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Precarious employment and health in the context of COVID-19: a rapid scoping umbrella review

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Background: There are widespread concerns that workers in precarious employment have suffered the most in the COVID-19 pandemic and merit special attention. The aim of this rapid scoping umbrella review was to examine what evidence exists about how COVID-19 has affected the health of this highly vulnerable group, and what gaps remain to be investigated. **Methods:** Five databases were searched for systematic or scoping reviews from January 2020 to May 2021. The quality of the included reviews was determined using A MeaSurement Tool to Assess systematic Reviews. **Results:** We identified 6 reviews that reported 30 unique relevant primary studies. The included studies indicate that essential (non-health) workers are at greater risk of COVID-19 infection and case fatality than others in their surrounding community. The occupational risk of exposure to COVID-19 also seems to be greater among more precarious categories of workers, including younger workers and workers in low-income and low-skilled occupations. Further, hazardous working conditions faced by many essential workers appear to have amplified the pandemic, as several occupational sites became 'super-spreaders', due to an inability to socially distance at work and high contact rates among workers. Finally, employment and financial insecurity generated by the pandemic appears to be associated with negative mental health outcomes. The quality of the included reviews however, and their primary studies, were generally weak and many gaps remain in the evidence base. **Conclusions:** Our study highlights that COVID-19 is creating new health risks for precarious workers as well as exacerbating the pre-existing health risks of precarious employment.

Introduction

Will the harms of COVID-19 disproportionately fall onto workers in informal, temporary and poorly protected employment? According to Guy Ryder, the Director General of the International Labour Organization, 'The COVID-19 pandemic has laid bare in the cruellest way, the extraordinary precariousness and injustices of our world of work'.[1] In terms of health, the consequences are potentially severe: the COVID-19 pandemic may increase the risk of COVID-19 incidence and spread among precarious workers.

Precarious work is a multidimensional construct encompassing low-quality employment conditions, including (i) employment insecurity, (ii) income inadequacy and (iii) a lack of rights and protection.[2,3] Crucially, precarious work often intersects with other axes of vulnerability. Women, younger workers, migrants, lower-skilled workers, and lower-educated workers are at disproportionate risk of working under precarious conditions and suffering poor health outcomes as a result.[2]

Even prior to COVID-19, austerity measures and weakening of social security systems led to marked increases in the numbers of persons leading precarious lives in many industrialized nations.[4] This situation has been worsening rapidly during the pandemic, and there is now clear evidence that the economic fallout is disproportionately impacting those working in low-paid, low-skill jobs.[5,6]

Precariousness may pose additional risks in what has been termed a 'syndemic', or a confluence of pandemic risks. In this case, the employment and health consequences of the pandemic may interact with and exacerbate pre-existing health and socioeconomic disadvantage.[7] Specifically, many of those working in essential jobs are less able to work from home and may be especially vulnerable to COVID-19 due to their proximity to and frequent contact with others.[8] Casual workers, with informal contracts and limited access to social protection, such as sick pay, may avoid self-isolating if symptomatic because doing so would lead to loss of earnings. Workers in lower occupational groups are also more likely to suffer from non-communicable diseases,[9] which could place them at greater risk of becoming severely ill or dying from COVID-19.[10]

Despite these concerns, there is a lack of evidence on whether and how precarious employees may differentially bear the risks and consequences of COVID-19, and what interventions could help protect these vulnerable groups. Prior to the pandemic, a series of systematic reviews on precarious employment, revealed it posed clear risks to health, especially to mental health.[2,11–15] Multiple systematic reviews have begun to synthesize the evidence on how COVID-19 has affected the well-being of workers experiencing precarious conditions or how precariousness has affected the dynamics of COVID-19 risk and transmission. It is thus timely to conduct an umbrella review to map and synthesize the evidence-base. Specifically, we aim to investigate what evidence exists about this highly vulnerable group, and what gaps remain to be investigated.

