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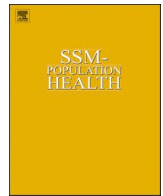
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Employment related COVID-19 exposure risk among disabled people in the UK

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ABSTRACT

We provide new evidence about the work-related exposure of disabled people to COVID-19 using household survey data combined with a novel occupational risk indicator. Despite their higher clinical vulnerability, disabled people in employment in the UK were significantly more likely to be going out to work during the pandemic rather than working from home, and were working in occupations that were more exposed to COVID-19 than the occupations of non-disabled workers. Our results raise questions about whether there are sufficient safeguards for disabled people in the workplace, and have longer-term implications for a labour market where COVID-19 is a persistent health issue.

1. Introduction

The coronavirus (COVID-19) pandemic of 2020–21 is one of the worst health crises in living memory, so far contributing to over five million deaths worldwide, including over 140,000 in the UK (World Health Organization, 2021a). Evidence suggests that certain demographic groups have been more severely affected than others and this has served to widen existing health inequalities. For example, in the UK in 2020, disabled people were more than three times more likely than non-disabled people to die from COVID-19 (Office for National Statistics, 2021a).

In this paper, we provide new evidence about the work-related exposure of disabled people to COVID-19. We show that, despite their higher clinical vulnerability, disabled people in employment in the UK were significantly more likely to be going out to work during the pandemic rather than working from home, and were working in occupations that were more exposed to COVID-19 than the occupations of non-disabled workers. Our results raise questions about whether there are sufficient safeguards for disabled people in the workplace, and have longer-term implications for a labour market where COVID-19 is a persistent health issue.

2. COVID-19 and the workplace

The SARS-CoV-2 virus, which causes COVID-19, is largely airborne and can spread from an infected person in small liquid particles called

aerosols when they cough, sneeze, sing, breathe heavily or talk. It can then be inhaled or inoculated through the mouth, nose or eyes of a close contact (World Health Organization, 2021b). As such, the risk of becoming infected increases the more one comes in contact with different people; hence workplaces can be fertile territory for the spread of the virus.

The World Health Organization (WHO) has documented the risks of COVID-19 infection in occupational settings. Health workers are at particular risk because of aerosol-generating procedures involving COVID-19 patients or work with infected people in indoor, crowded places without adequate ventilation (World Health Organization, 2021b). This is confirmed by Bielicki et al. (2020). Using UK Biobank data, Mutambudzi et al. (2021) find that healthcare workers in the first wave of the pandemic had a more than seven-fold higher risk of severe COVID-19 than non-essential workers.

The WHO also recognises that transmission of SARS-CoV-2 has occurred in a wide range of workplaces outside of healthcare. Notable occupations include service and sales, cleaning and domestic work, education, meat-processing, hospitality, drivers and transportation, public safety, construction and social service occupations. Workplaces with physical person-to-person contact, inadequate ventilation, common eating areas and shared work accommodations and travel are found to be most conducive to COVID-19 outbreaks (World Health Organization, 2021c). People working in social care and transport occupations in the UK had a two-fold higher risk of severe COVID-19 in the first wave of the pandemic than non-essential workers (Mutambudzi et al., 2021).

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Statistics on COVID-19 related deaths by occupation in the UK tell a similar story. Men and women working in social care occupations had among the highest death rates in 2020, and men working in healthcare had a significantly higher rate of death than men of a similar age in the wider population. Men working in elementary occupations, particularly process plant workers, also experienced a very high relative death rate (Office for National Statistics, 2021b).

In the UK, much of the policy response to the pandemic involved addressing the risk of virus spread in work spaces. Rules imposed in March 2020 implored people to work from home if possible (GOV.UK, 2020a), and this guidance remained in place throughout most of the pandemic. At the time of writing, people in England are no longer advised to work from home (the advice is still in place in the rest of the UK). However, employers are required to conduct a risk assessment of any return to workplaces, giving extra consideration to workers vulnerable to COVID-19 (BEIS, 2021).

Support was made available to sectors where it was considered essential for 'keyworkers' to continue to attend their place of work during the lockdowns. The emphasis for this group was to minimise the risk of catching or spreading the virus while enabling them to continue to work. Personal protective equipment (PPE) was supplied to sectors (such as health and social care) where the risk of infection was particularly high (GOV.UK, 2020b). Nevertheless, it is clear from the evidence reported above that these keyworkers were more likely to catch and die from COVID-19 than workers who stayed at home.

