree vs no post-secondary education = 0.51, 95%CI 0.23–1.13) (see Table 4).

Table 3

Inequalities in psychological distress during the second COVID-19 infection wave. Next Steps cohort study, England, September 2020–February 2021.

Variable	Model 1 + baseline covariates		Model 2 + health at ages 25–26		Model 3 + conditions in 2020–21	
	PR	95%CI	PR	95%CI	PR	95%CI
Educational attainment						
No post-secondary education (ref.)	–	–	–	–	–	–
Post-secondary education below degree	1.04	0.80–1.34	1.10	0.86–1.39	1.14	0.91–1.43
Degree	0.98	0.69–1.38	1.09	0.80–1.50	1.17	0.85–1.61
Time (ref. = Sep 2020)	1.17	0.99–1.38	1.17	0.99–1.38	1.16	0.99–1.37
Conditions in 2020–21 (time-varying)						
Living with no other adults	–	–	–	–	0.98	0.77–1.24
Being single	–	–	–	–	1.36	1.11–1.67
Living with children	–	–	–	–	0.85	0.67–1.08
Being worse off financially	–	–	–	–	1.58	1.31–1.91
Not currently working	–	–	–	–	1.08	0.88–1.33

N participants = 4167; N observations = 8334.

Estimates are prevalence ratios (PR) from weighted random-intercept Poisson models in 20 imputed datasets. Bolded estimates are statistically significant at the $p < .05$ level. Model 1 baseline covariates at ages 13–14 include: sex, ethnicity, presence of longstanding health condition, parental home ownership, parent with a degree, parent with a longstanding health condition, and sexual orientation (ages 25–26). Model 2 health covariates at ages 25–26 also include: fair or poor self-rated health, life dissatisfaction, psychological distress, and longstanding mental health condition.

CI = confidence interval.

Table 4

Inequalities in anxiety symptoms during the second COVID-19 infection wave. Next Steps cohort study, England, September 2020–February 2021.

Variable	Model 1 + baseline covariates		Model 2 + health at ages 25–26		Model 3 + conditions in 2020–21	
	PR	95%CI	PR	95%CI	PR	95%CI
Educational attainment						
No post-secondary education (ref.)	–	–	–	–	–	–
Post-secondary education below degree	0.69	0.44–1.07	0.76	0.51–1.13	0.80	0.54–1.20
Degree	0.51	0.23–1.13	0.62	0.30–1.28	0.70	0.33–1.46
Time (ref. = Sep 2020)	1.08	0.80–1.47	1.08	0.80–1.47	1.06	0.79–1.42
Conditions in 2020–21 (time-varying)						
Living with no other adults	–	–	–	–	1.08	0.67–1.75
Being single	–	–	–	–	1.01	0.65–1.56
Living with children	–	–	–	–	0.86	0.54–1.39
Being worse off financially	–	–	–	–	1.76	1.27–2.44
Not currently working	–	–	–	–	1.15	0.74–1.80

N participants = 4167; N observations = 8334.

Estimates are prevalence ratios (PR) from weighted random-intercept Poisson models in 20 imputed datasets. Bolded estimates are statistically significant at the $p < .05$ level. Model 1 baseline covariates at ages 13–14 include: sex, ethnicity, presence of longstanding health condition, parental home ownership, parent with a degree, parent with a longstanding health condition, and sexual orientation (ages 25–26). Model 2 health covariates at ages 25–26 also include: fair or poor self-rated health, life dissatisfaction, psychological distress, and longstanding mental health condition.

CI = confidence interval.

Changes in anxiety over time were not significant (PR = 1.08, 95%CI 0.80–1.47), and did not further differ by education (interaction $p = .615$). In the final model, compared to the reference category: 1) being worse off financially was associated with a higher risk of anxiety (PR = 1.76, 95%CI 1.27–2.44).

3.2.4. Depressive symptoms (PHQ-2)

Educational attainment was not significantly associated with depressive symptoms when controlling for baseline covariates (PR of having a degree vs no post-secondary education = 0.80, 95%CI 0.36–1.78) (see Table 5). Changes in depressive symptoms over time were not significant (PR = 0.97, 95%CI 0.72–1.31), and did not further differ by education (interaction $p = .900$). In the final model, compared to the reference category: 1) being single was associated with a higher risk of depressive symptoms (PR = 1.89, 95%CI 1.16–3.07), and 3) being worse off financially was associated with a higher risk of depressive symptoms (PR = 1.72, 95%CI 1.12–2.64).