Methods

Here, we perform a rapid scoping umbrella review ('a systematic review of systematic reviews') to synthesize evidence on precarious work and health during the pandemic. Rapid umbrella reviews represent an increasingly common approach in public health,[16] especially in the context of fast moving situations like the COVID-19 pandemic, which calls for the rapid synthesis of evidence to inform effective public-health action.[17]

Conceptual framework

Figure 1 details our conceptual framework which informed our review. We draw on work by Kreshpaj et al.[3] who recently undertook a systematic review of definitions and operationalizations of precarious work, to discern three different dimensions of precarity: (i) employment insecurity; (ii) income inadequacy; and (iii) a lack of rights and protection.[3] For our present purposes, where we are seeking to identify the consequences for health of precarious employment, we also include dimensions of (iv) hazardous working conditions and (v) adverse health effects. While it is certainly true that many people in precarious employment are exposed to hazardous work environments and adverse health effects, we do not include these dimensions in our definition of 'precarious employment' as this would be a departure from the various definitions of 'precarious', which emphasize insecurity and being subject to unpredictable events. Further, while the risk of adverse health events is increased in hazardous environments, if we were to include these events in our definition of precarity, we would introduce a degree of circularity into the study. We also draw on work by Benach et al.[2] to contextualize these five dimensions of precarious work within broader macroeconomic processes, such as labour market and welfare state policies. We incorporate the syndemic nature of the pandemic by including an interaction between the dimensions of precarity, other axes of inequality (as previously described) and existing health conditions.[7]

Search strategy and study selection

Our search strategy implemented a combination of title and abstract searches across PubMed, Medline (Ovid), Embase (Ovid), PsycINFO (Ovid) and Web of Science. We included search terms from previous systematic reviews of precarious employment, supplemented with terms relevant to the pandemic, such as 'frontline', 'essential', 'gig', 'coronavirus' and 'sarscov2' and common variations. We also searched the reference lists of included articles to identify additional reviews. The full search strategy is available in Supplementary Appendix S1. Because the study took a scoping approach to systematically map the breadth of evidence,[16] we did not register the protocol on PROSPERO.

We defined our inclusion criteria *a priori* in terms of Population, Intervention, Comparison, Outcome and Study Design as outlined in table 1. In summary, we focused on the retrieval of peer-reviewed systematic or scoping reviews that included quantitative studies assessing the health impact of one or more dimensions of precarious employment, as identified by our conceptual framework. We focused only on employed precarious workers, and examine the health impacts of unemployment during the pandemic in a separate review.[18] We did not include primary studies that focused only on hazardous work environments and/or adverse health effects, unless the study examined essential non-healthcare workers, who are often in precarious positions, or other groups vulnerable to precarious work (i.e. women workers, younger workers, migrant workers, lower-educated workers or workers in lower-skilled occupations).[2] Only reviews in English were included and reviews were excluded if they focused on healthcare workers, as the experiences of this group have been examined in-depth elsewhere.[19,20] Further, healthcare workers face a unique set of working conditions and associated challenges during the pandemic, often including very high levels of exposure to infection and phenomena, such as moral injury. The flowchart for the screening and inclusion and reasons for exclusion at the full text stage are detailed in figure 2 and Supplementary Appendix S2, respectively.

After applying inclusion/exclusion criteria, the search yielded six systematic reviews for inclusion in our review (table 2). Two reviews captured relevant themes but did not report any primary quantitative studies on precariousness and health in the context of COVID-19.[21,22] We nonetheless included them because they captured precarious groups relevant to our review, namely migrant workers and younger workers. These 6 reviews reported the results of 171 primary studies, of which 30 were relevant to this rapid scoping umbrella review (table 3).

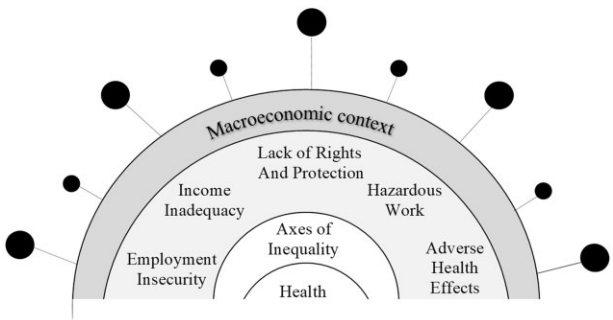

Figure 1 Conceptual framework: COVID-19, precarious work and health (adapted in part from Kreshpaj et al.[3], Benach et al.[2], and Bambra et al.[7])

Data extraction, quality appraisal and data synthesis

Data extraction was limited to the content of the systematic review (and any relevant supplementary material); we did not extract data from the primary studies. Data extraction was conducted by C.L.M. and then checked by D.S.