As shown in our analysis below, in April 2020 the employed population was split into three roughly equal groups: those working from home; those working outside the home; and those employed but working zero hours. Many in this latter group were furloughed under the Job Retention Scheme (JRS), introduced at the start of lockdown to protect jobs at risk due to workplace closures and the economic downturn. This group, however, reduced in size over the following months as workplaces were able to introduce mitigation measures to allow more people to return to work.

3. COVID-19 and clinical vulnerability

Most people infected with COVID-19 experience mild to moderate symptoms and are able to recover without special treatment. However, older people and those with underlying medical problems such as cardiovascular disease, diabetes, chronic respiratory disease and cancer are more likely to develop serious illness (World Health Organization, 2021d). In the UK, people at high risk (clinically extremely vulnerable) were advised to shield (that is, to stay at home and avoid contact with people outside their household) (NHS, 2021).

4. COVID-19 and health inequalities

There is clear evidence that the effects of the COVID-19 pandemic have not been felt equally across the population, and that this extends beyond differences in clinical vulnerability due to age and pre-existing health conditions. As such, the pandemic has exposed, and arguably widened, existing health inequalities.

Much of the recent literature focuses on how COVID-19 has had differential impacts according to ethnicity. In the UK, death rates during the first wave were lower for White British people than almost all other ethnic groups (Office for National Statistics, 2021c). While it is noted that Black and Minority Ethnic (BAME) people are more likely to have health conditions associated with clinical vulnerability, their lower age profile suggests they should not be at disproportionate risk of severe illness due to COVID-19 (Selden and Berdahl, 2020). Therefore, it is likely that increased exposure risk due to socioeconomic factors is underlying these differences in death rates. Indeed, it is found that BAME people are more likely to work in occupations where the risk of infection is high (Rogers et al., 2020; Hawkins, 2020; Platt, 2021) or to live in the same household as an at-risk worker (Selden and Berdahl, 2020). It is

also shown that risk of fatality is higher within low socioeconomic status communities (Clouston et al., 2021).

5. COVID-19 and disability

Less is known about variation in exposure risk according to disability status. Data from the Office for National Statistics (ONS) shows that, between January and November 2020 in England, after adjusting for age, the risk of death involving COVID-19 was about three times higher for more-disabled people (defined as those whose disability limits their day-to-day activities "a lot") and about two times higher for less-disabled people (those whose disability limits their day-to-day activities "a little") compared to non-disabled people. In fact, nearly 60% of people who died due to COVID-19 up to November 20, 2020 were disabled (ONS, 2021a), suggesting, therefore, a high correlation between disability and clinical vulnerability.

After adjusting for other personal and household characteristics (including pre-existing health conditions), the differential risk of death reduces but is still significant for more-disabled and less-disabled women, and more-disabled men (ONS, 2021a). This suggests that clinical vulnerability alone does not explain the raised death rates among disabled people.

As suggested by Platt (2021), this may be partly explained by the fact that disabled people with clinically vulnerable health conditions may be more at risk than non-disabled people with the same conditions. If a health condition is experienced as disabling (limiting day-to-day activities), then it is by nature more severe or less well-managed than a health condition that is not disabling.

Nevertheless, there is a case that disabled people (similarly to those from BAME groups) may have been disproportionately exposed to the virus. Although not based on empirical evidence, Kuper et al. (2020) discuss why this may be the case. Social distancing and self-isolation can be more difficult for disabled people if they rely on the support of carers. Disabled people may have a greater need to leave home for medical appointments or to collect medication or devices, if home delivery is not available. Disabled people may lack easy access to handwashing facilities. Higher levels of poverty and deprivation among disabled people may expose them to greater risk of infection. Also, people with sensory or intellectual impairments may be less informed about the virus, public restrictions and available services, and are therefore less able to protect themselves. Moreover, people with mental disorders are thought to have a higher risk of infection, in part due to challenges in appraising health information and complying with preventative behaviours (Wang et al., 2021).

While these theories may be providing some insights, it has been suggested that more research is needed to unpack why death rates among disabled people have been so high, and whether the employment patterns of disabled people have been playing a role (House of Commons Work and Pensions Committee, 2021). Our analysis aims to feed into this research gap by providing evidence on the employment related exposure risk of disabled workers during the pandemic.

