



HAL
open science

Impact of work arrangements during the COVID-19 pandemic on mental health in France

Irwin Hecker, Tarik El-Aarbaoui, Solène Wallez, Astrid Juhl Andersen, José Luis Ayuso-Mateos, Richard Bryant, Giovanni Corrao, David Mcdaid, Roberto Mediavilla, Ellenor Mittendorfer-Rutz, et al.

► To cite this version:

Irwin Hecker, Tarik El-Aarbaoui, Solène Wallez, Astrid Juhl Andersen, José Luis Ayuso-Mateos, et al.. Impact of work arrangements during the COVID-19 pandemic on mental health in France. *SSM - Population Health*, inPress, 10.1016/j.ssmph.2022.101285 . hal-03854100v1

HAL Id: hal-03854100

<https://hal.science/hal-03854100v1>

Submitted on 15 Nov 2022 (v1), last revised 20 Feb 2023 (v2)

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

Impact of work arrangements during the COVID-19 pandemic on mental health in France

Irwin Hecker^a, Tarik El-Aarbaoui^a, Solène Wallez^a, Astrid Juhl Andersen^a, José Luis Ayuso-Mateos^{b,c,d}, Richard Bryant^e, Giovanni Corrao^{f,g}, David McDaid^h, Roberto Mediavilla^{b,c,i}, Ellenor Mittendorfer-Rutz^j, Matteo Monzio Compagnoni^{f,g}, A-La Park^h, Antje Riepenhausen^{k,l}, Thomas Rigotti^{m,n}, Katharina Seeber^o, Marit Sijbrandij^p, Pierre Smith^{o,q}, Oliver Tüscher^{n,r}, Henrik Walter^{k,l}, Anke Witteveen^p, Murielle Mary-Krause^a, Maria Melchior^a

- a Sorbonne Université, INSERM, Institut Pierre Louis d'Épidémiologie et de Santé Publique, IPLESP, Equipe de Recherche en Epidémiologie Sociale, ERES, F75012, Paris, France
- b Department of Psychiatry, Universidad Autónoma de Madrid (UAM), Madrid, Spain
- c Centro de Investigación Biomédica en Red de Salud Mental (CIBERSAM), Madrid, Spain
- d Department of Psychiatry, La Princesa University Hospital, Instituto de Investigación Sanitaria Princesa (IIS-Princesa), Madrid, Spain
- e School of Psychology, UNSW Sydney, Sydney, NSW, 2052, Australia
- f Unit of Biostatistics, Epidemiology and Public Health, Department of Statistics and Quantitative Methods, University of Milano-Bicocca, Milan, Italy
- g National Centre for Healthcare Research and Pharmacoepidemiology, University of Milano-Bicocca, Milan, Italy
- h Care Policy and Evaluation Centre, Department of Health Policy, London School of Economics and Political Science, London, United Kingdom, WC2A 2AE
- i Instituto de Investigación del Hospital Universitario La Paz (IdiPAZ), Madrid, Spain
- j Division of Insurance Medicine, Department of Clinical Neuroscience, Karolinska Institutet
- k Department of Psychiatry and Neurosciences - CCM, Research Division of Mind and Brain, Charité - Universitätsmedizin Berlin, Corporate Member of Freie Universität Berlin and Humboldt-Universität zu Berlin, Berlin, Germany
- l Berlin School of Mind and Brain, Faculty of Philosophy, Humboldt-Universität zu Berlin, Berlin, Germany
- m Department of Work, Organizational and Business Psychology, Institute of Psychology, Johannes Gutenberg University Mainz, Mainz, Germany
- n Leibniz Institute for Resilience Research, Mainz, Germany
- o Research Institute of Health and Society (IRSS), Université Catholique de Louvain, Brussels, Belgium
- p Department of Clinical, Neuro and Developmental Psychology, WHO Collaborating Centre for Research and Dissemination of Psychological Interventions, Amsterdam Public Health research institute, Vrije Universiteit Amsterdam
- q Department Epidemiology and public health, Sciensano, Brussels, Belgium
- r Department of Psychiatry and Psychotherapy, Johannes Gutenberg University Medical Center Mainz, Mainz, Germany

Corresponding author:

Maria Melchior

Email address: maria.melchior@inserm.fr

Telephone: +33144738445

Full postal address: Sorbonne Université – Faculté de Médecine, Site Saint-Antoine, UMR-S 1136 – N° BC 2908, Équipe Cohorte TEMPO, 27 rue Chaligny, 75012 PARIS

Keywords: work, anxiety, depression, COVID-19, cohort, France

Abstract

Background

The COVID-19 pandemic has been accompanied by an increase in symptoms of anxiety/depression in the French population. Work and financial difficulties may contribute to this deterioration of mental health however, to date, longitudinal prospective data are lacking on how work arrangements are associated with mental distress.

Objective

Our study aims to better understand relationships between work arrangements and financial difficulties during the COVID-19 pandemic and individuals' patterns of symptoms of anxiety/depression, while controlling for pre-pandemic factors, including employment and financial characteristics as well as mental health.

Methods

Data were gathered for the TEMPO Project, a 30-year follow-up cohort study aiming to better understand trajectories of mental health. Between March 2020 and July 2021, 904 participants completed at least one of nine questionnaires aiming to specifically evaluate living circumstances and mental health during the COVID-19 pandemic.

Results

In adjusted generalized estimating equations models controlling for participants' demographic characteristics as well as employment and mental health prior to the COVID-19 pandemic, we found that individuals who were unemployed during the pandemic were more likely to report symptoms of anxiety/depression (OR = 1.89; 95% CI = 1.07-3.33) compared to those with stable employment. Similarly, persons who had financial difficulties during the pandemic had higher levels of symptoms of anxiety/depression (OR = 1.43; 95% CI = 0.99-2.07) than those who did not have such difficulties.

Conclusion

Adults who were unemployed or experiencing financial difficulties during the COVID-19 pandemic were more likely to show elevated levels of symptoms of anxiety/depression. Importantly, this increased risk of poor mental health was not explained by pre-existing socioeconomic or mental health difficulties. Our study highlights the role of social determinants in shaping the risk of mental health difficulties; these should be targeted by interventions aiming to improve population wellbeing in the context of a pandemic.

Background

Studies of past epidemics have shown that, beyond the immediate impacts in terms of morbidity and mortality, these outbreaks have adverse effects on population patterns of mental health. There was evidence of mental health problems during the Spanish flu pandemic a century ago, in contexts where misinformation and unpreparedness exacerbated anxiety (Ammon, 2002; Kelly, 2020). For more recent viruses, such as SARS-CoV-1 (El-Hage et al., 2020), H1N1 (El-Hage et al., 2020), MERS-CoV (Park et al., 2018) and Ebola (Kamara et al., 2017; Srivatsa & Stewart, 2020), mental health was mostly studied among health care workers, who were exposed to the virus, had increased workloads and experienced potentially traumatic events (e.g. patients unexpectedly passing away). During the COVID-19 pandemic, there is now evidence of a mental health burden (Hossain et al., 2020; Santomauro et al., 2021; Wu et al., 2021; Xiang et al., 2020; Xiong et al., 2020) with, for instance, 27% and 25% respective increases in depressive and anxiety disorders observed globally (Santomauro et al., 2021).

COVID-19 has been accompanied by a sudden surge in employment difficulties, such as decreased numbers of job postings, increased rates of unemployment, reduced or frozen activity and job losses in some economic sectors (OECD, 2020; RESPOND, 2021b; Rosén & Stenbeck, 2021). This has created a quasi-experimental context for which mental health comparisons before and during the pandemic have been performed (Prati & Mancini, 2021). Job losses sharply increased strongly during the COVID-19 pandemic (ILO, 2021) and disproportionately affected individuals who were already economically vulnerable prior to the COVID-19 pandemic (Ksinan Jiskrova et al., 2021). This instability and deterioration of the labour market has been found to be related to population mental health. In Australia, the deterioration of job security has been linked to the occurrence of mental health difficulties (LaMontagne et al., 2021). COVID-19-related job loss or anticipation of job loss for the individual or someone in one's household was also seen to associate with symptoms of anxiety/depression in the United States (Ganson et al., 2021). And in Switzerland, despite universal healthcare, people who lost their jobs due to the COVID-19 crisis experienced a higher psychological impact (Marmet et al., 2021). Similarly to job losses, a drop in working hours has been also linked with depression (Guerin et al., 2021). Thus, unemployment during the COVID-19 crisis has been identified as a risk factor for poor mental health (de Miquel et al., 2022; Ngoc Cong Duong et al., 2020; Solomou & Constantinidou, 2020; van der Velden et al., 2020).