Included reviews were quality appraised using the Assessment of Multiple Systematic Reviews 2 (AMSTAR 2) approach.[23] This critical appraisal tool has become standard as part of umbrella review methodology. Each review was given an overall rating of quality ranging from high to critically low, based on characteristics of the design of the review. Study quality was assessed alongside data extraction. Overall quality ratings of included reviews are reported in table 2 and quality appraisal results by AMSTAR topic are provided in Supplementary Appendix S3.

Results

Of the six reviews identified for inclusion, four focused on employment and working conditions in the context of COVID-19, one looked at employment and working conditions also in relation to other epidemic infectious diseases[21,22] and another looked more generally at the literature, but with a search timeline that would have captured studies undertaken in context of COVID-19.[21]

We disaggregated the reviews and the studies they included in terms of their focus. Two reviews focused on workers in general,[24,25] and four focused on groups particularly vulnerable to precarious work [two focused on essential workers,[26,27] one focused on young workers (people aged $\leq$30 years)[21] and one focused on migrant workers[22]]. Of the 30 relevant primary studies contained in the reviews, 25 covered essential non-health workers and 5 covered workers in general. Below, we narratively synthesize the results with respect to these two main categories of workers (essential non-health workers and workers in general).

Table 1 Inclusion criteria

Population	Human subjects of working age
Intervention/exposure	Precarious employment, defined as exposure to single or multiple dimensions as outlined by our conceptual framework
Comparator	Control groups (when compared/available)
Outcome	Studies reporting at least one health outcome not limited to morbidity, mortality, prevalence and incidence of conditions and life expectancy
Study design	Quantitative studies undertaken in 2020–21, from any setting—low-, middle- and high-income countries

