



Influences of zero hour contracts and disability – Analysis of the 1970 British Cohort study

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ABSTRACT

Rationale: In recent decades, there has been a rise of the “gig-economy” where workers are given non-standard work agreements, and work is completed in an ad-hoc nature. It was believed people this would create greater access to employment for people with disability as there would no longer be a need to disclose disability and could ‘pick and choose’ work. Although, little research has been done on the health-outcomes of working in non-standard agreements compared to traditional employment, and in particular it’s impact on disability.

Objective: This study examines one particular non-standard workplace agreement, working under zero hour contracts as the main source of income as a predictor for disability at age 46 and how income levels effect this, while controlling for pre-existing illness at age 34.

Method: This study used existing data made available in the 1970 British Cohort study. Age 46 and Age 34 sweeps were used, including predictors for disability such as zero hour work, sex, and income, and binary multiple logistic regression was used.

Results: This study was able to demonstrate that there is an association between working under a zero hour contract as the main source of income and disability. Further, this study shows that this association is statistically significant at low incomes but not at high incomes.

Conclusions: The relationship between zero hour work and disability presented in this study may suggest that zero hour work will produce a burden on healthcare systems and limit further economic outputs by limiting individual’s capacity for work.

Zero hours contracts are employment arrangements in which the employer does not guarantee a minimum number of, or regular working hours for the employee. In the past few decades, zero hour contracts have become commonplace in most industrialised nations. This trend is part of a wider increase in nonstandard working agreements often referred to as the ‘gig economy’. The gig economy is comprised of digital marketplaces connecting workers to employers. It offers a flexible alternative to provide goods and services in an economy (Taylor et al., 2017). This work is often self-directed and relies on contingent pieces of work, freelancing, casual labour, zero hour and short-term contracts (Huws et al., 2016; Taylor et al., 2017). It was thought these digital marketplaces would have low barriers to entry and compensation is directly proportionate to the amount of effort (Davis & Hoyt, 2020a, 2020b). Proponents for gig-work argue that this type of work provides individuals with greater flexibility and autonomy. However, individuals do not have minimum guarantees for work, and typically have little say

about how much work they perform (Freni-Sterrantino & Salerno, 2021). Generally, gig work is more prevalent in urban areas and with younger people, immigrants, and those from lower to middle socioeconomic class (Freni-Sterrantino & Salerno, 2021; Tran & Sokas, 2017). Individuals who use gig work to supplement another income source have higher satisfaction with gig work compared to those who rely on gig work as their main income (Wood et al., 2019).

To date there has been surprisingly little research into the impact of zero hour contracts on health (Freni-Sterrantino & Salerno, 2021). It has been shown that UK domiciliary care workers on zero hour contracts have high levels of stress compared to those who are on contracted hours (Ravalier et al., 2019). With increasing workplace stress, individuals are at increased risk of chronic health conditions including cardiovascular disease, psychiatric conditions and metabolic conditions such as type II diabetes (Ravalier et al., 2017). Similarly, job insecurity in middle ages has shown to increase the risk of high blood pressure and diabetes,

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which is particularly concerning when younger individuals are more likely to engage in gig-work (Waynforth, 2018). In the US, analysis of workers on ‘piece rate’ jobs were at higher risk of negative intermediate and long term health conditions when compared to salaried workers (Davis & Hoyt, 2020a, 2020b). Deleterious health impacts were higher in low-waged, female and non-white workers, suggesting those at higher risk of experiencing discrimination in traditional workplace agreements would face poorer outcomes when engaging in the gig economy (Davis & Hoyt, 2020a, 2020b).

The focus of the present study is disability. In gig work, flexible working conditions can help reduce the stigma for people with disabilities by reducing the need to disclose their health condition, but in doing so, they also absorb all the risks associated in completing the work (e.g. providing and maintaining equipment) (Harpur & Blanck, 2020). A benefit of someone with disability working the gig-economy is their ability to pick and choose tasks. This enables them to be able to create individualised work plans, be able to determine how to accommodate for their individual needs and reduces the need to seek formal approval for these changes (Harpur & Blanck, 2020). However, people with disability may be restricted from entering gig-work as they may lack the education, resources, or work training to gain work. An additional barrier that may exist for people with disability is an “income cliff”, where income from gig-work increases the possibility of exceeding income limits for government benefits (Doucette & Bradford, 2019). In Australia, a government inquiry has shown workers with disabilities are more likely to engage in gig-work as an essential source of income. It further showed that of those workers who are economically vulnerable, people with disabilities are more likely to engage in gig-work (McDonald et al., 2019). Hence, people with disabilities would be at higher risk at the negative consequences of engaging in gig-work.