Evidence shows that mental health follows a socioeconomic gradient (Allen et al., 2014; Bartoll-Roca et al., 2021), with low socioeconomic status affecting mental health due to both material and psychosocial impacts (Marmot, 2001). Disadvantaged economic situation has been seen to associate with worse mental health before (Chung et al., 2018; San Sebastián et al., 2018) and during the COVID-19 pandemic (Claes et al., 2021; Hassan et al., 2021). Financial difficulties are a burden that grew during the COVID-19 pandemic (Clark et al., 2021; Ettman et al., 2021; Goyal et al., 2021). It has been demonstrated that persons with a disadvantaged economic situation are more likely to have depression and anxiety symptoms in various countries: in Austria, where moderate symptoms of depression/anxiety/insomnia were observed to be especially frequent in low incomes groups (Pieh et al., 2020), in the United Kingdom, where individuals with a disadvantaged economic situation were more frequently exposed to COVID-19 and more strongly experiencing negative effects from lockdown (Patel et al., 2020) and in Thailand where job loss, income loss, and financial problems were related to the occurrence of adverse mental health outcomes including anxiety/depression (Ruengorn et al., 2021). In the context of COVID-19, individuals that are already socially and economically vulnerable suffer more severely from the negative health effects (i.e. higher rates of infection and mortality) of the crisis than the rest of the population, aggravating health inequalities (Bambra et al., 2020). The worsening of these inequalities is largely due to the deleterious effect of the pandemic and the associated measures on labour and economy (Nicola et al., 2020).

When the COVID-19 pandemic started, France implemented major economic measures, to allow companies suffering from a significant drop in activity to benefit from state-funded partial unemployment, with no remaining costs for the employer, in which case employees benefited from 84% of their original salary. Additionally, companies going bankrupt, small businesses, care workers and the health sector received financial support and unemployment benefits were extended.

The COVID-19 pandemic has impacted mental health patterns through multiple pathways, including negative changes in individuals' work and financial circumstances. Exact relations between changes in employment, financial situation and mental health in times of COVID-19 have however not yet been fully documented. Previous studies have rarely provided longitudinal prospective pre- and intra-pandemic data or in the position to control for individuals' work and financial situations prior the COVID-19 pandemic. However previous crises showed that work-related and financial uncertainty has an impact on individual's health (Knabe & Rätzl, 2011). Then, as the COVID-19 pandemic worsened individuals' work-related and financial situations, it is relevant to test if mental health deteriorated with the sanitary

crisis. Pre-pandemic data covering employment, financial and anxiety/depression characteristics isolates the effect of each of these factors during the pandemic.

Given this information, we expected the pandemic to have further exacerbated the social inequalities related to mental health to the disadvantage of those experiencing employment or financial difficulties, even in the context of government support, as they might suffer more from the uncertainty induced by the COVID-19 pandemic. It will then potentially distinguish a vulnerable mental health group during the pandemic and identify their need for mental health studies and intervention.

Using longitudinal data collected through the TEMPO cohort study, we tested the hypothesis that individuals in the least stable and least paid jobs before and during the COVID-19 public health crisis were more likely to have symptoms of anxiety and depression.

Study population and procedures

The TEMPO (Trajectoires ÉpidéMIologiques en POulation) cohort started in 2009 with the aim of better understanding mental health patterns and addictive behaviours over time (Mary-Krause, Herranz Bustamante, et al., 2021). Study participants were recruited, using a random sampling strategy from young adults who had taken part in a study on children's mental health in 1991 (when they were aged 4 to 18 years) and participated in a follow-up in 1999. The TEMPO cohort included participant evaluations in 2009, 2011, 2015 and 2018. In 2020, as soon as measures to contain the COVID-19 pandemic were put in place in France, TEMPO cohort participants were contacted to collect data monitoring their health status during COVID-19. Nine waves of data were collected using self-administered questionnaires between March 24, 2020, and the end of July 2021. From March 24 to April 21, 2020, participants completed one questionnaire per week; from April 21 to May 19, 2020, participants completed one questionnaire every other week; and then from June 26 to July 10, 2020, and December 7, 2020 to July 18, 2021, participants completed one questionnaire, respectively (**Supplementary Figure 1**). All questionnaires were sent online to TEMPO participants with valid email addresses ($n = 1,224$). The last questionnaire was also sent by post to TEMPO participants without a valid email address ($n = 955$). Overall, 904 individuals completed at least one study questionnaire between March 2020 and July 2021 (Five study questionnaires were completed on average (Mean=4.55; Standard Deviation (SD)=3.09).).

Measures

Outcome: Symptoms of anxiety/depression

High levels of anxiety/depression were identified using depression/anxiety-related items from the French version of the Achenbach System of Empirically Based Assessment (ASEBA) Adult Self-Report (ASR) (Achenbach & Rescorla, 2003), at each data-collection wave. This self-administered questionnaire includes 8 to 13 items, each rated on a 3-point Likert scale (“Not at all true”; “Sometimes or a little true”; “Very true or often true”). The sum of all relevant items was standardised from 0 to 100 and dichotomised at the 85th percentile according to the ASR guidelines, to identify persons with significant symptoms of anxiety/depression. Participants with less than 66% of complete ASR items were considered to have missing data on this dimension. Within this study, the Cronbach’s α and McDonald’s ω of this scale were respectively 0.91 and 0.92.

Exposures

Employment characteristics

Participants’ employment characteristics during COVID-19 were split into four categories (“Worked normally or from home”; “Worked less or were on partial unemployment” (Reduced or paused employment, but with one’s original contract. Employees retained eighty-four percent of their original salary.); “Forced leave”; “No job”), assessed at each wave.

Financial difficulties during COVID-19

At each wave of data collection, participants’ financial difficulties in the preceding 7 days, or since the last assessment, were investigated according to four domains: “Paying the rent, heat or electricity bills for your home”; “Paying for medical care or medication (for you, your partner or your children)”; “Eating in sufficient quantities (you had to reduce your size or frequency of meals)”; “Eating varied and balanced meals (you had to eat the same thing several times)”. If participants provided at least one positive response, they were considered as having financial difficulties (“No”; “Yes”).

Covariates

Covariates taken into account were those potentially associated with symptoms of anxiety/depression and were as follows: recent changes in participants’ household income, pre-pandemic household income, type of work (Kim & Cho, 2020), sex (Xiong et al., 2020), age (Wang et al., 2020), educational level (Yu & Williams, 1999), loneliness (Lloyd-Evans et al., 2020), pre-existing symptoms of anxiety/depression (Andersen et al., 2021; Pierce et al., 2020), as well as chronic health problems and COVID-19-like symptoms (Chung et al., 2018; Mary-Krause, Bustamante, et al., 2021).

Type of employment prior to COVID-19

Participants' type of employment prior to COVID-19 was defined according to their type of work contract and socioeconomic level, based on 5 categories "High/intermediate occupational grade with stable contract" (stable contract with no end date); "High/intermediate occupational grade and self-employed worker"; "Low occupational grade with stable contract"; "No job"; "Other" (High/intermediate occupational grade with a short-term contract (maximum duration of 24 months, renewable twice at most); Low occupational grade with short-term contract; Low occupational grade and self-employed worker). "Low occupational grade" included farmers, administrative staff and trade and service employees as well as blue-collar workers. "High/intermediate occupational grade" included business owners, managers and academic occupations (e.g. doctor, journalist), craftsmen, traders, and intermediate occupations (between managerial and employee (e.g. school teacher, nurse)).

