BMJ Open

National survey of mental health and life satisfaction of gig workers: the role of loneliness and financial precarity

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ABSTRACT

Objectives To compare the mental health and life satisfaction of those employed in the gig work and contingent work with those in full-time or part-time work and the unemployed in the UK during the COVID-19 pandemic. To explore the possible mechanisms of latent and manifest benefits of employment, such as financial precarity and loneliness.

Design Cross-sectional survey.

Participants A representative sample of 17 722 employed and unemployed British adults, including 429 gig workers. People with disability, retirees and full-time students are not included in the sample.

Main outcome measures Mental health (General Health Questionnaire-12 score) and life satisfaction (a direct question from UK Household Longitudinal Study (UKHLS)) as outcomes. Self-reported loneliness (four widely used questions from UKHLS) and financial precarity (a direct question from UKHLS) as mediators.

Results Gig workers reported mental health and life satisfaction worse than those employed full time and part time, but better than the unemployed. Mediation analyses showed that gig workers' worse mental health and life satisfaction than other workers were explained by their higher levels of loneliness and financial precarity, while gig workers' better mental health and life satisfaction than the unemployed were explained by their less financial precarity.

Conclusions Informal and freelance economy provided manifest benefits of employment to gig workers compared with unemployment but lacked latent benefits of employment. Public policies should provide social support to freelance and contingent workers to reduce their loneliness and improve their psychological well-being, especially during the COVID-19 pandemic.

INTRODUCTION

The gig and informal economy have rapidly expanded around the world over past 10 years.[1] Freelance and contingent workers are salient during the COVID-19 pandemic because quarantine policies and layoffs may increase remote work on outsourcing platforms such as Uber, Amazon Mechanical Turk and TaskRabbit. For example, a government survey in 2017 estimated that 4.4% of the UK population were engaged in gig-type jobs.[2] We define gig work as 'contingent work

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This is the first study to our knowledge to examine mental health and subjective well-being of gig workers in the informal economy using a nationally representative sample.

⇒ We compared gig workers with other workers and the unemployed, thereby identifying employment relations as a determinant of mental health and psychological well-being.

⇒ We drew from the theoretical framework of latent and manifest benefits of employment to test two mechanisms of loneliness and financial precarity.

⇒ Our sample size of gig workers was small, so future studies can oversample gig workers and use more nuanced classifications of freelance and contingent workers.

⇒ Our cross-sectional survey cannot establish causality, especially due to selection biases.

that is transacted on a digital marketplace'.[3] According to the US Department of Labor Bureau of Labor Statistics, contingent work is 'any work arrangement which does not contain an explicit or implicit contract for long-term employment'.[4] Another concept that is related to but broader than gig work is informal work, which is often used interchangeably with contingent work but may encompass underground economy.[3] Gig work is often performed by those who are low-skilled or economic immigrants. Many are not able to find more formal full-time employment opportunities, so the gig economy provides a viable way to generate an income.[5] However, gig-type jobs have been found to pose a range of psychological and mental health risks, which could exacerbate health inequities.[6]

Existing studies linking participation in gig-type work to mental health and well-being outcomes are equivocal about the relationship. Using a broader definition of informal workers which included 66.45% of the employed (ie, anyone who does not have a long-term employment contract), a

Chinese study found that informal workers experienced more depressive symptoms.[7] In contrast, using a non-probability sample of French driving and food delivery workers, another study found no difference in stress and anxiety between gig drivers and other drivers. However, lower levels of stress and anxiety were found among gig bikers compared with workers who did not have gig-type jobs.[8] In terms of well-being, research found lower levels of life satisfaction among Americans whose primary income was derived from Mechanical Turk (MTurk), a labour outsourcing platform, compared with those who were part-time MTurk workers.[9] However, a UK-based convenience sample of Uber drivers in London found higher levels of self-reported life satisfaction compared with employed and self-employed workers.[10] These mixed findings are due in part to the variety of methodologies used. As far as we can tell, no studies used a probability sample of different types of gig workers. In addition, researchers have not agreed on the definitions of gig workers, which can refer to people solely engaged in gig work or the gig workers simultaneously holding other employments. As such, it is useful to compare the results based on different classification criteria. Therefore, our first objective is to compare the mental health and well-being, especially life satisfaction, of gig workers from diverse industries and platforms with those engaged in traditional employment such as full-time and part-time workers and the unemployed using a newly released nationally representative survey.[11]