The purpose of the present study was to determine whether zero hours work as the main source of income is associated an increased likelihood of disability in middle-age, with the presence of disability earlier in adulthood statistically controlled.

1. Methods

Data for this study was obtained from the ongoing longitudinal study of the 1970 British Birth Cohort Study (BCS70) that consists of subjects born over a single week of 1970 from England, Scotland and Wales enrolled at birth (16 571 babies) (Elliott & Shepherd, 2006). To date there have been 10 sweeps across various ages in their life course and cohort profiles, survey design, questions and interview format have been described in detail elsewhere (Centre of Longitudinal Studies, 1970; Centre of Longitudinal Studies, 2022a; Elliott & Shepherd, 2006). For the purpose of this study, the sample includes working participants from the last data sweep at age 46, completed in from Jul 2016 to July 2018 (n = 8581) and at age 34, completed in 2004 (n = 9665). (Centre of Longitudinal Studies, 1970; Centre of Longitudinal Studies, 2022a).

1.1. Outcome

The dependent variable was a binary variable indicating the presence or absence of a disability, defined by the Equality Act of 2010, at age 46 (Fell & Dyban, 2019). This includes any health condition which makes daily life more difficult than normal that have persisted for a year or longer. Many common episodic or recurring conditions including epilepsy and major depression are included as disabling conditions, as are progressive conditions including systemic lupus. The Equality Act excludes a range of conditions including seasonal allergies and substance-use disorders (Fell & Dyban, 2019).

1.2. Predictors

The main dependent variable was whether the cohort member’s main job was self-reported as zero hour contract work (BD10DISEQ) in

the 2016 sweep (age 46). This was determined by the cohort member providing a “yes/no” response to the question, whether zero hour contracts are the main source of income for the cohort member.

Additional covariates included were sex (B10CMSEX), gross weekly-income at age 46 (B10GROW 2016 sweep) and long-term illness at age 34 (b71siany 2004 sweep). Disability is more common in women, and less common with increasing socioeconomic status (Vaughan et al., 2021). Potential interaction effects between income and zero-hours work, and sex and zero hours work on disability were explored using margins plots. These interactions seemed plausible because with higher income, the nature of zero-hours contract work is likely to be different: some highly paid professional contract work may be zero-hours and less likely to be associated with disability. Similarly, as women face more workplace discrimination it may be expected that being a woman with a zero-hours contract may be more likely to be associated with disability.

1.3. Statistical analysis

Binary multiple logistic regression was used. Three sets of logistic regression models were carried out: a model for each predictor separately, a model including all four predictors, and a penalised (Firth) logit model to address the likely problem of bias due to few events (few cases of disability). Interactions were explored by calculating margins and displaying them in margins plots. Analysis was carried out in Stata 16.

2. Results

2.1. Descriptive statistics

A total of 15 744 cohort members had completed the Age 34 and Age 46–48 sweep. Of those, a total of 4797 had provided sufficient information across each variable to be included in the regression analysis for predicting disability. Table 1, summarises the descriptive statistics for each binary variable and Table 2, summarises the descriptive statistics for gross weekly income.

A total of 657 cohort members were registered as disabled under the Equality Act 2010, corresponding to 13.7% of those included in the analysis. The median gross weekly pay was \$557. At age 34, 1203 of the cohort members had some long-standing illness, disability or infirmity.

2.2. Logistic regression results

Table 3 summarises the results of logistic regression models predicting disability at age 46–48. Being on a zero hour contract was statistically significantly associated with an increased odds of disability in all three models, but the odds ratios were smaller and p-values substantially larger in the multivariate models than in the bivariate model. This appeared to be due to multicollinearity between income and zero-hours work (VIF = 15), which increased the variance for both variables,

Table 1
Descriptive statistics of binary variables.

	Zero hours work contract				No zero hours work			
	N. no	% no	N. yes	% yes	N. no	% no	N. yes	% Yes
Disability at age 46-48	93	77.5	27	22.5	4049	86.5	631	13.5
Sex	38	31.7	82	68.3	2186	46.7	2494	53.3
	M	M	F	F	M	M	F	F
Long-standing illness, disability or infirmity at age 34	84	70	36	30	3510	75	1167	25

Table 2
Descriptive statistics for gross weekly pay, split by zero hours contract work.

Zero hours work contract	Zero hours work contract					No zero hours work				
	N.	Min.	Max.	Mean	SD	N.	Min.	Max.	Mean	SD
Gross Weekly pay (GB£)	120	18.45	2403.85	409.50	397.63	4680	.02	80 759	829.36	2249.34

Table 3
Results of regression analysis for predictors of disability.