Income

Recent changes in participants' household income ("Increased or remained stable"; "Decreased") since prior to the COVID-19 pandemic, and participants' current monthly household income ("More than 2500 euros"; "2500 euros or less" (The median household income is about 2500 euros in France (Insee, 2021).)) were assessed.

Participants were also asked to self-report any financial difficulty before the pandemic ("No"; "Yes").

Sociodemographic characteristics

Participants' sociodemographic characteristics included sex ("Male"; "Female"), age, educational level ("No higher education level"; "Higher education level"), living situation ("With a partner and children"; "With a partner"; "Alone"; "Other"), housing type ("Individual house"; "Apartment").

Loneliness was measured using the UCLA (University of California, Los Angeles) 3-item Loneliness Scale ("1" (hardly never) to "3" (often)) (Hughes et al., 2004) in each wave of data collection. The average level of loneliness was calculated for each wave of data collection, and, following prior research, the top 20% was considered indicative of loneliness ("No"; "Yes") (Steptoe et al., 2013).

Health characteristics

Participants' symptoms of anxiety/depression prior to the COVID-19 pandemic were collected in the 2009, 2011 and 2018 TEMPO cohort study waves using the ASR (2009 (n=20), 2018 (n=748)) (Achenbach & Rescorla, 2003) and the Mini-International Neuropsychiatric Interview (MINI) (2011 (n=117)) (Sheehan et al., 1998). The most recent measure available was systematically used.

Self-reports of chronic, physical health problems were also collected for the following conditions: cardiovascular disease, diabetes, overweight or obesity, chronic digestive disease, cancer, asthma, migraines, nervous breakdowns, musculoskeletal disorders and occurrence of self-reported COVID-19-like symptoms (“No”; “Yes”).

Some information was only collected the first time a participant answered a TEMPO COVID-19 questionnaire: employment and financial information prior to COVID-19, sociodemographic characteristics, chronic health problems. Other information was collected for each wave answered by the participant: symptoms of anxiety/depression, employment and financial information during COVID-19, loneliness and COVID-19 symptoms.

Statistical analyses

The aim of our statistical analyses was to identify associations between participants’ employment characteristics and symptoms of anxiety/depression in the context of the COVID-19 pandemic.

Due to the longitudinal nature of the exposure and outcome variables, we used Generalized Estimating Equations (GEE) modelling (Liang & Zeger, 1986). This method allows the inclusion of repeated observations and considers the correlation of within-subject data. The correlation structure of the statistical model was chosen using Quasi Information Criterion (QIC) (Cui & Qian, 2007; Pan, 2001) and Correlation Information Criterion (CIC) (Hin & Wang, 2009), and the exchangeable correlation structure was chosen. Collinearity of model variables was explored and measured with GVIF and $GVIF^{1/(2 \cdot Df)}$, which are Variance Inflation Factor (VIF) derivatives (Fox, 2016; Fox & Monette, 1992; Fox & Welsberg, 2018; James et al., 2013).

Both bivariate and multivariate GEE models were tested. Covariates included in multivariate statistical models were selected based on a hypothesised association and a p-value of less than 0.20 in bivariate GEE models. Interactions were tested while adjusting for the multivariate model variables.

An average of 5.1% missing data on study covariates was observed and subsequently imputed using Multiple Imputations by Chained Equations (MICE) with Fully Conditional Specification (FCS), based on five multiple imputations (Bodner, 2008; White et al., 2011). The study outcome, as well as pre-existing symptoms of anxiety/depression and loneliness, were not imputed because they were not missing at random. After removing incomplete cases for those unimputed variables, 864 participants had data sufficient for analyses. Statistical analyses were performed with R software (R Core Team, 2020).

Results

Across all TEMPO study waves since the beginning of the COVID-19 pandemic, 28.8% of participants had symptoms of anxiety and depression at least once during the period of data collection. People who had left their employment, reduced their work hours, were on forced leave, or had no employment during the pandemic were more likely to experience symptoms of anxiety/depression. Furthermore, experiencing financial difficulties, a decrease in income during the pandemic, having had a low income before COVID-19, being female, having pre-existing symptoms of anxiety/depression, feeling lonely, having chronic health problems or having experienced COVID-19-like symptoms were found to be characteristics associated with higher prevalence of symptoms of anxiety/depression (**Table 1**).

In bivariate GEE models (**Table 2**), when compared to participants who worked as usual, those who worked less or were on partial unemployment (OR = 1.43; 95% CI = 1.09-1.88), were unemployed (OR = 2.53; 95% CI = 1.75-3.67) or experienced financial difficulties (OR = 1.55; 95% CI = 1.15-2.07) were more likely to experience symptoms of anxiety/depression.

After adjusting for covariates, being unemployed during the COVID-19 pandemic and having financial difficulties remained respectively significantly and almost significantly associated with higher odds of symptoms of anxiety/depression (OR = 1.89; 95% CI = 1.07-3.33 and OR = 1.43; 95% CI = 0.99-2.07, respectively) (**Table 2**).

No interactions were found between unemployment or financial difficulties during the COVID-19 pandemic and participants' sex.

Discussion

Using data from 864 persons participating in the longitudinal TEMPO cohort, specifically followed-up between March 2020 and July 2021, we found that those who experienced job instability or financial difficulties during the COVID-19 pandemic were more likely to have symptoms of anxiety/depression. Importantly, these findings were obtained while controlling for pre-existing employment, as well as prior financial and mental health difficulties. Moreover, as the income and employment difficulties that participants encountered were largely due to the pandemic, and independent of participants' characteristics, our data suggest a direct role of employment and economic circumstances on individuals' likelihood of mental health difficulties during the course of the pandemic.

Strengths and limitations

This study has some limitations which need to be described before interpreting the data. First, TEMPO participants are not representative of the general French population, as women and people with high socioeconomic position are

overrepresented (Mary-Krause, Herranz Bustamante, et al., 2021). This may have led to an underestimation of the levels of work-related and financial difficulties, as well as mental health outcomes, in the study. Generalisability is also limited in the sense that the association between employment or financial characteristics and mental health is studied in a context of social support, potentially underestimating the strength of the association compared to countries where the level of economic support was weaker (Hale et al., 2021). Second, participants' psychological symptoms were not assessed by objective diagnoses but by self-reports, leading to possible reporting bias (Althubaiti, 2016). Nevertheless, the ASEBA scale which we used is well-validated and makes it possible to identify the presence of internalising symptoms with precision (Achenbach & Rescorla, 2003). In addition, pre-COVID-19 measures are based on different data collection points, and measures obtained since the beginning of the sanitary crisis evaluate different periods, which could induce measurement bias. Finally, financial difficulties were self-reported, again risking reporting bias. However, as the questionnaires are anonymous and self-completed, this source of bias is probably limited (Ong & Weiss, 2000).

Our study also has several strengths. First, pre-COVID-19 data were included in the analyses, allowing to control for participants' previous employment situation, financial difficulties and mental health. Second, data were collected throughout the course of the COVID-19 pandemic, making it possible to monitor participants' situation over this period. This longitudinal approach to data collection during the pandemic also enables less recall bias than data collection conducted retrospectively. Finally, participants were contacted by both e-mail and post, thus limiting participation bias even though differences in measurement may arise from the use of two different data collection methods.

Interpretation

We found that unemployment and financial difficulties during the COVID-19 pandemic were respectively significantly and almost significantly associated with symptoms of anxiety/depression, highlighting the role of social determinants with regard to mental health (Bambra et al., 2020; Marmot, 2001), despite the existing financial support and exceptional economic measures implemented in France to help the population face the economic and social consequences of the COVID-19 pandemic (Insee, 2020).