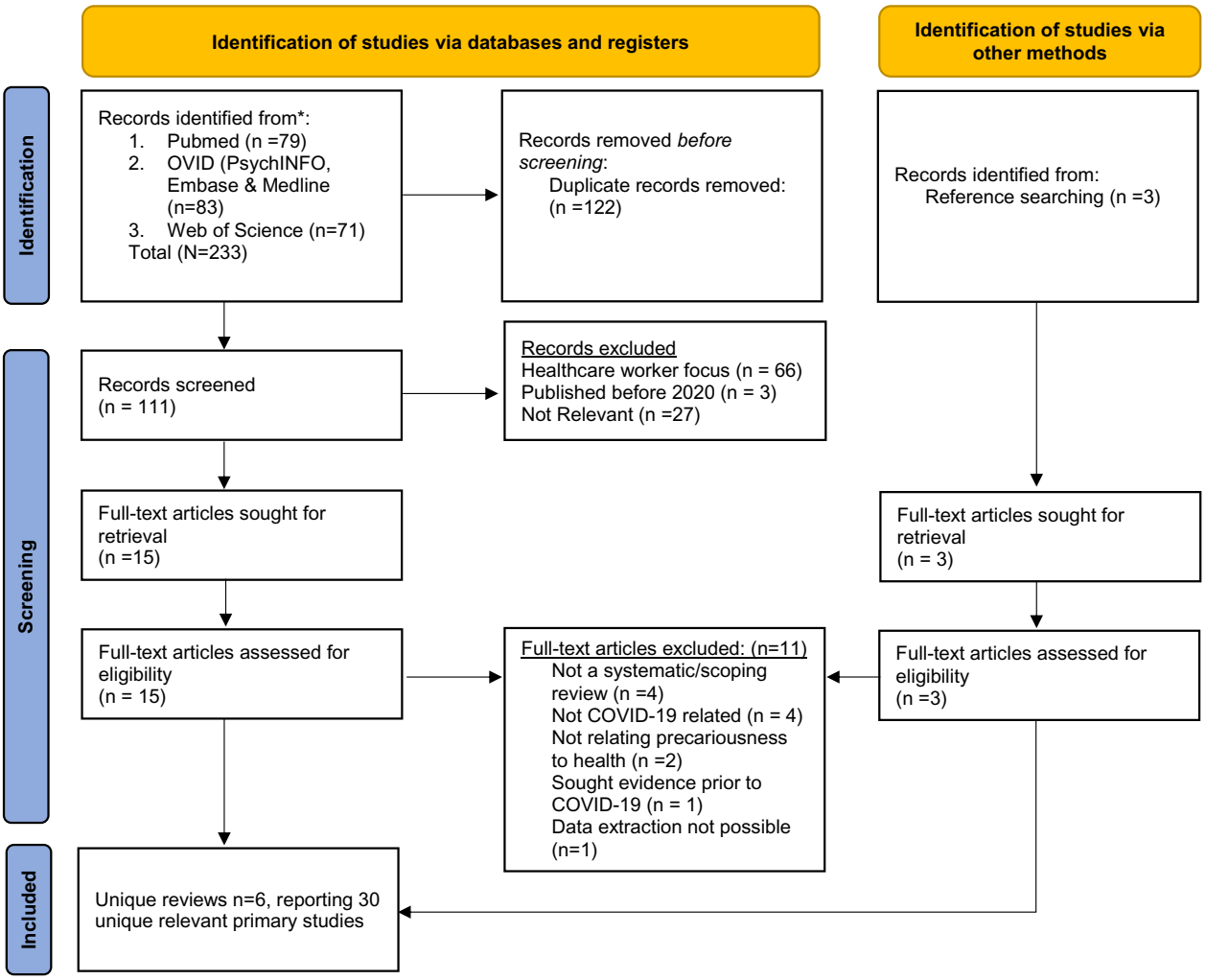

Figure 2 PRISMA flowchart for screening and inclusion

Essential non-health workers

A systematic review by Gaitens et al.[27] on risk of COVID-19 transmission facing essential workers included 41 studies. Of them, 19 were relevant to the current review. All were undertaken in the USA other than two that examined meatpackers in Europe and England. In general, the authors observed consistently increased risk of transmission for essential non-health workers including those working in the food industry; law enforcement or public safety (including first responders); transportation (in either mass transit or the airline industry); as factory workers; and as doormen and janitors.

Eleven focused on food industry workers, including those in the meatpacking industry and grocery stores. Both groups were found to be at high risk of developing COVID-19 infection. Factors associated with increased risk included encountering a large number of customers (high contact rates) and the inability to socially distance at work. Notably, one study found that 38% of all infections in one US state (238 of 626) were workers employed at one meatpacking company (at an early stage of the epidemic). Another study found that 20% of grocery store workers in a single US grocery store tested positive for COVID-19, a rate of infection that was higher than in surrounding communities (specific community rates were not reported).

Turning to law enforcement and public safety workers, one study reported 5175 infections among 14 290 New York City firefighters and emergency services personnel (including paramedics and emergency medical service technicians). With respect to transit workers, 24% of approximately 3000 in New York City reported a COVID-19 infection (compared with 19.9% in the general population). Finally, with respect to factory workers, one study found 4 deaths and 300 infections in one US company with an estimated 2000 workers (comparable rates in the community were not reported).

Table 2 Included reviews

References	No. of relevant studies (total)	Context (setting, country, search timeframe)	Dimensions of precarity	Summary of results	AMSTAR 2 quality appraisal
Bellotti et al.[25]	2 (36)	Global, from 2019 to April 2021	Exposure to infection and disease in workplace ($N = 2$)	Bellotti et al. undertake a systematic review and aim to narratively synthesize the effects COVID-19 has had on employment and work across different age groups. Of the 36 studies included, 2 were relevant to this review. These studies look at occupational risk of exposure to COVID-19. One study examined workers in Canada and found a higher occupational risk of exposure to COVID-19 among younger workers, and among those in low-income, low-skill occupations. Another study found higher risk of exposure among Mexican hospitality workers. Studies that were not included in the current umbrella review were those that were commentary or perspective pieces, or those that did not examine a relation to a health outcome	Critically low
Côté et al.[26]	8 (30)	• USA ($N = 5$) • Canada ($N = 1$) • France ($N = 1$) • Singapore ($N = 1$) March–September 2020	Exposure to infection and disease in workplace ($N = 5$) Immigrant and refugee status ($N = 1$) Gig economy employment ($N = 1$) Job insecurity due to COVID-19 and financial concerns ($N = 1$)	Côté et al. undertake a rapid scoping review and aim to narratively synthesize the literature on COVID-19 transmission risk to workers in essential sectors, such as retail, healthcare, manufacturing and agriculture. They particularly aim to capture the experiences of workers in precarious employment and social situations. Of the 30 studies identified by the authors, 8 were relevant to the current review. All 8 were undertaken with respect to high-income countries and the majority of these studies measure precarity with respect to exposure to and transmission of COVID-19 in the workplace. One study looks at immigrant and refugee workers as a particularly vulnerable group. A summary of the findings of each of these studies was not provided and the review did not formally assess the quality of included studies. Studies that were not included in the current review were those that used pre-pandemic data to assess potential risks to workers, those that were qualitative in nature, and those where a health outcome could not be identified.	Critically low
Gaitens et al.[27]	19 (41)	USA ($N = 17$), England ($N = 1$), Germany ($N = 1$), April–December 2020	Exposure to infection and disease in workplace	Gaitens et al. undertake a systematic review and aim to narratively synthesize the literature on COVID-19 transmission risk to essential workers. Of the 41 studies identified by the authors, 19 were relevant to the current review. All 19 studies were undertaken within settings in the USA, except for two, which focused on meatpackers in Germany and England. All of these 19 studies examined COVID-19 related deaths and/or infection in the workplace. Negative impacts are found for essential workers across a range of occupational domains however, many of these studies did not contain denominators of the total number of workers at risk and/or a comparison of rates in the general population. The review did not formally assess the quality of included studies and included non-peer reviewed, grey literature. Studies that were not included in the current umbrella review were those that were not included in the authors' summary table, as details on these studies could not be systematically identified and extracted. This means that some studies that were discussed in the review, and focused on psychological stress, were not included.	Critically low