Within the existing empirical evidence, there is little information concerning the types of mental health benefits that may be lacking from participation in gig work, and thus how labour market and public health policies can best respond to reducing any potential negative health impacts. To examine the mechanisms between participation in gig work and mental health and well-being, we adopt the latent deprivation model[12] or vitamin model,[13] which proposed that employment provides workers with not only manifest or financial benefits, but also latent or psychosocial benefits.[14]

Evidence showed that finding a job provided both types of benefits to the formally unemployed.[15][16] However, both qualitative and quantitative research suggested that gig workers did not obtain the same levels of manifest or latent benefits from employment with other workers. The material benefits for gig workers fluctuate with their ability of attracting and retaining clients on the digital platforms, which are shaped by the macroeconomic cycles and platform policies that are beyond their individual control.[8] Therefore, gig workers may experience a higher level of financial precarity. Moreover, one of the critical latent benefits is social support from stable social networks.[14] This may be difficult for gig workers to obtain for two reasons: first, the nature of their contacts with customers is often transient, so it is hard for them to form long-term relationships with their clients.[3] Second, they seldom have a fixed workplace and predictable work schedule, making it hard to develop social networks

among coworkers and colleagues.[17][18] Thus, gig workers reported more loneliness than other workers,[19] which could deteriorate their mental health, especially during the social isolation of the COVID-19 pandemic.[20] Therefore, the second objective of the article is to explore whether gig workers can obtain the full range of manifest and latent benefits from their employment that reduce financial precarity and loneliness and to suggest targeted public health policy responses.

METHODS
Data and sample
This study used the data from the Understanding Society: The UK Household Longitudinal Study (UKHLS) wave 11 (2019–2021) because this wave contains a question on gig workers in the UK.[11] The UKHLS uses a multistage stratified and clustered sampling method to interview a nationally representative sample of over 40 000 UK households. The response rate of the UKHLS wave 11 is around 76%.[11] To construct the analytical sample, we exclude respondents who are economically inactive such as retired, full-time students, those with longstanding illness, disabled, home careers, etc because they are usually loosely attached to the labour market. Because we are interested in comparing employment relationships, we include employees rather than entrepreneurs who have very different job characteristics. After deleting a small number of missing values of all variables of interests (around 5%), we obtained an analytical sample of 17 722 respondents. All analyses are weighted to consider the unequal probabilities of sampling, non-responses and complex survey design.[11]

Variables and measures
The first dependent variable is mental health, which is measured by the 12-item General Health Questionnaire (GHQ-12).[20] GHQ-12 is a widely accepted and validated scale, consisting of 12 questions to measure people's depression, anxiety, happiness, sleeping problems, etc on a four-point scale ranging from 1 (better than usual), 2 (same as usual), 3 (less than usual) to 4 (much less than usual). Given the high internal consistency (Cronbach's alpha=0.90), we follow the convention of previous research to recode 3 and 4–0 and recode 1 and 2–1 (caseness). The sum of all 12 items yields the GHQ-12 score ranging from 0 to 12, with a higher score indicating poorer mental health (or higher mental distress).[21] The second dependent variable is life satisfaction,[22][23] which is measured by a single and validated question asking respondents' satisfaction with their overall life on a seven-point scale ranging from 1 (completely dissatisfied) to 7 (completely satisfied).[24]

The main independent variable is employment relationships consisting of four categories: gig workers, full-time employed, part-time employed and unemployed. The distinction between full-time and part-time work is whether employees work least 35 hours

Table 1 Weighted sample descriptive statistics

	Full-time employed	Part-time employed	Gig workers	Unemployed	F/χ² tests
Mental distress (GHQ-12), M (SD)	1.89 (0.04)	2.07 (0.07)	2.65 (0.24)	3.47 (0.20)	P<0.001
Life satisfaction, M (SD)	5.12 (0.02)	5.20 (0.03)	4.88 (0.09)	4.34 (0.09)	P<0.001
Subjective financial situation, M (SD)	2.02 (0.01)	2.09 (0.02)	2.35 (0.08)	2.84 (0.06)	P<0.001
Loneliness, M (SD)	1.46 (0.01)	1.49 (0.01)	1.59 (0.04)	1.74 (0.03)	P<0.001
Age, M (SD)	42.92 (0.17)	44.31 (0.37)	41.08 (1.19)	37.78 (0.70)	
Gender, %					P<0.001
Male	0.58	0.26	0.64	0.57	
Female	0.42	0.74	0.36	0.43	
Partnership, %					P<0.001
No	0.28	0.31	0.40	0.6	
Yes	0.64	0.60	0.53	0.29	
Education levels, %					P<0.001
Tertiary	0.53	0.41	0.45	0.27	
Secondary	0.41	0.50	0.42	0.53	
Below secondary	0.07	0.10	0.13	0.21	
Race, %					P<0.001
White	0.91	0.92	0.86	0.84	
Non-white	0.09	0.08	0.14	0.16	
N	11 950	4218	429	1125	17 722
Row %	67.43	23.80	2.42	6.35	100