Similarly, in Australia, at the beginning of the COVID-19 pandemic, people who lost employment during COVID-19 were more likely to report psychological distress and poor mental and physical health compared to those whose working hours were not reduced (Griffiths et al., 2021). Interestingly, this study showed that unemployed people experienced

higher levels of symptoms of anxiety/depression during the COVID-19 pandemic even when maintaining a similar financial situation before and during the pandemic. In parallel to financial concerns, loss of social status and increased stress due to unemployment are important and can have an impact on mental health (Korzeniewska, 1995). In other contexts, previous work has shown that the impact of job loss on mental health depends on non-financial factors such as the feeling of injustice when one's employer downsizes (Brenner et al., 2014). In the context of the COVID-19 pandemic, uncertainty about the present and future situation could explain difficulties related to mental health. Such uncertainty has been shown to have had tangible negative consequences for job seekers, as companies have been particularly reluctant to hire during the health crisis (OECD, 2020). The lack of work-related social interaction and daily structure, especially during lockdowns, could also explain these difficulties (Gilan et al., 2021).

The uncertainty linked to the COVID-19 pandemic (Mengin et al., 2020) could have disproportionately affected individuals with limited resources, like those experiencing financial difficulties identified in this study, more severely (Brooks et al., 2020). Indeed, similar conclusions have already been drawn about exposure to work-related and financial uncertainty during financial crises, such as the Great Recession, and the negative impact on health (Knabe & Rätzel, 2011; Kopasker et al., 2018). In the context of the COVID-19 pandemic for instance, anti-pandemic health measures led to additional expenses (e.g. face masks, hydroalcoholic gel) which could have worried individuals from disadvantaged economic positions more. During the COVID-19 pandemic, strict health measures such as lockdown could have led to more negative emotions in individuals with financial difficulties related to poor housing (Brooks et al., 2020). People with unemployment and income problems are often more isolated and constrained by low resources, a situation that has continued and was exacerbated during the pandemic (Berhuet & Hoibian, 2021). In the future, people with financial difficulties might find the pandemic more worrying because of the potential upcoming financial crisis that could follow (Sultana et al., 2021). Therefore, in the manner of a vicious circle, such effects of the COVID-19 pandemic on income and labour may lead to a decrease in risk-taking skills and thus negatively impact the economy overall (Galandra et al., 2020).

Many policy recommendations have already emerged since the beginning of the COVID-19 pandemic to better address the needs of vulnerable populations (Rahman et al., 2021) and could inspire interventions for persons who are unemployed or have financial difficulties. These recommendations aim to reduce mental health inequalities between vulnerable groups and the population with measures targeted and adapted to specific contexts (RESPOND, 2021a). It would also be relevant to aim interventions more globally to persons who experienced work-related difficulties, such

as attempts to reduce job-related stressors and promote unhealthy work dimensions (Fiol-DeRoque et al., 2021; Kunzler et al., 2021; Sharifi et al., 2020). For example, in the United States, the effects of household income shocks during the COVID-19 pandemic on depressive symptoms appear to be stronger in states with fewer policies aiming to protect employees' income (Donnelly & Farina, 2021). Reevaluation of low paid essential workers (McCartan et al., 2021) or financial support to families of essential workers (C. Fong & Iarocci, 2020) have been suggested in this context. At the workplace, communication and organisation better adapted to the public health context, alongside improved prevention of work-related health risks, are paths to support mental health (Kniffin et al., 2021). When people are unemployed, especially in times of COVID-19, they need to be supported and targeted by prevention during what may be a longer and harder than usual job search (Kniffin et al., 2021), as this study identifies them as vulnerable to anxiety/depression symptoms. Finally, these policy recommendations must be implemented so as not to reinforce health inequalities (Alberti et al., 2020; Chu et al., 2020; Rahman et al., 2021).

Conclusion

This study provides evidence that, after adjusting for prior occupational and financial variables, there was a significant mental health impact on unemployed workers during the COVID-19 pandemic and a near-significant impact for people with financial difficulties. We demonstrated that persons in unstable situations were vulnerable to symptoms of anxiety/depression despite the rapid financial and economic measures put in place. It is thus necessary to support these individuals who have limited (monetary, material, social) resources and depend on the country's economic situation. Individuals exposed to disrupted work scheduling due to the COVID-19 pandemic, or other crises, may continue to experience increased stress due to the subsequent negative consequences and uncertainty of their future; it is therefore relevant to target these individuals in mental health prevention programs.

Table 1: Employment and financial characteristics of TEMPO participants and the occurrence of symptoms of anxiety/depression during the COVID-19 pandemic, March 2020-July 2021, n=864 (χ^2 or mean comparison test, p-value).

	Symptoms of anxiety/depression during COVID-19 (n=864)		p-value ²
	No (n=615 (71.2%))	Yes ¹ (n=249 (28.8%))	
Employment and financial characteristics			
Employment during COVID-19			0.0002
Worked normally or from home	75.6%	24.4%	
Worked less / forced leave / no job ¹	63.2%	36.8%	
Type of employment before COVID-19³			0.0059
High/intermediate occupational grade ⁴ with a stable contract	74.5%	25.5%	
High/intermediate occupational grade and self-employed worker	62.1%	37.9%	
Low occupational grade ⁵ with a stable contract	69.9%	30.1%	
No job	48.0%	52.0%	
Other	61.5%	38.5%	
Changes in income during COVID-19			0.0046
Increased or remained stable	74.5%	25.5%	
Decreased ¹	65.3%	34.7%	
Household income before COVID-19³			0.0003
More than 2500 euros	58.6%	41.4%	
2500 euros or less	74.0%	26.0%	
Financial difficulties during COVID-19			<0.0001
No	75.3%	24.7%	
Yes ¹	56.4%	43.6%	
Financial difficulties before COVID-19³			0.1854
No	71.9%	28.1%	
Yes	65.6%	34.4%	
Sociodemographic characteristics³			
Sex³			<0.0001
Male	83.3%	16.7%	
Female	64.4%	35.6%	
Age (Mean(SD))³	40.2 (3.7)	39.9 (3.5)	0.2264
Educational level³			0.9256
No higher education level	71.0%	29.0%	
Higher education level	72.3%	27.7%	
Living situation³			0.3065
With a partner and children	73.3%	26.7%	
With a partner	65.9%	34.1%	
Alone	69.5%	30.5%	
Other	57.9%	42.1%	
Housing type			0.5879
Individual house	72.0%	28.0%	
Apartment	69.7%	30.3%	
Loneliness⁷			<0.0001
No	41.2%	58.8%	
Yes	80.5%	19.5%	
Health characteristics			
Symptoms of anxiety/depression before COVID-19⁶			<0.0001
No	82.8%	17.2%	
Yes	37.9%	62.1%	
Chronic physical health problems^{3 8}			0.0047
No	75.8%	24.2%	
Yes	66.9%	33.1%	
COVID-19-like symptoms			0.0211
No	73.6%	26.4%	
Yes ¹	63.8%	36.2%	

¹ At least once during follow-up

² P-values in bold are statistically significant at the 5% threshold

³ Measured at the first TEMPO-COVID-19 wave answered

⁴ Business owners, managers and academic occupations, craftsmen and traders, intermediate occupations

⁵ Farmers, administrative staff, trade and service employees, blue-collar workers

⁶ Last information available in 2018 (n=748) , 2011 (n=117) or 2009 (n=20)