	Model for each predictor without covariates			Model with covariates			Penalised (Firth) logit model	
	B	OR (95% CI)	p	B	OR (95% CI)	p	B (95% CI)	p
Zero-hour contract	0.62	1.87 (1.21–2.89)	.005	0.52	1.67 (1.06–2.62)	.026	0.54 (0.09–0.98)	.018
Sex (M = 1, F = 2)	0.51	1.67 (1.41–1.98)	<.001	0.52	1.68 (1.40–2.00)	<.001	0.52 (0.35–0.70)	<.001
Gross weekly pay (£/100)	−0.02	.98 (.973–.997)	.018	−0.01	1.00 (0.99–1.00)	.27	−0.01 (0.99–1.00)	.515
Long-standing illness, disability or infirmity at age 34	1.24	3.45 (2.91–4.09)	<.001	1.23	3.51 (2.95–4.16)	<.001	1.11 (0.88–1.28)	<.001

although not enough to make the p-value for zero hour work to lose statistical significance. Attempts to mitigate the problem by log transformation of income and converting income to percentiles only exacerbated the collinearity. The interaction between income and zero-hours work is displayed in Fig. 1a, which shows that disability for zero hour workers was only more likely at lower incomes. The p-value for this interaction when added to the logistic regression model as a centred residual was statistically significant (B = 0.43, p = 0.015). Income was a statistically significantly protective against disability in the bivariate model (see left side of Table 3), but was not significant in the multivariate models due to the aforementioned multicollinearity with zero hours work. Women had an increased odds of disability, as did cohort members who were disabled earlier in adulthood. There was no evidence of interaction with sex or prior disability: zero-hours work was associated with a similar increase in the risk of disability for both sexes, and for all three levels of disability reported at age 34 (Fig. 1b and c).

3. Discussion

The results showed an association between working in a zero-hours contract as the main source of income and an increased odds of disability in middle-age. While statistically significant as a main effect, an interaction with income was also present such that zero-hours work was associated with disability at low but not high income. Interaction effects were not found for sex or disability earlier in adulthood: zero hours contract work increased the odds of disability similarly regardless of cohort members’ prior disability. This is consistent with a bidirectional relationship: zero-hours working conditions lead to an increased risk of disability, and disability limits options and bargaining power with employers such that registered disabled individuals are more likely to engage in zero-hours contract labour.

This research addresses a gap in the published literature on work and health, but the results are broadly consistent with several prior studies which have explored relationships between working in zero hour contracts and health. Davis and Hoyt (2020) longitudinal study in the US on the impacts of piece rate on health showed increased rates of self-reported health limitations compared to salaried employees (OR 1.4–1.8 95% CI) and health-limitations disproportionately affecting low-waged, female and non-white populations (Davis and Hoyt, 2020). Therefore, working under zero hour contracts may compound health issues people with disability already face, putting them at increased risk of job-limiting disability and a more vulnerable position. Similarly, Bender et al. (2012) demonstrated in European workers, that the more workers engage in piece-rate work, the higher the risk of injury even when controlling for job type and workplace hazards. This may offer an explanation to the association between zero hour work and disability demonstrated in this study.

If the relationship between zero hours work and disability observed

in the present research represents the true situation in modern economies, zero hours work will produce a burden for healthcare systems and depress future economic output by making more individuals less capable of making future economic contributions. The results additionally suggest that more workplace protections may be needed for people with disability.

In the United Kingdom, approximately 3% of adults were on zero hour contracts in 2021 compared to just 0.4% in 2004, highlighting the increasing prevalence of these workplace agreements (Leaker, 2022). There is a bimodal distribution for adults engaging in zero-hour contracts at ages of 16–24 and for those aged 65 and older (Leaker, 2022). Therefore, there appears to a relationship of zero hour work in the extremes of one’s working life. This may be particularly concerning where zero hour work may exacerbate health conditions associated with ageing or may limit the economic output of younger individuals just beginning their working life.

3.1. Limitations and future research

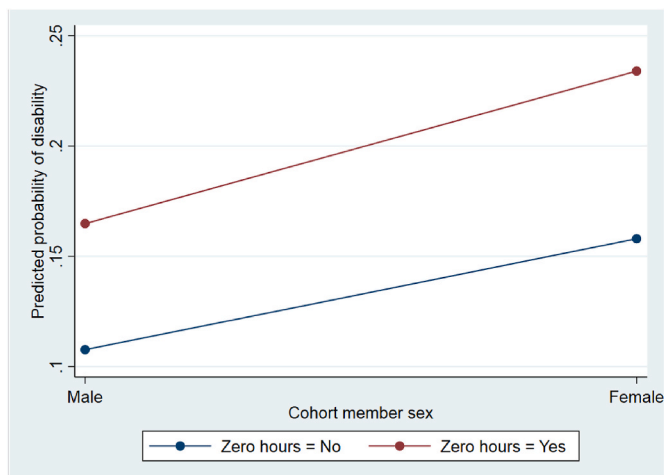
One limitation of this study is that the 1970 British Cohort study first included information on working in under a zero-hours contract as the main job in the age 46–48 sweep. Due to the COVID pandemic, the collection of the 2020 sweep was delayed. As data from the next sweep of the British Cohort (2021–2022) becomes available, further analyses could be completed to determine whether working in a zero-hours contract is associated with new disability (Centre of Longitudinal Studies, 2022b).