6. Our analysis

We use data from Understanding Society: The UK Household Longitudinal Study (UKHLS) (University of Essex, 2021), a panel of households from across the UK surveyed every year since 2009. After the start of the pandemic, a number of households answered additional surveys at monthly and later bimonthly intervals. These 'Covid waves' took place in April, May, June, July, September and November 2020, and January and March 2021. Our sample consists of individuals interviewed in at least one Covid wave who could also be matched to responses given in the most recent pre-pandemic wave of the main survey (Waves 10 or 11).

The sample is divided according to whether the individual was disabled before the pandemic. To be classified as disabled, the

respondent had to report that they have a long-standing physical or mental impairment, illness or disability and have substantial difficulties with one or more of the following areas of life: mobility (moving around and walking); lifting, carrying or moving objects; manual dexterity (using hands to carry out everyday tasks); continence (bladder or bowel control); hearing (apart from using a standard hearing aid); sight (apart from wearing standard glasses); communication or speech problems; memory or ability to concentrate, learn or understand; recognising when they are in physical danger; physical co-ordination (e.g. balance); difficulties with own personal care (e.g. getting dressed, taking a bath or shower); or other health problem or disability.¹

Our sample consists of 10,684 working age individuals who were in employment or self-employment in the weeks leading up to the pandemic (January or February 2020), of which 1698 (16%) were disabled. As employment rates remained broadly stable over the course of the pandemic (largely due to the JRS), our analysis focuses on changing working patterns among the employed population as a result of the COVID-19 pandemic and lockdown restrictions.

6.1. Working from home

One of the primary ways to avoid disease exposure at work is to work at home. Fig. 1 shows that, in the weeks before the first lockdown, only about one in ten workers in the UK regularly worked at home, and that disabled people were significantly less likely to work from home than non-disabled people. Unsurprisingly, there was a large increase in the number of people mainly working at home between February and April 2020. However, the gap between disabled and non-disabled people increased: in April 2020, 40% of non-disabled people were working at home, compared with only 30% of disabled people, and this gap was sustained throughout the pandemic.²

6.2. Working zero hours

Many people unable to work at home instead reduced their hours in response to lockdown restrictions. This may have been voluntary as a way of keeping safe or imposed by employers due to the closure of workplaces or drop in demand. Fig. 2 shows that, in April 2020, around a third of employed or self-employed people worked zero hours in a given week, although numbers fell substantially in subsequent months. Many,

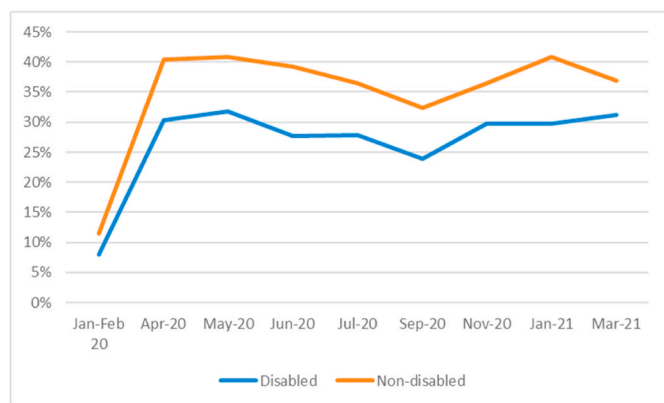


Fig. 1. Percentage of workers always or often working at home.

¹ This definition of disability is closely aligned to that of the Equality Act (2010): a person has a disability if they have a physical or mental impairment and the impairment has a substantial and long-term adverse effect on their ability to carry out normal day-to-day activities.

² The difference is statistically significant (at the 5% level) in every survey month except November.

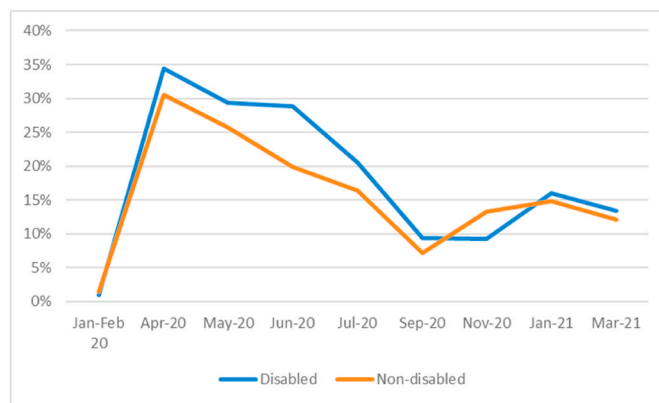


Fig. 2. Percentage of workers working zero hours in the reference week.

but not all, of these individuals were furloughed under the JRS. Here we see less difference between disabled and non-disabled workers than for working from home, and in only two months are the differences statistically significant. In June, disabled workers were more likely to be working zero hours than non-disabled workers (29% versus 20%), but in November 2020 during the second lockdown, disabled people were less likely to be working zero hours (9% versus 13%).