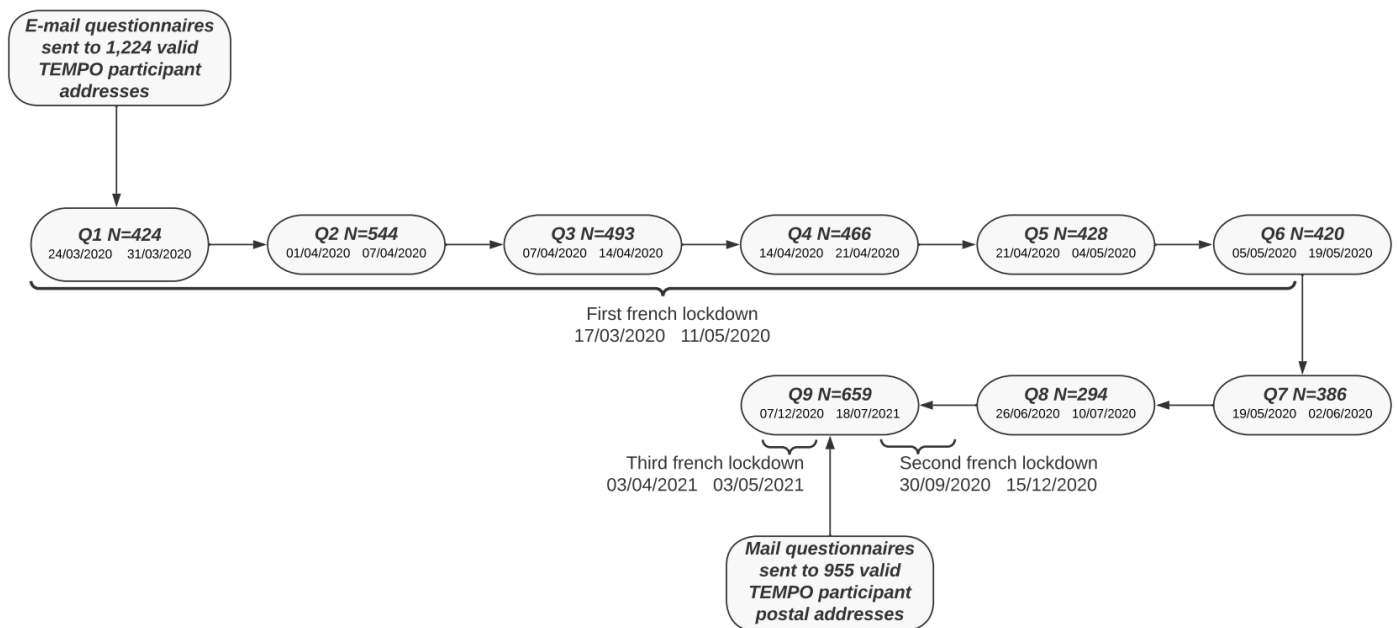
⁷ Measured at each TEMPO-COVID-19 wave answered and averaged

⁸ At least one among: cardiovascular disease, diabetes, overweight or obesity, chronic digestive disease, cancer, asthma, migraines, nervous breakdowns, musculoskeletal disorders

Table 2: Employment and financial characteristics of TEMPO cohort participants and symptoms of anxiety/depression, France, March 2020-July 2021, n=864 (bivariate and multivariate GEE models, OR, 95% CI).

	Symptoms of anxiety/depression during COVID-19 (n=864)			
	Bivariate		Multivariate	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Employment and financial characteristics				
Employment during COVID-19				
Worked normally or from home	1		1	
Worked less or were on partial unemployment	1.43 (1.09-1.88)	0.0101	1.34 (0.92-1.95)	0.1275
Forced leave	1.30 (0.97-1.75)	0.0808	1.20 (0.82-1.76)	0.3475
No job	2.53 (1.75-3.67)	<0.0001	1.89 (1.07-3.33)	0.0273
Type of employment before COVID-19				
High/intermediate occupational grade with a stable contract	1		1	
High/intermediate occupational grade and self-employed worker	2.01 (1.21-3.34)	0.0067	1.94 (1.08-3.48)	0.0255
Low occupational grade with a stable contract	1.52 (1.10-2.12)	0.0121	1.07 (0.69-1.67)	0.7488
No job	3.20 (1.71-5.98)	0.0003	1.11 (0.43-2.85)	0.8297
Other	1.91 (1.07-3.39)	0.0286	1.22 (0.65-2.30)	0.5404
Changes in income during COVID-19				
Increased or remained stable	1		1	
Decreased	1.16 (0.96-1.41)	0.1269	1.08 (0.81-1.43)	0.6054
Household income before COVID-19				
More than 2500 euros	1		1	
2500 euros or less	1.90 (1.34-2.70)	0.0004	1.42 (0.84-2.40)	0.1940
Financial difficulties during COVID-19				
No	1		1	
Yes	1.55 (1.15-2.07)	0.0035	1.43 (0.99-2.07)	0.0566
Financial difficulties before COVID-19				
No	1		1	
Yes	1.60 (1.03-2.49)	0.0373	1.05 (0.61-1.81)	0.8537
Sociodemographic characteristics				
Sex				
Male	1		1	
Female	2.13 (1.50-3.04)	<0.0001	1.40 (0.96-2.05)	0.0785
Age	0.98 (0.94-1.02)	0.3347	1.01 (0.96-1.06)	0.6386
Educational level				
No higher education level	1		1	
Higher education level	1.12 (0.71-1.76)	0.6218	1.10 (0.63-1.91)	0.7451
Living situation				
With a partner and children	1		1	
With a partner	1.36 (0.77-2.42)	0.2856	0.98 (0.53-1.80)	0.9415
Alone	1.23 (0.86-1.77)	0.2500	0.79 (0.45-1.39)	0.4123
Other	1.67 (0.91-3.05)	0.0951	0.93 (0.42-2.03)	0.8497
Housing type				
Individual house	1		1	
Apartment	0.96 (0.71-1.30)	0.7863	0.83 (0.57-1.21)	0.3322
Loneliness				
No	1		1	
Yes	8.35 (6.12-11.41)	<0.0001	7.59 (5.40-10.67)	<0.0001
Health characteristics				
Symptoms of anxiety/depression before COVID-19				
No	1		1	
Yes	7.77 (5.69-10.62)	<0.0001	5.97 (4.26-8.36)	<0.0001
Chronic physical health problems				
No	1		1	
Yes	1.28 (0.98-1.67)	0.0713	1.24 (0.91-1.70)	0.1788
COVID-19-like symptoms				
No	1		1	
Yes	1.22 (0.92-1.62)	0.1578	1.20 (0.83-1.72)	0.3300

Supplementary Table 1: TEMPO cohort flowchart.



References

- Achenbach, T. M., & Rescorla, L. A. (2003). *Manual for the ASEBA adult forms & profiles*. Burlington: University of Vermont, Research Center for Children, Youth, and Families.
- Alberti, P. M., Lantz, P. M., & Wilkins, C. H. (2020). Equitable Pandemic Preparedness and Rapid Response: Lessons from COVID-19 for Pandemic Health Equity. *Journal of Health Politics, Policy and Law*, 45(6), 921–935. <https://doi.org/10/gj36hv>
- Allen, J., Balfour, R., Bell, R., & Marmot, M. (2014). Social determinants of mental health. *International Review of Psychiatry*, 26(4), 392–407. <https://doi.org/10.3109/09540261.2014.928270>
- Althubaiti, A. (2016). Information bias in health research: Definition, pitfalls, and adjustment methods. *Journal of Multidisciplinary Healthcare*, 211. <https://doi.org/10.2147/JMDH.S104807>
- Ammon, C. E. (2002). Spanish flu epidemic in 1918 in Geneva, Switzerland. *Eurosurveillance*, 7(12), 190–192. <https://doi.org/10/gj3x5d>
- Andersen, A. J., Mary-Krause, M., Bustamante, J. J. H., Héron, M., El Aarbaoui, T., & Melchior, M. (2021). Symptoms of anxiety/depression during the COVID-19 pandemic and associated lockdown in the community: Longitudinal data from the TEMPO cohort in France. *BMC Psychiatry*, 21(1), 381. <https://doi.org/10.1186/s12888-021-03383-z>
- Bambra, C., Riordan, R., Ford, J., & Matthews, F. (2020). The COVID-19 pandemic and health inequalities. *Journal of Epidemiology and Community Health*, jech-2020-214401. <https://doi.org/10.1136/jech-2020-214401>
- Bartoll-Roca, X., Palència, L., Gotsens, M., & Borrell, C. (2021). Socioeconomic inequalities in self-assessed health and mental health in Barcelona, 2001-2016. *Gaceta Sanitaria*, S0213911121000510. <https://doi.org/10.1016/j.gaceta.2021.02.009>
- Berhuet, S., & Hoibian, S. (2021). *Les solitudes en France. Un tissu social fragilisé par la pandémie*. Crédoc.
- Bodner, T. E. (2008). What Improves with Increased Missing Data Imputations? *Structural Equation Modeling: A Multidisciplinary Journal*, 15(4), 651–675. <https://doi.org/10/c9dgr4>
- Brenner, M. H., Andreeva, E., Theorell, T., Goldberg, M., Westerlund, H., Leineweber, C., Hanson, L. L. Magnusson., Imbernon, E., & Bonnaud, S. (2014). Organizational Downsizing and Depressive Symptoms in the European Recession: The Experience of Workers in France, Hungary, Sweden and the United Kingdom. *PLoS ONE*, 9(5), e97063. <https://doi.org/10.1371/journal.pone.0097063>

- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet*, 395(10227), 912–920. <https://doi.org/10/ggnt8>
- C. Fong, V., & Iarocci, G. (2020). Child and Family Outcomes Following Pandemics: A Systematic Review and Recommendations on COVID-19 Policies. *Journal of Pediatric Psychology*, 45(10), 1124–1143. <https://doi.org/10.1093/jpepsy/jsaa092>
- Chu, I. Y.-H., Alam, P., Larson, H. J., & Lin, L. (2020). Social consequences of mass quarantine during epidemics: A systematic review with implications for the COVID-19 response. *Journal of Travel Medicine*, 27(7), taaa192. <https://doi.org/10.1093/jtm/taaa192>
- Chung, R. Y.-N., Chung, G. K.-K., Gordon, D., Wong, S. Y.-S., Chan, D., Lau, M. K.-W., Tang, V. M.-Y., & Wong, H. (2018). Deprivation is associated with worse physical and mental health beyond income poverty: A population-based household survey among Chinese adults. *Quality of Life Research*, 27(8), 2127–2135. <https://doi.org/10/gdwzhr>
- Claes, N., Smeding, A., & Carré, A. (2021). Mental Health Inequalities During COVID-19 Outbreak: The Role of Financial Insecurity and Attentional Control. *Psychologica Belgica*, 61(1), 327. <https://doi.org/10/gnqkws>
- Clark, R. L., Lusardi, A., & Mitchell, O. S. (2021). Financial Fragility during the COVID-19 Pandemic. *AEA Papers and Proceedings*, 111, 292–296. <https://doi.org/10/gnqkcz>
- Cui, J., & Qian, G. (2007). Selection of Working Correlation Structure and Best Model in GEE Analyses of Longitudinal Data. *Communications in Statistics - Simulation and Computation*, 36(5), 987–996. <https://doi.org/10/c85kxr>
- de Miquel, C., Domènech-Abella, J., Felez-Nobrega, M., Cristóbal-Narváez, P., Mortier, P., Vilagut, G., Alonso, J., Olaya, B., & Haro, J. M. (2022). The Mental Health of Employees with Job Loss and Income Loss during the COVID-19 Pandemic: The Mediating Role of Perceived Financial Stress. *International Journal of Environmental Research and Public Health*, 19(6), 3158. <https://doi.org/10.3390/ijerph19063158>
- Donnelly, R., & Farina, M. P. (2021). How do state policies shape experiences of household income shocks and mental health during the COVID-19 pandemic? *Social Science & Medicine*, 269, 113557. <https://doi.org/10/ghwz58>
- El-Hage, W., Hingray, C., Lemogne, C., Yroni, A., Brunault, P., Bienvenu, T., Etain, B., Paquet, C., Gohier, B., Bennabi, D., Birmes, P., Sauvaget, A., Fakra, E., Prieto, N., Bulteau, S., Vidailhet, P., Camus, V., Leboyer, M., Krebs, M.-O., & Auquier, B. (2020). [Health professionals facing the coronavirus disease 2019 (COVID-19) pandemic: What are the mental health risks?]. *L'Encephale*, 46(3S), S73–S80. <https://doi.org/10/ggzx8d>

- Ettman, C. K., Abdalla, S. M., Cohen, G. H., Sampson, L., Vivier, P. M., & Galea, S. (2021). Low assets and financial stressors associated with higher depression during COVID-19 in a nationally representative sample of US adults. *Journal of Epidemiology and Community Health*, 75(6), 501–508. <https://doi.org/10/gk7g89>
- Fiol-DeRoque, M. A., Serrano-Ripoll, M. J., Jiménez, R., Zamanillo-Campos, R., Yáñez-Juan, A. M., Bennasar-Veny, M., Leiva, A., Gervilla, E., García-Buades, M. E., García-Toro, M., Alonso-Coello, P., Pastor-Moreno, G., Ruiz-Pérez, I., Sitges, C., García-Campayo, J., Llobera-Cánaves, J., & Ricci-Cabello, I. (2021). A Mobile Phone-Based Intervention to Reduce Mental Health Problems in Health Care Workers During the COVID-19 Pandemic (PsyCovidApp): Randomized Controlled Trial. *JMIR MHealth and UHealth*, 9(5), e27039. <https://doi.org/10/gj832b>
- Fox, J. (2016). *Applied Regression Analysis and Generalized Linear Models. Third Edition. Sage.*
- Fox, J., & Monette, G. (1992). Generalized collinearity diagnostics. In *JASA* (Vol. 87, pp. 178–183). *JASA*.
- Fox, J., & Welsberg, S. (2018). *An R Companion to Applied Regression. Third Edition, Sage.*
- Galandra, C., Cerami, C., Santi, G. C., Dodich, A., Cappa, S. F., Vecchi, T., & Crespi, C. (2020). Job loss and health threatening events modulate risk-taking behaviours in the Covid-19 emergency. *Scientific Reports*, 10(1), 22236. <https://doi.org/10/gj36hq>
- Ganson, K. T., Tsai, A. C., Weiser, S. D., Benabou, S. E., & Nagata, J. M. (2021). Job Insecurity and Symptoms of Anxiety and Depression Among U.S. Young Adults During COVID-19. *Journal of Adolescent Health*, 68(1), 53–56. <https://doi.org/10/gj3x5b>
- Gilan, D., Müssig, M., Hahad, O., Kunzler, A. M., Samstag, S., Röthke, N., Thrul, J., Kreuter, F., Bosnjak, M., Sprengholz, P., Betsch, C., Wollschläger, D., Tüscher, O., & Lieb, K. (2021). Protective and Risk Factors for Mental Distress and Its Impact on Health-Protective Behaviors during the SARS-CoV-2 Pandemic between March 2020 and March 2021 in Germany. *International Journal of Environmental Research and Public Health*, 18(17), 9167. <https://doi.org/10.3390/ijerph18179167>
- Goyal, K., Kumar, S., Rao, P., Colombage, S., & Sharma, A. (2021). Financial distress and COVID-19: Evidence from working individuals in India. *Qualitative Research in Financial Markets*, 13(4), 503–528. <https://doi.org/10/gnqsr>
- Griffiths, D., Sheehan, L., van Vreden, C., Petrie, D., Grant, G., Whiteford, P., Sim, M. R., & Collie, A. (2021). The Impact of Work Loss on Mental and Physical Health During the COVID-19 Pandemic: Baseline Findings from a Prospective Cohort Study. *Journal of Occupational Rehabilitation*. <https://doi.org/10/gj36hr>