Second, a potential limitation of this study stems from the fact that in the 1970 British Cohort sample 13.7% people reported disability, compared to 22% in the general population (Vaughan et al., 2021).

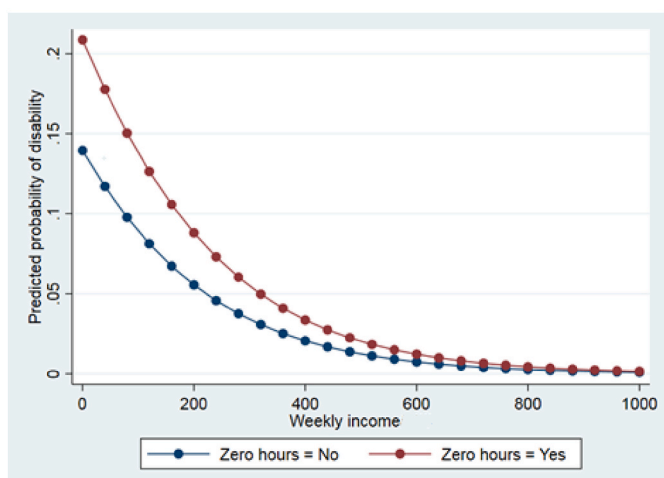
The reasons for this discrepancy are not known and could indicate higher loss-to-follow-up in disabled participants. This would perhaps be more likely to lead to underestimation of the impact of zero hour contracts on people with disability rather than overestimation. There appears to be a large drop in sample size, however this is due to the those working in zero hour contracts were being compared to all workers, with people not being employed were not considered at risk of disability due to employment related reasons.

4. Conclusion

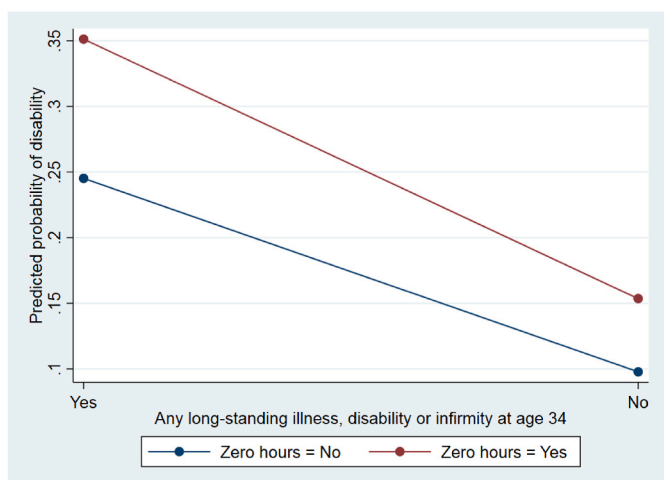
There is an association between zero hour contracts as a main source of income and disability in the UK working population. This association is stronger at lower incomes, however, there does not appear to be a greater risk for high income workers. Further research in this area is warranted to determine the causality of this relationship and how supplement incomes through zero hour contracts affect disability.



a. Predicted probability of disability vs cohort member sex



b. Predicted probability of disability vs weekly income



c. Predicted probability of disability vs Any long-standing illness, disability or infirmity at age 34

Fig. 1. Margins plots displaying interactions between zero hours work as the main job and predicted disability for the three covariates included in the logistic regression analysis.

Ethics

Ethics was not required for use of the data as made available by the Centre of Longitudinal Studies, London, through the UK Data Service.

Data

The datasets generated during the current study are available in the UK Data Service repository, <https://beta.ukdataservice.ac.uk/datacatalogue/series/series?id=200001>.

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Author contribution

Meet Patel: conceptualisation, writing – original draft, Writing Review & Editing, Data Curation, Methodology, Formal analysis. **David Waynforth:** Methodology, Formal analysis, Writing – Original Draft, Writing – Review & Editing, Supervision.

Consent for publication

Not applicable.

Declaration of competing interest

The authors declare that they have no competing interests.

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