3.2.5. Effect modification between educational attainment and negative conditions during the pandemic

None of the 24 interactions tested between educational attainment and the six negative conditions during the pandemic across the four mental health outcomes reached statistical significance (Supplementary Table 4).

Table 5
Inequalities in depressive symptoms during the second COVID-19 infection wave. Next Steps cohort study, England, September 2020–February 2021.

Variable	Model 1 + baseline covariates		Model 2 + health at ages 25–26		Model 3 + conditions in 2020–21	
	PR	95%CI	PR	95%CI	PR	95%CI
	Educational attainment					
No post-secondary education (ref.)	–	–	–	–	–	–
Post-secondary education below degree	0.85	0.51–1.41	0.93	0.57–1.53	0.99	0.60–1.65
Degree	0.80	0.36–1.78	0.97	0.46–2.06	1.10	0.52–2.33
Time (ref. = Sep 2020)	0.97	0.72–1.31	0.97	0.72–1.31	0.96	0.72–1.29
Conditions in 2020–21 (time-varying)						
Living with no other adults	–	–	–	–	0.81	0.50–1.29
Being single	–	–	–	–	1.89	1.16–3.07
Living with children	–	–	–	–	0.81	0.51–1.29
Being worse off financially	–	–	–	–	1.72	1.12–2.64
Not currently working	–	–	–	–	1.27	0.76–2.13

N participants = 4167; N observations = 8334.

Estimates are prevalence ratios (PR) from weighted random-intercept Poisson models in 20 imputed datasets. Bolded estimates are statistically significant at the $p < .05$ level. Model 1 baseline covariates at ages 13–14 include: sex, ethnicity, presence of longstanding health condition, parental home ownership, parent with a degree, parent with a longstanding health condition, and sexual orientation (ages 25–26). Model 2 health covariates at ages 25–26 also include: fair or poor self-rated health, life dissatisfaction, psychological distress, and longstanding mental health condition.

CI = confidence interval.

4. Discussion

In light of the lack of evidence on mental health inequalities among younger adults, this project explored the impact of social and economic risk factors, operationalized through educational attainment and conditions during the pandemic, on the mental health of English Millennials in the second COVID-19 infection wave in 2020–21. Supporting other analyses of mental health trajectories in this cohort (Patel et al., 2022), we found that population levels of mental health were relatively stable in this age group between September 2020 and February 2021, with only the risk of life dissatisfaction increasing. This is in line with findings from the first COVID-19 infection wave that showed that most young adults had been able to quickly recover from the pressures of the pandemic and lockdown measures (Pierce et al., 2021). Overall, we found that inequalities across a range of mental health indicators in this age group: 1) did not meaningfully vary by educational attainment, but 2) have been likely driven by a few key negative social and financial conditions experienced over the past year.

Contrary to common knowledge on the relationship between education and mental health, our first main finding is that none of the mental health outcomes were significantly more prevalent in those without post-secondary education at ages 30–31 (Fryers et al., 2003; Niemeyer et al., 2019; Pinto-Meza et al., 2013; Ross and Mirowsky, 2006). Educational attainment also did not modify the impact of conditions identified during the pandemic on mental health. Two life-course perspectives can help us better understand this null finding. From an

epidemiological perspective, the benefits of higher education on health are likely to develop with age, and be smallest in early adulthood (Miech et al., 2005; Mirowsky and Ross, 2005; Ross and Wu, 1996). From a social perspective, it may also be that higher education is a decreasingly important driver of health inequalities for more recent generations (Gagné et al., 2021b).

Higher education has traditionally represented an important mechanism of social mobility over the past half-century, particularly among women (Dougherty, 2005). However, negative changes in the labor market that started in the 1990s and accelerated in more recent decades have reduced the capacity of higher education to enable new generations to rapidly enter secure, well-paying jobs, which may reduce the magnitude of the role of educational attainment in wellbeing (Belfield and van der Erve, 2018). Supporting this, a study examined differences in life satisfaction at ages 25–26 between the 1970-born British Cohort Study and the Next Steps study, and found that higher education was a protective factor in Gen X women but not in Millennial women (Gagné et al., 2022). Evaluating changes in compulsory schooling laws over time, scholars have argued that staying longer in education may not benefit everyone and could even hinder those who would have preferred to finish earlier (Avenado et al., 2017).