- Guerin, R. J., Barile, J. P., Thompson, W. W., McKnight-Eily, L., & Okun, A. H. (2021). Investigating the Impact of Job Loss and Decreased Work Hours on Physical and Mental Health Outcomes Among US Adults During the COVID-19 Pandemic. *Journal of Occupational & Environmental Medicine*, 63(9), e571–e579. <https://doi.org/10/gkfbmbm>
- Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., Webster, S., Cameron-Blake, E., Hallas, L., Majumdar, S., & Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nature Human Behaviour*, 5(4), 529–538. <https://doi.org/10/gjm8fm>
- Hassan, M. F., Mohd Hassan, N., Kassim, E. S., & Utoh Said, Y. M. (2021). Financial Wellbeing and Mental Health: A Systematic Review. *Studies of Applied Economics*, 39(4), Article 4. <https://doi.org/10/gnqkwr>
- Hin, L.-Y., & Wang, Y.-G. (2009). Working-correlation-structure identification in generalized estimating equations. *Statistics in Medicine*, 28(4), 642–658. <https://doi.org/10/cn5wdv>
- Hossain, M. M., Tasnim, S., Sultana, A., Faizah, F., Mazumder, H., Zou, L., McKyer, E. L. J., Ahmed, H. U., & Ma, P. (2020). Epidemiology of mental health problems in COVID-19: A review. *F1000Research*, 9, 636. <https://doi.org/10.12688/f1000research.24457.1>
- Hughes, M. E., Waite, L. J., Hawkey, L. C., & Cacioppo, J. T. (2004). A Short Scale for Measuring Loneliness in Large Surveys: Results From Two Population-Based Studies. *Research on Aging*, 26(6), 655–672. <https://doi.org/10/dmfzbj>
- ILO. (2021). *World Employment and Social Outlook: Trends 2021*. INTL LABOUR OFFICE.
- Insee. (2020). *France, portrait social—Édition 2020*.
- Insee. (2021). *Revenus et patrimoine des ménages*.
- James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). *An Introduction to Statistical Learning* (Vol. 103). Springer New York. <https://doi.org/10.1007/978-1-4614-7138-7>
- Kamara, S., Walder, A., Duncan, J., Kabbedijk, A., Hughes, P., & Muana, A. (2017). Mental health care during the Ebola virus disease outbreak in Sierra Leone. *Bulletin of the World Health Organization*, 95(12), 842–847. <https://doi.org/10/gcm5t4>
- Kelly, B. D. (2020). Plagues, pandemics and epidemics in Irish history prior to COVID-19 (coronavirus): What can we learn? *Irish Journal of Psychological Medicine*, 37(4), 269–274. <https://doi.org/10/gjwzrb>
- Kim, Y., & Cho, S. (2020). Socioeconomic status, work-life conflict, and mental health. *American Journal of Industrial Medicine*, 63(8), 703–712. <https://doi.org/10/gk3gt7>

- Knabe, A., & Rätzel, S. (2011). Scarring or Scaring? The Psychological Impact of Past Unemployment and Future Unemployment Risk: Scarring or Scaring? *Economica*, 78(310), 283–293. <https://doi.org/10.1111/j.1468-0335.2009.00816.x>
- Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., Bamberger, P., Bapuji, H., Bhawe, D. P., Choi, V. K., Creary, S. J., Demerouti, E., Flynn, F. J., Gelfand, M. J., Greer, L. L., Johns, G., Kesebir, S., Klein, P. G., Lee, S. Y., ... Vugt, M. van. (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *American Psychologist*, 76(1), 63–77. <https://doi.org/10/gg7t38>
- Kopasker, D., Montagna, C., & Bender, K. A. (2018). Economic insecurity: A socioeconomic determinant of mental health. *SSM - Population Health*, 6, 184–194. <https://doi.org/10.1016/j.ssmph.2018.09.006>
- Korzeniewska, M. (1995). [Health effects of unemployment]. *Medycyna Pracy*, 46(4), 407–414.
- Ksinan Jiskrova, G., Bobák, M., Pikhart, H., & Ksinan, A. J. (2021). Job loss and lower healthcare utilisation due to COVID-19 among older adults across 27 European countries. *Journal of Epidemiology and Community Health*, jech-2021-216715. <https://doi.org/10.1136/jech-2021-216715>
- Kunzler, A. M., Stoffers-Winterling, J., Stoll, M., Mancini, A. L., Lehmann, S., Blessin, M., Gilan, D., Helmreich, I., Hufert, F., & Lieb, K. (2021). Mental health and psychosocial support strategies in highly contagious emerging disease outbreaks of substantial public concern: A systematic scoping review. *PLOS ONE*, 16(2), e0244748. <https://doi.org/10/gk672x>
- LaMontagne, A. D., Too, L. S., Punnett, L., & Milner, A. J. (2021). Changes in Job Security and Mental Health: An Analysis of 14 Annual Waves of an Australian Working-Population Panel Survey. *American Journal of Epidemiology*, 190(2), 207–215. <https://doi.org/10/gj3x5c>
- Liang, K.-Y., & Zeger, S. L. (1986). Longitudinal data analysis using generalized linear models. *Biometrika*, 73(1), 13–22. <https://doi.org/10/ccfq6>
- Lloyd-Evans, B., Frerichs, J., Stefanidou, T., Bone, J., Pinfold, V., Lewis, G., Billings, J., Barber, N., Chhappia, A., Chipp, B., Henderson, R., Shah, P., Shorten, A., Giorgalli, M., Terhune, J., Jones, R., & Johnson, S. (2020). The Community Navigator Study: Results from a feasibility randomised controlled trial of a programme to reduce loneliness for people with complex anxiety or depression. *PLOS ONE*, 15(5), e0233535. <https://doi.org/10/gh2n63>
- Marmet, S., Wicki, M., Gmel, G., Gachoud, C., Daeppen, J.-B., Bertholet, N., & Studer, J. (2021). The psychological impact of the COVID-19 crisis is higher among young Swiss men with a lower socioeconomic status: Evidence from a cohort study. *PLOS ONE*, 16(7), e0255050. <https://doi.org/10/gnp92b>

- Marmot, M. (2001). Psychosocial and material pathways in the relation between income and health: A response to Lynch et al. *BMJ*, *322*(7296), 1233–1236. <https://doi.org/10/fjc3gq>
- Mary-Krause, M., Bustamante, J. J. H., Héron, M., Andersen, A. J., El Aarbaoui, T., Melchior, M., & Murakami, M. (2021). Impact of COVID-19-like symptoms on occurrence of anxiety/depression during lockdown among the French general population. *PLOS ONE*, *16*(7), e0255158. <https://doi.org/10.1371/journal.pone.0255158>
- Mary-Krause, M., Herranz Bustamante, J. J., Bolze, C., Galéra, C., Fombonne, E. J., & Melchior, M. (2021). Cohort profile: The TEMPO cohort study. *International Journal of Epidemiology*, dyab026. <https://doi.org/10/gk3gvc>
- McCartan, C., Adell, T., Cameron, J., Davidson, G., Knifton, L., McDaid, S., & Mulholland, C. (2021). A scoping review of international policy responses to mental health recovery during the COVID-19 pandemic. *Health Research Policy and Systems*, *19*(1), 58. <https://doi.org/10/gk7zqm>
- Mengin, A., Allé, M. C., Rolling, J., Ligier, F., Schroder, C., Lalanne, L., Berna, F., Jardri, R., Vaiva, G., Geoffroy, P. A., Brunault, P., Thibaut, F., Chevance, A., & Giersch, A. (2020). Conséquences psychopathologiques du confinement. *L'Encéphale*, *46*(3), S43–S52. <https://doi.org/10/ghc6pj>
- Ngoc Cong Duong, K., Nguyen Le Bao, T., Thi Lan Nguyen, P., Vo Van, T., Phung Lam, T., Pham Gia, A., Anuratpanich, L., & Vo Van, B. (2020). Psychological Impacts of COVID-19 During the First Nationwide Lockdown in Vietnam: Web-Based, Cross-Sectional Survey Study. *JMIR Formative Research*, *4*(12), e24776. <https://doi.org/10/gj3x49>
- Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International Journal of Surgery*, *78*, 185–193. <https://doi.org/10.1016/j.ijssu.2020.04.018>
- OECD. (2020). *OECD Employment Outlook 2020: Worker Security and the COVID-19 Crisis*. OECD. <https://doi.org/10.1787/1686c758-en>
- Ong, A. D., & Weiss, D. J. (2000). The Impact of Anonymity on Responses to Sensitive Questions1. *Journal of Applied Social Psychology*, *30*(8), 1691–1708. <https://doi.org/10.1111/j.1559-1816.2000.tb02462.x>
- Pan, W. (2001). Akaike's information criterion in generalized estimating equations. *Biometrics*, *57*(1), 120–125. <https://doi.org/10/cqcz3j>
- Park, J.-S., Lee, E.-H., Park, N.-R., & Choi, Y. H. (2018). Mental Health of Nurses Working at a Government-designated Hospital During a MERS-CoV Outbreak: A Cross-sectional Study. *Archives of Psychiatric Nursing*, *32*(1), 2–6. <https://doi.org/10/ggt7th>