(continued)

Table 2 Continued

References	No. of relevant studies (total)	Context (setting, country, search timeframe)	Dimensions of precarity	Summary of results	AMSTAR 2 quality appraisal
Giorgi et al.[24]	1 (37)	Iran ($N=1$) December 2019–July 2020	Work suspension due to COVID-19 ($N=1$)	Giorgi et al. undertake a systematic review and aim to narratively synthesize how workplace factors related to the COVID-19 pandemic affect the mental health of workers. Of the 37 studies identified by the authors, 1 was relevant to the current review. This study looked at Iranian workers whose employment was suspended during the pandemic and found negative mental health impacts. The review authors did not formally assess the quality of included studies. Studies that were not included in the current umbrella review were those that used pre-pandemic data to assess potential risks to workers, those that were qualitative in nature, and those where a dimension of precarity could not be identified.	Critically low
Sheilds et al.[21]	0 (9)	NA	N/A	Sheild et al. (2021) undertook a systematic review and aimed to narratively synthesize literature focussed specifically on the mental health impacts of employment conditions and psychosocial workplace exposures on young workers. Of the nine studies identified by the authors, none were relevant to the current review. This is because none of the included studies were COVID-19 related, despite the search extending to 22 January 2021.	Low
Wang et al.[22]	0 (17)	NA	N/A	Wang et al. (2020) undertook a systematic review to narratively synthesize findings from studies on migrant workers' well-being during five major epidemic infectious disease pandemics, including COVID-19. Of the 17 studies identified by this review, none were relevant to the current review. While the review identified some studies on COVID-19, none were quantitative.	Critically low

Finally, Côté et al.[26] undertook a rapid scoping review to narratively synthesize the literature on COVID-19 transmission risk for workers, with an emphasis on essential workers. Of the 30 studies identified by the authors, 8 were relevant to the current review and 6 focused on essential workers. Of these six, two looked at essential workers in the meat packing industry, and one looked at drivers in the gig economy. For the remaining three, although it was unclear whether the essential workers were in healthcare or not we included them nonetheless. All six were undertaken in high-income countries (USA: $N=4$, Canada: $N=1$ and France: $N=1$). Of the four US-based studies, two looked at employment-related risk of COVID infection among meat processing workers ($N=241$, $N=112\,616$), one examined sickness-related absences among essential workers ($N=538\,785$), and another looked at racial inequalities in COVID-19 mortality among essential workers ($N=2669$). The fifth study examined asylum seekers in Canada working in essential services, examining mental health outcomes (the number of workers in this study was not provided by the authors of the primary study). The sixth and final study looked both at risks to health and mental health among drivers in the gig economy in France ($N=137$). Unfortunately, the review authors did not provide a summary of the detailed results of each primary study nor did they formally assess the quality of included studies.

Workers in general

A systematic review by Giorgi et al.[24] on workers in general included 37 studies, and only 1 was relevant to the current review. This study ($N=1058$) found that Iranian adults who worked from home, at the office, or had not worked during and before COVID-19, all reported lower levels of distress than those who suspended working; precise figures of distress, however, were not provided by the review authors. The review authors also did not formally assess the quality of any of the included studies.