%, proportions; GHQ-12, General Health Questionnaire; M, means.

per week. To measure gig work, the questionnaire asked respondents about whether they have done any of the following jobs using a website, platform or app in order to make money during the last month, including (1) carried passengers in your vehicle (eg, taxi rides), (2) delivered food and drink from restaurants and food outlets to people, (3) provided courier services (eg, package and postal deliveries, messenger services), (4) performed manual tasks (eg, cleaning, decorating, building, home fixtures and repairs, pet-sitting), (5) performed non-manual tasks (eg, web and software development, writing and translation, accounting, legal and administrative services, marketing and media, audio and visual services). The 1–4 gig jobs are manual work and last gig work is non-manual. The main analysis focuses on gig work as a whole including all types of gig workers. Further analyses distinguishing between manual and non-manual gig workers, between solely gig workers and gig workers with standard jobs, between gig workers with different working hours are conducted as robustness checks.

There are two mediators in this study. The first is financial precarity, which is defined as subjective worry about financial situation,[8 25 26] and measured by a single question asking respondents to evaluate their current financial precarity on a 5-point scale from 1 (living comfortably) to 5 (find it very difficult).[27] The second

mediator is loneliness, which is measured by four items asking respondents about the frequencies of feeling lack of companionship, feeling left out, feeling isolated from others, and feeling lonely on a 3-point scale ranging from 1 (hardly ever or never), 2 (some of the time) to 3 (often). Given the high internal consistency (Cronbach's alpha=0.90), an averaged score of the four items is calculated with a higher score indicating stronger loneliness. Further analysis using principal component analysis yields a similar result.[28]

As mental health and employment relationships may be related to a range of social and demographic characteristics, we controlled for the following variables. They include age (grand mean centred), age squared to take in account the potential curvilinear effect, whether respondents have a married or cohabited partner, education levels (tertiary level, secondary level and below secondary level) and race (white and non-white).

Analytical strategy

First, we use descriptive statistics to describe the analytical variables and use χ^2 and analysis of variance F tests to examine whether the four employment groups differ in health, social and demographic characteristics. Second, we use weighted ordinary least squared (OLS) regression models to examine the mental health differences between gig workers,

Table 2 Weighted ordinary least squared regression models predicting mental distress and life satisfaction for different employment relationships

	GHQ-12 mental distress		Life satisfaction	
	Model 1	Model 2	Model 3	Model 4
Employment relationships (Ref.=Gig workers)				
Full-time employed	−0.76**(0.25)	−0.83*** (0.25)	0.23* (0.10)	0.27** (0.10)
Part-time employed	−0.145	−0.75** (0.25)	0.32** (0.10)	0.32** (0.10)
Unemployed	0.82** (0.31)	0.69* (0.31)	−0.54*** (0.13)	−0.44*** (0.13)
Gender (ref.=male)		0.64*** (0.07)		−0.04 (0.03)
Age (centred)		−0.02*** (0.00)		0.(0.00)
Age squared		−0.00*** (0.00)		0.00*** (0.00)
Partnership (ref.=no)		−0.43*** (0.11)		0.39*** (0.05)
Education levels (ref.=tertiary)				
Secondary		−0.0136		−0.14*** (0.03)
Below secondary		−0.37** (0.13)		−0.11 (0.06)
Race (ref.=white)		0.04 (0.13)		−0.15** (0.06)
Constant	2.65*** (0.24)	2.84*** (0.28)	4.88*** (0.09)	4.54*** (0.11)
Observations	17 722	17 722	17 722	17 722
R^2	0.02	0.04	0.02	0.04

Robust SE in parentheses.
$*p<0.05$, $**p<0.01$, $***p<0.001$.
GHQ-12, General Health Questionnaire.

employed and unemployed, while controlling for sociodemographic variables. Third, we use Sobel-Goodman mediation analyses to examine whether the mental health differences if any can be explained by financial precarity and loneliness. In addition, we conduct a number of robustness checks. First, we repeat the multivariate regression analyses while controlling for mental health and employment relationships at UKHLS wave 10 to examine whether the mental health effect is driven by selection effect (ie, whether people with poorer mental health selected into gig work). Second, we repeat the model of life satisfaction by using binary logistic and ordered logistic models. For the binary logistic model, we recode life satisfaction into a binary variable where 1 indicates 'satisfied' and 0 indicates 'dissatisfied' or 'neither satisfied nor dissatisfied'. Third, we distinguish between different types of gig workers (manual and non-manual gig workers, solely gig workers and gig workers with standard jobs, gig workers with different working hours) to examine whether the mental health differ across subgroups of gig workers. Finally, we test objective income rather than subjective financial situation as a mediator of mental health differences between employed respondents and gig workers. We use the Strengthening the Reporting of Observational Studies in Epidemiology cross-sectional reporting guidelines.