Beyond educational attainment, our second main finding was that some social and economic circumstances continued to be associated with worse mental health after the initial shock in early 2020. Two conditions showed strong negative associations in the fully-adjusted models: being single and being financially worse off since the start of the pandemic. This matches well what other recent studies have found in the general population, meaning that these issues matter just as much in younger adults as in other age groups. For instance, Pierce et al. (2021) found that having increased difficulties paying bills was associated with increased distress between May and October 2020, whereas living with a partner was associated with a lower risk of decreasing or consistently poor mental health over time (Pierce et al., 2021). We note that whereas financial worries showed relatively similar effect sizes across mental health indicators, being single had a stronger magnitude of association with depressive symptoms (PR = 1.89) compared with anxiety symptoms (PR = 1.01), which is in line with previous studies on these relationships (Leach et al., 2013).

These findings contribute to the argument that the role of different risk factors on mental health responses vary across the duration of a negative life event, represented here by the second infection wave in England. At least during the first year of the pandemic, the “immediate” benefits of economic and social resources (e.g., being financially secure and partnered) seem to have far outweighed the less immediate benefits from the human and “cultural” capital associated with completing a degree (Phelan et al., 2010; Ross and Mirowsky, 2006). In line with these findings, other studies that examined the distribution of mental health in the general population also found weak associations between educational attainment and mental health in 2020–21, especially compared to other socioeconomic indicators such as employment status, financial insecurity, or area deprivation (Fancourt et al., 2021). Educational attainment, however, may become more meaningful over time as younger adults come out of the pandemic. It remains to be seen whether this lack of differences will persist beyond 2021.

4.1. Strengths and limitations

We build on the methodological qualities of the Next Steps cohort (i.e., its large sample, prospective nature, and range of data collected since adolescence) and its COVID-19 substudy to derive robust estimates of changes in mental health inequalities in 2020–21. Our study also benefitted from the comparative use of multiple mental health indicators, which yielded surprisingly consistent findings.

A considerable limitation here is the relatively low response rates across the COVID-19 substudy, which is a direct consequence of the short follow-up period allowed to assess cohort members' response at a

specific point in time (i.e., instead of maximising response by allowing fieldwork over a much longer period of time). Sensitivity analyses of the weighting procedure suggest that weighting only partially addresses the potential for non-response bias (Brown et al., 2021). This also affected our statistical power to reliably test statistical interactions.

The interpretation of findings would ideally use other designs (e.g., a counter-factual scenario over a similar time period) to support causality. The timing of the pre-pandemic mental health measures, collected in 2015–16, also limits our ability to mitigate confounding. Partially supporting our findings, we reproduced as a sensitivity analysis our main models also controlling for mental health indicators in the COVID-19 Wave 1 and obtained consistent results (Supplementary Tables 7.1–7.4).

Finally, we note that the use of fully-adjusted models precludes us from distinguishing the temporal relationships between conditions during the pandemic (i.e., whether it is confounding and mediation at work), likely leading to some over-adjustment. In particular, it is likely that part of the negative effect of not working on mental health is explained through the increased likelihood of becoming financially worse off over time.

4.2. Conclusion

Population levels of mental health in 2020–21 have greatly varied in keeping with the push and pull of the COVID-19 pandemic, limiting our capacity to make sense of long-term trajectories and differences across socioeconomic groups. It is likely that the consequences of the pandemic will be only fully felt over the years and decades to come (Bell and Blanchflower, 2011). We contributed to the evidence gap by exploring mental health inequalities over the six months covering the second COVID-19 wave among Millennials who grew up in England. Differences in educational qualifications are unlikely to have exacerbated mental health inequalities in 2020–21. However, negative social and financial circumstances, namely being single and financially distressed, were likely important drivers of declines in mental health during this period. In the short term, the findings support the need for policies and interventions to support younger adults with fewer social and economic resources, across all education groups, to mitigate this mental health crisis.

CRedit authorship contribution statement

TG developed the project, accessed and cleaned the data, performed the analyses, and wrote the first draft. TG and AM designed the final analytic strategy, interpreted the results, and contributed to writing the final draft.

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Conflict of interest

The authors declare that they have no conflict of interest.

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Ethical statement

The authors assert that all procedures contributing to this work have complied with the ethical standards of the relevant national and institutional guides. No ethical approval was necessary for the secondary analysis of these data.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jad.2023.01.101>.

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