A review by Bellotti et al.[25] included 36 studies, 2 of which were relevant to this review and on workers in general. One study looked at workers in Canada and found a higher occupational risk for exposure to COVID-19 among younger workers, and among those in low-income, low-skill occupations. Another study found higher risk for exposure among Mexican hospitality workers. The review authors did not formally assess the quality of included studies and the number of workers included in the studies was not reported.

Finally, the review by Côté et al. included two primary studies undertaken among workers in general. One of these studies was based in the USA and one was from Singapore. The US-based study examined COVID-related job and income insecurity and its impact on mental health ($N=474$). The second study looked at COVID-19 infections among migrant workers in Singapore ($N=17\,758$). As noted previously, however, the systematic review authors did not provide a summary of the specific results of these primary studies, nor did they formally assess the quality of included studies.

Quality assessment

All six reviews included in the analysis were narrative syntheses. Most were rated 'critically low' quality by AMSTAR2. Common weaknesses included a failure to consider quality or bias, and a limited or missing summary table. The reviews drew heavily upon cross-sectional studies. None of the reviews formally assessed the quality of included studies, which is particularly relevant as they included several non-peer reviewed, grey literature studies. This may account for why several primary studies contained in the

Table 3 Included primary studies

References	Author(s) of primary study	Study design	Setting and participants	Occupational group/ category	Dimension of precarity	Health outcome/ risk	Summary results
Côté et al.[26]	Apouey et al. (2020)	Mixed methods: longitudinal	France; March and April 2020 ($N=137$)	Essential workers	Employment in gig economy (drivers)	Health risks and mental health	Not explicitly stated
Côté et al.[26]	Donohue et al. (2020)	Quantitative descriptive statistics: sociodemographics and occupational exposure, workplace preventive measures and so forth	USA ($N=241$)	Essential workers: meat processing	Exposure to infection and disease in workplace	Employment-related risk for infection	Not explicitly stated
Côté et al.[26]	Waltenburg et al. (2020)	Quantitative: sociodemographic statistics	USA ($N=112$ 616 workers, 16 223 cases)	Essential workers: meat processing	Exposure to infection and disease in workplace	Employment-related risk for infection	Not explicitly stated
Côté et al.[26]	Goudet et al. (2020)	Descriptive statistics from online survey distributed through a network of community organizations working with immigrant and refugee populations	Canada (QC); 14 May–15 June 2020; *n* not provided by primary study	Essential workers	Immigrants, refugees and undocumented migrants workers	Mental health	Not explicitly stated
Côté et al.[26]	Koh (2020)	Quantitative: data gathered from daily reports by health authorities	Singapore; March, April and early May 2020 ($N=17$ 758)	Workers in general (migrant workers)	Exposure to infection and disease in workplace	COVID-19 infection	Not explicitly stated
Côté et al.[26]	Lyttelton et al. (2020)	Quantitative (specific analytical technique not described)	USA ($N=538$ 785 in essential occupations)	Essential workers	Exposure to infection and disease in workplace	Sickness-related absences	Not explicitly stated
Côté et al. [26]	Rogers et al. (2020)	Quantitative (specific analytical technique not described)	USA; up to 24 April 2020 (beginning date not specified) ($N=2669$ deaths)	Essential workers	Exposure to infection and disease in workplace	Racial disparities in COVID-19 mortality	Not explicitly stated
Côté et al. [26]	Wilson et al. (2020)	Linear regression	USA; 6–12 April 2020 ($N=474$)	Workers in general	Job insecurity due to COVID-19 and financial concern	Mental health	Not explicitly stated
Giorgi et al.[24]	Jahanshahi et al. (2020)	Cross-sectional	Iran ($N=1058$)	Workers in general	Suspended work due to COVID-19	Mental health	'This study investigated factors associated with mental distress in a sample of 1058 participants. Results showed that Iranian adults who worked from home, at the office, or had not worked during and before Covid-19, all reported lower distress that those who suspended working'

(continued)