Patient and public involvement

The research questions were informed by the priorities of patients or public (ie, gig workers).

RESULTS

Table 1 reports descriptive statistics. There are 429 gig workers (2.42%) in the sample. Overall, we find that the full-time and part-time employed have the highest levels of mental health and life satisfaction, followed by gig workers, and the unemployed have the worst mental health and well-being. At the same time, full-time and part-time employed also have the least of financial precarity and loneliness, followed by gig workers, and the unemployed again have the worst financial precarity and highest loneliness. In addition, gig workers differ from other employed and unemployed groups in a number of ways. For example, while gig workers are slightly younger, less likely to have a partner, slightly less educated and more likely to be non-white than employed groups, they are older, more likely to have a partner, much more educated and less likely to be non-white than the unemployed.

Table 2 reports a number of weighted OLS regression models. Model 1 shows that compared with gig workers, full-time and part-time employed people have a significantly lower level of mental distress, whereas the unemployed have a significantly higher level of mental distress. Adding a range of sociodemographic variables, Model 2 shows that the mental health differences between the

Table 3 Sobel-Goodman mediation analyses

	Total mediation	Subjective financial situation	Loneliness
Panel A: mental distress (GHQ-12)			
Employment relationships (ref.=Gig workers)			
Full-time employed			
Indirect effect	−0.55 (0.21)**	−0.23 (0.05)***	−0.32 (0.09)***
Percent mediated	67.75%	28.43%	39.32%
Part-time employed			
Indirect effect	−0.41 (0.21)*	−0.16 (0.05)**	−0.26 (0.09)**
Percent mediated	55.71%	21.08%	34.63%
Unemployed			
Indirect effect	0.45 (0.21)*	0.24 (0.06)***	0.21 (0.12)
Percent mediated	64.21%	34.37%	NA
Panel B: life satisfaction			
Employment relationships (ref.=Gig workers)			
Full-time employed			
Indirect effect	0.29 (0.10)**	0.15 (0.03)***	0.14 (0.04)***
Percent mediated	97.79%	52.84%	44.95%
Part-time employed			
Indirect effect	0.21 (0.10)*	0.10 (0.03)***	0.10 (0.03)***
Percent mediated	60.96%	30.32%	30.64%
Unemployed			
Indirect effect	−0.25 (0.10)*	−0.17 (0.04)***	−0.08 (0.05)
Percent mediated	62.42%	40.67%	NA

Robust SEs in parentheses.
*p<0.05, **p<0.01, ***p<0.001.
GHQ-12, General Health Questionnaire; NA, not available.

four groups remain similar. However, the mental health advantages of employed groups have to some extent widened while the disadvantage of unemployed people is attenuated in size by the sociodemographic characteristics. Specifically, we find that those who are female, younger, do not have a partner and have higher education levels are more likely to suffer from mental health problems than their counterparts. Model 3 compares life satisfaction between gig workers, employed and unemployed, and yields similar results. Specifically, we find that while full-time and part-time employed people have significantly higher life satisfaction than gig workers, unemployed people have significantly lower life satisfaction than gig workers. This pattern remains similar after controlling for sociodemographic characteristics.

Table 3 uses Sobel-Goodman mediation analyses to examine to what extent the mental distress differences between gig workers, full-time/part-time employed and unemployed can be explained by their financial precarity and loneliness. Overall, in panel A around 68% of mental health advantage of full-time employed over gig workers can be explained by their lower financial precarity (28%) and loneliness (39%) with each making a significant contribution to the total mediation. A relatively lower percent (56%) of part-time employed people's better mental health can be mediated by financial precarity and loneliness, which contribute 21% and 34% to the total mediation respectively. In contrast, gig workers' better mental health over unemployed can only be significantly mediated by their better financial precarity (34%), but not by loneliness (only significant at 0.1). In Panel B, we find that full-time employees' higher life satisfaction over gig workers can be almost fully mediated by their better financial precarity (53%) and lower loneliness (45%). Also, a large proportion (61%) of part-time employees' higher life satisfaction can be mediated by financial precarity and loneliness with each making an equal contribution (30%). Again, gig workers' better life satisfaction over unemployed can only be mediated by their lower financial precarity (41%), but not by loneliness (only significant at 0.1).