6.3. Working outside the home

Based on the measures of working from home and working zero hours, we construct an indicator for working outside the home. This assumes that any people still employed but neither working from home nor working zero hours continued going out to the workplace. Clearly this is the group of workers most at risk of COVID-19 exposure. As shown in Fig. 3, mirroring the rise in working from home and working zero hours, the proportion of workers working outside the home dropped sharply between February and April 2020. In January–February, nearly 90% of workers were in the workplace, but by April this fell to 38% of disabled workers and 32% of non-disabled workers, a gap of 6 percentage points. The gap persisted throughout the pandemic.³

6.4. Exposure to risk

Not every occupation or workplace is equally at risk of exposure to

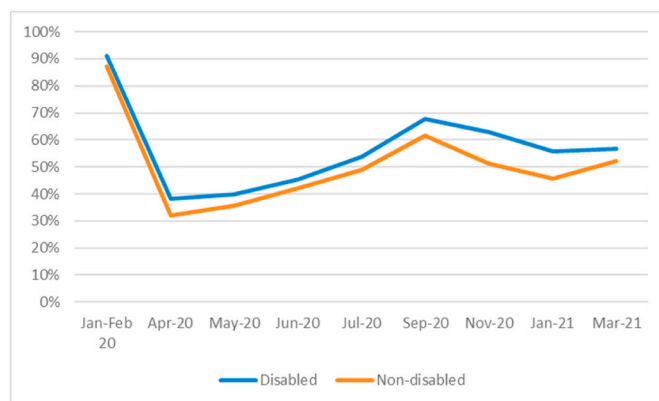


Fig. 3. Percentage of workers working outside the home in the reference week.

³ The difference is statistically significant for every month except May, June, July and March.

COVID-19. Following Kikuchi and Khurana (2020), we ascribe a Risk Indication Factor (RIF) to every individual in our dataset, based on their stated occupation in 2019. The RIF is based on the extent to which occupations score highly on exposure to disease or infection and physical proximity to others while at work according to O*NET (2021), where 0 denotes the lowest possible risk and 100 denotes the highest possible risk. These two job qualities are found to be closely correlated to actual case rates of COVID-19 (Zhang, 2020). Fig. 4 shows that disabled people were on average in occupations with a higher RIF than non-disabled people during the weeks leading up to lockdown (when most people were still working outside the home). This difference is statistically significant. The average RIF increased sharply for both disabled and non-disabled people in April 2020, due to the fact that those continuing to go out to work during lockdown were mainly people in essential services (such as healthcare) where exposure risk is higher. However, at the same time, the difference between disabled and non-disabled people also widened, such that the RIF was 59.3 for disabled workers compared with 52.2 for non-disabled workers. This gap continued to be significant in all months except June, November and March.

6.5. Work activities and risks of partners

Previous research has highlighted that household factors play a role in COVID-related risks, with intersections between health vulnerabilities and other types of household disadvantage (Mikolai et al., 2020). As inferred by Selden and Berdahl (2020), some individuals, while not necessarily working outside the home themselves, may have been living with a partner going out to work during the pandemic. This can also expose people to greater risk of infection. We find that the partners of disabled people were less likely to work from home but more likely to be working zero hours than the partners of non-disabled people, leading to no overall (significant) difference in the propensity for partners to be going out to work.⁴ The partners of disabled people also worked in occupations with a higher RIF than the partners of non-disabled people but again this difference is not statistically significant. So while exposure to COVID-19 via a partner's work activities seems to be a plausible route, in practice our results suggest it is the individual worker's own work activity which counts.

7. Discussion

Our analysis shows that disabled people in the UK have, over the

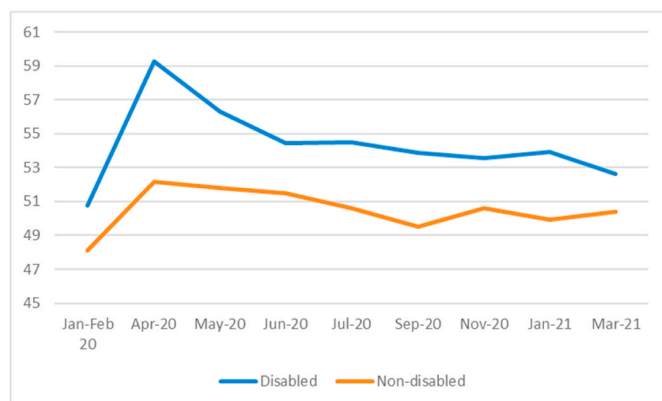


Fig. 4. Average Risk Indication Factor of people working outside the home.