Table 3 Continued

References	Author(s) of primary study	Study design	Setting and participants	Occupational group/ category	Dimension of precarity	Health outcome/ risk	Summary results
Gaitens et al.[27]	Dyal et al. (2020); Scher et al. (2020); Rosane et al. (2020); Steinberg et al. (2020); Deutsche Welle et al. (2020); Stewart et al. (2020); Douglas et al. (2020); Bradley et al. (2020); Redman et al. (2020); Lan et al. (2020); UFCW et al. (2020)	Quantitative (precise design not indicated)	USA, Europe , England , April–December 2020	Essential workers: food system workers (meat and poultry processing) , grocery store workers ; grocery, retail, pharmacy, meat packing and other essential industries	Exposure to infection and disease in workplace	COVID-19 infection or COVID-19-related mortality	Essential workers in the food/meat-packing industry tend to work on long production lines and in close proximity to their coworkers. They are also noted to live in crowded conditions, and share transportation to work. These workers tend to have high rates of infections compared to surrounding communities, which has forcied the closure of some plants. Grocery store workers were also found to be at high risk for developing infection due to encountering a high volume of customers and the inability to social distance. One study found that 20% of grocery store workers tested positive for COVID-19 which is a rate of infection higher than rates reported in surrounding communities.
Gaitens et al.[27]	Guse et al. (2020)	Quantitative (precise design not indicated)	USA, May 2020, total *N* not indicated	Essential workers: law enforcement/public safety/first responders: emergency responders (fire and police)	Exposure to infection and disease in workplace	COVID-19 infection or COVID-19-related mortality	Fifty-three deaths in New York City emergency responders (fire and police)
Gaitens et al.[27]	Weiden et al. (2020)	Quantitative (precise design not indicated)	USA, 31 May 2020 ($N = 14$ 290)	Essential workers: law enforcement/public safety/first responders: emergency responders	Exposure to infection and disease in workplace	COVID-19 infection or COVID-19-related mortality	Four deaths and 5175 infections among 14 290 New York City firefighters and emergency services personnel (paramedics and emergency medical service technicians)
Gaitens et al.[27]	Barr et al. (2020)	Quantitative (precise design not indicated)	USA, May 2020, total *N* not indicated	Essential workers: law enforcement/public safety/first responders: officers and staff in correctional facilities	Exposure to infection and disease in workplace	COVID-19 infection or COVID-19-related mortality	Over 5000 infections among state and federal correctional officers
Gaitens et al.[27]	New York State (2020)	Quantitative (precise design not indicated)	USA, December 2020, total *N* not indicated	Essential workers: law enforcement/public safety/first responders: officers and staff in correctional facilities	Exposure to infection and disease in workplace	COVID-19 infection or COVID-19-related mortality	Six deaths and 2169 infections in New York state
Gaitens et al.[27]	Gershon et al. (2020)	Quantitative (precise design not indicated)	USA, August 2020, total *N* not indicated	Essential workers: transportation workers: mass transit workers	Exposure to infection and disease in workplace	COVID-19 infection or COVID-19-related mortality	24% of approximately 3000 New York transit workers reported infection (compared with 19.9% in general population)

(continued)

Table 3 Continued

References	Author(s) of primary study	Study design	Setting and participants	Occupational group/ category	Dimension of precarity	Health outcome/ risk	Summary results
Gaitens et al.[27]	Feldman et al. (2020)	Quantitative (precise design not indicated)	USA, April 2020, total *N* not indicated	Essential workers: transportation workers: airline industry	Exposure to infection and disease in workplace	COVID-19 infection or COVID-19-related mortality	Fifteen US deaths in 9 days in April
Gaitens et al.[27]	Friendman et al. (2020)	Quantitative (precise design not indicated)	USA, July 2020, total *N* not indicated	Essential workers: factory workers	Exposure to infection and disease in workplace	COVID-19 infection or COVID-19-related mortality	Four deaths and 300 infections in 1 US company with an estimated 2000 workers
Gaitens et al.[27]	Gould et al. (2020)	Quantitative (precise design not indicated)	USA, April 2020, total *N* not indicated	Essential workers: doormen and janitors	Exposure to infection and disease in workplace	COVID-19 infection or COVID-19-related mortality	Forty-five deaths in New York City
Bellotti et al.[25]	Hoehn-Valasco, Silverio-Murillo and de la Miyar (2021)	Quantitative (precise design not indicated)	Mexico, total *N* not indicated	General workers	Exposure to infection and disease in workplace	Occupational risk of exposure to COVID-19	Higher risk of infection for Mexican hospitality workers

NA, not applicable.

reviews were weak. For example, many failed to report denominators of the total number of workers at risk and/or a comparison of infection rates in the general population.