To ensure the robustness of the results, we conduct a number of robustness checks. First, we repeat the multivariate regression analyses while controlling for mental health and employment relationships at UKHLS wave 10 to examine whether the mental health effect is driven by selection effect in online supplemental table 1. Overall, we find that after controlling for the selection effects the

mental health differences between the four employment groups remain similar and significant. Second, we repeat the model for life satisfaction by using binary logistic and ordered logistic models in online supplemental table 2 and find that the results remain similar. Third, we distinguish between manual (62.09%) and non-manual gig workers (37.91%) to examine whether the mental health differ between both groups. Online supplemental table 3 shows that while manual and non-manual gig workers do not have significant differences in mental health and life satisfaction, both groups tend to have lower levels of mental health and well-being than employed people and better mental health and well-being than unemployed. However, due to small sample sizes of gig worker subgroups some groups differences are only significant at 0.1.

Fourth, we distinguish between solely gig workers (66.01%) and gig workers with standard jobs (33.99%) in online supplemental table 4 and find that the results are generally consistent with our main conclusions. For mental health, solely gig workers have significantly lower levels of mental health than the employed, but not significantly different levels of mental health compared with the unemployed. Changing gig workers with standard jobs as the reference group, we find that gig workers with standard jobs have significantly better mental health than the unemployed but similar mental health to the employed. For life satisfaction, gig workers regardless of types are generally worse than the employed but better than the unemployed in mental health and life satisfaction.

Fifth, we distinguish between gig workers with shorter (lower than the average or 20 hours per week, 66.34%) and longer working hours (equal or higher than the average or 20 hours per week, 33.96%) in online supplemental table 5. The overall pattern is similar. Specifically, we find that gig workers with shorter working hours are worse than the employed but similar to the unemployed especially in mental health, whereas gig workers with longer working hours are similar to the employed but are significantly better than the unemployed in both mental health and life satisfaction.

Sixth, as unemployed respondents do not have income, we use subjective financial situation as a mediator in the main analyses. As a robustness check, we restrict our sample to employed respondents and test logged monthly income as a mediator in online supplemental table 6. Overall, the results are consistent with our main conclusions and show that logged monthly income can explain around 24%–29% of mental health differences and 55%–83% of life satisfaction differences between employed and gig workers, which are statistically significant. Overall, the robustness checks suggest that our findings are robust to alternative model and variable specifications.

DISCUSSION

We found that, on one hand, gig workers in the UK had worse mental health and life satisfaction compared with other workers during the COVID-19 pandemic, even after controlling for various risk factors. The disparities are explained by their loneliness and financial precarity. Although this is the first nationally representative study on gig workers, the finding corroborates a study on German freelance media workers, which link their adverse psychosocial work conditions with poorer subjective health.[29] It is also broadly in line with a US-based study that evidenced more health limitations of piece rate workers compared with other workers[30] and a Chinese study that documented more depressive symptoms among informal workers in comparison with formal workers.[7] Our results contrasted the findings from two studies on the convenience samples of gig drivers in France and London,[8 10] respectively, which evidenced their better mental health. Our findings suggested that these findings may not generalise to all gig workers across industries and platforms and underscored the importance of using probability samples to paint a full picture of gig workers' mental health burden.

On the other hand, gig workers did report better mental health and life satisfaction than those of the unemployed, which reiterated the significance of employment, regardless of types, in improving mental health.[14–16] Therefore, our findings did not question the role of the growing gig economy in supplementing incomes and improving well-being of those without access to better jobs. Instead, public health policies should focus on closing the mental health gap between the gig workers and other workers.

Latent benefit of employment

Consistent with the theories on the psychosocial benefits of employment[31] and past research on gig workers, our findings suggest that financial insecurity was not the only source of the mental health burden of gig workers. Rather, loneliness explained a larger portion of the mental health gap between gig workers and full-time workers. Our finding corroborates Jahoda's latent deprivation model[12 13] and the widely established relationship between workplace social capital and mental health.[32 33] This finding holds key implications for public health policies, especially during the COVID-19 pandemic when social isolation and loneliness are prevalent.[20] Although cash assistance is helpful to improve public mental health, work-based social connections are critical to the mental health of those who had to work outside formal workplaces.[34 35]

Public health implications

Our findings call attention of mental health practitioners to employment relationships, especially gig-type jobs, as an emergent social determinant of mental health.[36 37] To prevent and reduce the mental health burden of gig workers, our findings suggest the need for public health policies to improve social support at workplaces and

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