⁴ The exception is March 2021 where partners of disabled people were significantly less likely to be working outside the home than partners of non-disabled people.

course of the COVID-19 pandemic, been disproportionately exposed to infection in the workplace. While disabled people are much less likely than non-disabled people to be in work,⁵ among those in work disabled workers are more likely to have continued working outside the home while the virus has been in circulation. Moreover, disabled people have been more heavily concentrated in risky occupations, in terms of disease exposure and physical proximity to others. This is despite the fact that, all else being equal, disabled people have higher clinical vulnerability to COVID-19. These facts, combined with the propensity for disabled people to be more exposed to infection in their non-working lives (Kuper et al., 2020), provide a compelling explanation for the higher than expected death rates among disabled people in the UK, even after accounting for age and underlying health conditions (ONS, 2021a).

It should be noted that disabled people have not only been disproportionately impacted by the health effects of the pandemic, but also the economic effects. Bryan et al. (2021) show that disabled people have experienced a greater reduction in hours worked and have been more likely to be temporarily away from work than non-disabled people since the start of the pandemic, and this may indicate greater vulnerability to job loss now the JRS has ended. This trend is mainly attributed to the relative concentration of disabled people in sectors forced to shut down during successive lockdowns.

When one also considers the effects of the pandemic and lockdown on other aspects of disabled people's lives, for example disrupted access to healthcare, personal assistance and community networks (Jesus et al., 2021), it is clear that disabled people have suffered a particularly raw deal compared to the non-disabled population.

The reason why disabled people have been more at risk of COVID-19 while at work is unclear, but may be partly explained by the higher concentration of disabled people in essential services, similarly to the BAME population. This could be due to disabled people having lower levels of education on average (Bryan et al., 2021) and/or the fact that the public sector tends to have more supportive frameworks for recruiting, managing and retaining disabled people (CIPD, 2021). Disabled people may also have struggled to work from home due to not having the necessary equipment or technology (House of Commons, 2021) or generally having more challenges getting online. People with impairments are found to be 25% less likely to have the skills to access devices and get online by themselves (Lloyds Bank, 2020).

The UK government has set a target to get one million more disabled people into work by 2027 (Department for Work and Pensions/Department of Health, 2017). This is a laudable aim as many disabled people want to work and this can be the most effective way for individuals and families to escape from poverty. However, in the context of COVID-19 and the analysis presented in this paper, this ambition comes with risks. Although the availability of vaccines is now mitigating the most severe impacts of COVID-19, unfortunately the pandemic is far from over. Moreover, the risk of future pandemics involving person-to-person transmission remains high (Global Preparedness Monitoring Board, 2019). Disabled people must be able to access employment without being placed at undue risk of potentially fatal infection.

A recent report of the Work and Pensions Committee on the disability employment gap (House of Commons, 2021) offers a number of recommendations to the UK government. These include: amending current legislation to give workers the statutory right to request remote or flexible working from the beginning of their employment; doing more to support and encourage employers to adopt job carving practices (that is, creating roles for employees that best suit their skills and needs) when recruiting a disabled person; and progressing plans to reform Statutory

⁵ The overall gap in employment rates between disabled and non-disabled people just before the COVID-19 outbreak was around 28 percentage points: 54% of disabled people of working age were employed compared to 82% of non-disabled people (Roberts et al., 2020).

Sick Pay such that it becomes available to more lower paid workers and those in precarious forms of work.

Policies such as these should promote safer working for all, and disabled people in particular, by expanding the number of jobs that can be performed remotely and enabling those most in need of this flexibility to access remote working, as well as making it easier for at risk individuals to take time off work when necessary.

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Ethical statement

The authors declare that we have complied with the Duties of Authors as set out in the Elsevier Publishing Ethics.

Author statement

Mark Bryan: Conceptualisation, Methodology, Writing – Review & Editing, Funding acquisition. **Andrew Bryce:** Methodology, Formal analysis, Writing – Original Draft, Visualisation. **Jennifer Roberts:** Conceptualisation, Methodology, Writing – Review & Editing, Project administration, Funding acquisition.

Declarations of interest

None.

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