- Patel, J. A., Nielsen, F. B. H., Badiani, A. A., Assi, S., Unadkat, V. A., Patel, B., Ravindrane, R., & Wardle, H. (2020). Poverty, inequality and COVID-19: The forgotten vulnerable. *Public Health, 183*, 110–111. <https://doi.org/10/ghf4tj>
- Pieh, C., Budimir, S., & Probst, T. (2020). The effect of age, gender, income, work, and physical activity on mental health during coronavirus disease (COVID-19) lockdown in Austria. *Journal of Psychosomatic Research, 136*, 110186. <https://doi.org/10/gg4spf>
- Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., John, A., Kontopantelis, E., Webb, R., Wessely, S., McManus, S., & Abel, K. M. (2020). Mental health before and during the COVID-19 pandemic: A longitudinal probability sample survey of the UK population. *The Lancet Psychiatry, 7*(10), 883–892. <https://doi.org/10/gg5ngp>
- Prati, G., & Mancini, A. D. (2021). The psychological impact of COVID-19 pandemic lockdowns: A review and meta-analysis of longitudinal studies and natural experiments. *Psychological Medicine, 51*(2), 201–211. <https://doi.org/10.1017/S0033291721000015>
- R Core Team. (2020). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.
- Rahman, M., Ahmed, R., Moitra, M., Damschroder, L., Brownson, R., Chorpita, B., Idele, P., Gohar, F., Huang, K. Y., Saxena, S., Lai, J., Peterson, S. S., Harper, G., McKay, M., Amugune, B., Esho, T., Ronen, K., Othieno, C., & Kumar, M. (2021). Mental Distress and Human Rights Violations During COVID-19: A Rapid Review of the Evidence Informing Rights, Mental Health Needs, and Public Policy Around Vulnerable Populations. *Frontiers in Psychiatry, 11*, 603875. <https://doi.org/10.3389/fpsyt.2020.603875>
- RESPOND. (2021a). *Policy recommendations on short-term impact of COVID-19 pandemic*. <https://respond-project.eu/wp-content/uploads/2021/12/D2.2-Policy-Recommendations-on-Short-Term-Impact-of-the-COVID-19-Pandemic.pdf>
- RESPOND. (2021b). *Rapid report on vulnerable groups for COVID-19 related psychological distress*. https://respond-project.eu/wp-content/uploads/2021/03/RESPOND_D2.1_Report.pdf
- Ridley, M., Rao, G., Schilbach, F., & Patel, V. (2020). Poverty, depression, and anxiety: Causal evidence and mechanisms. *Science, 370*(6522), eaay0214. <https://doi.org/10/ghpbks>
- Rosén, M., & Stenbeck, M. (2021). Interventions to suppress the coronavirus pandemic will increase unemployment and lead to many premature deaths. *Scandinavian Journal of Public Health, 49*(1), 64–68. <https://doi.org/10/gh9h5m>

- Ruengorn, C., Awiphan, R., Wongpakaran, N., Wongpakaran, T., Nochaiwong, S., & for the Health Outcomes and Mental Health Care Evaluation Survey Research Group (HOME-Survey). (2021). Association of job loss, income loss, and financial burden with adverse mental health outcomes during coronavirus disease 2019 pandemic in Thailand: A nationwide cross-sectional study. *Depression and Anxiety*, da.23155. <https://doi.org/10/gj3x43>
- San Sebastián, M., Mosquera, P. A., & Gustafsson, P. E. (2018). Whose income is more important: Mine, yours or ours? Income inequality and mental health in northern Sweden. *European Journal of Public Health*, 28(6), 1056–1061. <https://doi.org/10/gd8r9z>
- Santomauro, D. F., Mantilla Herrera, A. M., Shadid, J., Zheng, P., Ashbaugh, C., Pigott, D. M., Abbafati, C., Adolph, C., Amlag, J. O., Aravkin, A. Y., Bang-Jensen, B. L., Bertolacci, G. J., Bloom, S. S., Castellano, R., Castro, E., Chakrabarti, S., Chattopadhyay, J., Cogen, R. M., Collins, J. K., ... Ferrari, A. J. (2021). Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *The Lancet*, 398(10312), 1700–1712. <https://doi.org/10/gm3qw3>
- Sharifi, M., Asadi-Pooya, A. A., & Mousavi-Roknabadi, R. S. (2020). Burnout among Healthcare Providers of COVID-19; a Systematic Review of Epidemiology and Recommendations: Burnout in healthcare providers. *Archives of Academic Emergency Medicine*, 9(1), e7. <https://doi.org/10.22037/aaem.v9i1.1004>
- Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., Hergueta, T., Baker, R., & Dunbar, G. C. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *The Journal of Clinical Psychiatry*, 59 Suppl 20, 22-33;quiz 34-57.
- Solomou, I., & Constantinidou, F. (2020). Prevalence and Predictors of Anxiety and Depression Symptoms during the COVID-19 Pandemic and Compliance with Precautionary Measures: Age and Sex Matter. *International Journal of Environmental Research and Public Health*, 17(14), 4924. <https://doi.org/10/gg4rsv>
- Srivatsa, S., & Stewart, K. A. (2020). How Should Clinicians Integrate Mental Health Into Epidemic Responses? *AMA Journal of Ethics*, 22(1), E10-15. <https://doi.org/10/gj3x48>
- Stephoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences*, 110(15), 5797–5801. <https://doi.org/10/f4stm5>
- Sultana, Mst. S., Khan, A. H., Hossain, S., Islam, T., Hasan, M. T., Ahmed, H. U., Li, Z., & Khan, J. A. M. (2021). The Association Between Financial Hardship and Mental Health Difficulties Among Adult Wage Earners During the

- COVID-19 Pandemic in Bangladesh: Findings From a Cross-Sectional Analysis. *Frontiers in Psychiatry*, 12, 635884. <https://doi.org/10.3389/fpsy.2021.635884>
- van der Velden, P. G., Contino, C., Das, M., van Loon, P., & Bosmans, M. W. G. (2020). Anxiety and depression symptoms, and lack of emotional support among the general population before and during the COVID-19 pandemic. A prospective national study on prevalence and risk factors. *Journal of Affective Disorders*, 277, 540–548. <https://doi.org/10/gh29hb>
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., McIntyre, R. S., Choo, F. N., Tran, B., Ho, R., Sharma, V. K., & Ho, C. (2020). A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain, Behavior, and Immunity*, 87, 40–48. <https://doi.org/10/ggv44z>
- White, I. R., Royston, P., & Wood, A. M. (2011). Multiple imputation using chained equations: Issues and guidance for practice. *Statistics in Medicine*, 30(4), 377–399. <https://doi.org/10/cmwhtz>
- Wu, T., Jia, X., Shi, H., Niu, J., Yin, X., Xie, J., & Wang, X. (2021). Prevalence of mental health problems during the COVID-19 pandemic: A systematic review and meta-analysis. *Journal of Affective Disorders*, 281, 91–98. <https://doi.org/10.1016/j.jad.2020.11.117>
- Xiang, Y.-T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., & Ng, C. H. (2020). Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *The Lancet Psychiatry*, 7(3), 228–229. <https://doi.org/10/ggpxwg>
- Xiong, J., Lipsitz, O., Nasri, F., Lui, L. M. W., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A., & McIntyre, R. S. (2020). Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of Affective Disorders*, 277, 55–64. <https://doi.org/10/gg7nkk>
- Yu, Y., & Williams, D. R. (1999). Socioeconomic Status and Mental Health. In C. S. Aneshensel & J. C. Phelan (Eds.), *Handbook of the Sociology of Mental Health* (pp. 151–166). Springer US. https://doi.org/10.1007/0-387-36223-1_8