Discussion

In this rapid scoping umbrella review, we aimed to examine what evidence exists about how COVID-19 has affected the health of workers in precarious employment, and what gaps remain to be investigated. Our study finds consistent evidence that COVID-19 is both creating new health risks for precarious workers and exacerbating the poor health effects of precarious employment. Essential non-health workers appear to be at elevated risk of COVID-19 infection and case fatality. Many of these workers are already at increased risk of poor health due to precarious employment conditions, creating a 'double-burden' of health and financial vulnerability.[27,28] The occupational risk of exposure to COVID-19 also seems to be greater among some typically precarious categories of workers, including younger workers and the low-income and low-skilled. In general, the pandemic appears to be generating employment and financial insecurity with negative mental health implications.

Our findings also suggest that the hazardous working conditions faced by many essential workers have amplified the COVID-19 pandemic, as several occupational sites, such as meat packing facilities and grocery stores were 'super-spreaders', due to an inability to social distance at work and high contact rates among workers.[27] A number of media reports have also linked COVID-19 outbreaks to certain occupational settings. Early on in the pandemic, one linked almost half of the outbreaks in the USA to meat processing plants.[29]

We did not find any relevant studies in two reviews included in our analysis: one focused on the mental health impacts of employment conditions experienced by young workers, and one focused on migrant workers' well-being during infectious disease outbreaks. The absence of relevant studies in these reviews points to important gaps in the literature.

In interpreting these findings, we must note a series of limitations. First, while a strength of this study is that our search was broad and wide-ranging, it is possible that additional primary evaluations have been conducted either after the systematic reviews were completed, or did not fit their inclusion criteria. This rapid scoping umbrella review is a synthesis of the findings from published systematic and scoping reviews, not a synthesis of all primary studies on precarious work and health in the context of COVID-19. Secondly, following umbrella review methodology, we did not extract data at the level of individual primary studies. While we were still able to meet our aim of mapping the evidence landscape, this inevitably involved losing nuance and made it difficult to report consistently on outcomes when the reviews themselves did not report them. Thirdly, the narrative analysis we performed on the data could be prone to subjective influence, a risk we attempted to minimize by conducting several rounds of analysis. The exclusion of non-English language reviews also may have affected the findings, we may have particularly overlooked reviews from middle and low-income countries.

Overall, although the reviews nearly universally concluded precariousness was a risk factor for worse health, our findings reveal a small, mixed evidence-base on precariousness and health in the context of COVID-19. Much of the research was low quality, and we were unable to find high-quality systematic review-level evidence. It should be noted, however, that our quality assessment was only a measure of a review's ability to provide systematic review-level evidence on the relationship between precariousness and health, not a measure of the quality of the review in general or in any other terms.

Almost all of the evidence dealt with transmission risk of COVID-19 in the workplace, consistently finding negative health impacts, both in terms of physical and mental health. These studies fall almost entirely under just two (overlapping) of the five dimensions of precarious work included in our conceptual framework: hazardous working conditions and exposure to adverse health risks. Few of the primary studies focused on any of the other three core dimensions of employment precarity: employment insecurity, inadequate income and lack of social rights and protection. Further, very few primary studies considered social inequalities in health or particularly vulnerable workers and none seemed to integrate consideration of broader macroeconomic processes, such as welfare or labour market policies. These remain important areas for future research. Finally, the included primary studies were focused almost exclusively on high-income countries, despite the inclusive search strategies of the systematic reviews. High-quality evidence on how COVID-19 is affecting the health of precarious workers worldwide is thus urgently needed.

Taken together, our review supports the view that precarious workers have suffered profoundly from COVID-19 and merit special attention. Many precarious workers have been undertaking work deemed essential to society during the pandemic yet they risk their own well-being, and sometimes their lives, for low pay and few employment rights.

Supplementary data

Supplementary data are available at *EURPUB* online.

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Key points

- Little is known about how COVID-19 has affected the health of workers in precarious employment.
- Workers in precarious employment, some of whom are essential workers, are at greater risk of COVID-19 infection and case fatality.
- The pandemic is increasing employment and financial insecurity that is associated with deteriorating mental health.
- Hazardous working conditions appear to have amplified the pandemic.

Additional Content

A video to accompany this paper is available at https://youtube.com/playlist?list=PLv5eq4ZCoNWubJurAJ-7Ht33cjNshLw7R.

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