RESPOND

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D2.1 RAPID REPORT ON VULNERABLE GROUPS FOR COVID-19 RELATED PSYCHOLOGICAL DISTRESS

This project has received funding from the European Union's Horizon 2020 research and innovation programme Societal Challenges under Grant Agreement No 101016127.

Deliverable D2.1 – Rapid report on vulnerable groups for COVID-19 related psychological distress

RESPOND: Improving the Preparedness of Health Systems to Reduce Mental Health and Psychosocial Concerns Resulting from the COVID-19 Pandemic

Project Acronym: RESPOND

Grant Agreement No 101016127

Deliverable Information	
Project start date	01/12/2020
Duration of the project	3 years (until 30/11/2023)
Deliverable number and name	D2.1 Rapid report on vulnerable groups for COVID-19 related psychological distress
Due date	Month 3
Delivery	Month 3
Work package	WP2
Lead partner for deliverable	INSERM
Approved by	WP2 Partners (VUA, UAM, UCLouvain, INSERM, KI, LIR, VUMC, UNIMIB, RL, UNSW)
Dissemination level	PU
Keywords	COVID-19, psychological distress, anxiety, depression, risk groups, vulnerable groups
Version	1.0
Reviewer	
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TABLE OF CONTENTS

EXECUTIVE SUMMARY

The COVID-19 epidemic which unfolded across the world has changed the way in which many populations live significantly and for a duration that is yet unknown. The EU-funded RESPOND project aims to examine the impact of the epidemic with regards to short and long-term mental health outcomes and associated conditions. This rapid report presents preliminary findings based on datasets from different countries that are included in the RESPOND consortium and can serve to shed light upon subgroups of the population that may be at risk of negative outcomes and could therefore require special attention, as well as those who are, on the contrary, resilient and whose characteristics can serve to model approaches that are delivered to strengthen the mental health of other groups.

Specifically, RESPOND data show that there is a significant increase in levels of psychological distress in the context of the epidemic compared to preceding years. This is particularly the case in young people, especially those experiencing loneliness, as well as persons who had psychological difficulties prior to the epidemic. It is important to note that these characteristics are often found among migrant groups, who may additionally experience greater difficulties accessing healthcare. Healthcare workers, despite elevated levels of stress, appear to have developed strategies to reduce their levels of psychological distress. Finally, the data show that social support and positive appraisal can serve as important resilience factors, strengthening the mental health of persons exposed to high levels of stress. Overall, these results shed light upon the groups at risk of negative mental health consequences in the context of the COVID-19 epidemic, which should be taken into account in intervention strategies aiming to reduce the individual and collective impact of the sanitary crisis.

1. INTRODUCTION

1.1. THE COVID-19 PANDEMIC

The COVID-19 pandemic has a major and potentially long-lasting effect on wellbeing and mental health across populations in Europe and worldwide. The pandemic has affected every country in the world, with some of the most deeply affected countries being in Europe, including countries involved in the project (JHU, 2020). Early reports concerning the levels of psychological distress associated with the COVID-19 crisis are highly concerning (McGinty et al., 2020) and led the UN to release a policy briefing on the mental health impacts of COVID-19 warning that a 'long-term upsurge in the number and severity of mental health problems is likely' (UN, 2020). Epidemic control measures implemented to fight against COVID-19 have had massive effects on the daily lives of European citizens and people worldwide. European governments installed epidemic control measures to contain the spread of the virus. These included contact tracing, short-term investments in ventilators, limitations in healthcare access, and lockdown restrictions and closures which have had further impacts on society at large (Blavatnik School of Government, 2020). Government responses are highly contingent on local political and social context, and countries have implemented different lockdown strategies over the course of the pandemic.

Despite social protection programs, many individuals have been directly impacted - workwise, financially, socially - by the economic consequences of the COVID-19 containment measures. The recent COVID-19 pandemic has been forcing millions of people to change their usual life, to work from home, and to practice physical and social distancing. Many people face uncertainty regarding their financial situation, as well as the risk and consequences of being contaminated. Many Europeans have seen their income decline, especially people in short-term, part-time or self-employment.

1.2. EFFECTS OF THE COVID-19 PANDEMIC ON WELLBEING, MENTAL HEALTH AND RESILIENCE

For a peacetime society, a virus epidemic is considered to be one of the most difficult and stressful events to manage in terms of public health and its social and economic consequences are expected to impact mental health. For example, physical distancing and staying at home orders have led to elevated levels of loneliness in many people, which are associated with depression and suicidal ideation (Stickley and Koyanagi, 2016). Furthermore, COVID-19 patients who recover may face serious mental health problems after discharge from the ICU, particularly posttraumatic stress disorder (PTSD), anxiety, and depression (Xiang et al., 2020; Moreno et al., 2020; Mi et al., 2020). Prior research indicated that economic recessions are associated with increases in mental health problems in the population, with historically higher increases in mental health symptoms in young people and women (Thomson and Katikireddi, 2018). Hence, the COVID-19 pandemic and the associated containment measures are expected to lead to an exacerbation of health inequalities in Europe.

The evidence regarding the mental health consequences of the confinement due to the COVID-19 pandemic in the general population is, however, inconclusive and sometimes hampered by methodological flaws. Although cross-sectional studies report a high prevalence rates of anxiety (e.g. generalized anxiety disorder) and depression symptoms in different populations (Elbay et al., 2020; Huang and Zhao, 2020; Liu et al., 2020; Odriozola-González et al., 2020; Ozamiz-Etxebarria et al., 2020; Pappa et al., 2020; Salari et al., 2020), only a few studies compared prevalence-rates before and after the COVID-19 epidemic. These studies showed that the prevalence of symptoms of anxiety and depression in 2020 is higher than in the same period in 2019 (Czeisler et al., 2020), 2018 (Twenge and Joiner, 2020), or before the pandemic (Bäuerle A, 2020).

1.3. RISK FACTORS FOR COVID-19 RELATED PSYCHOLOGICAL DISTRESS

Several risk factors have been identified that may contribute to the deterioration of mental health during the COVID-19 pandemic such as COVID-19 infection severity, pre-existing mental health problems, and loneliness.

Studies into risk factors linked to a COVID-19 infection such as the symptoms experienced, contact with persons who were affected, COVID-19-related fears, as well as the level of information provided regarding COVID-19 (Al Zubayer at al., 2020; McCracken et al., 2020; Newby et al., 2020; Olagoke, 2020; Ozdin and Bayrak Ozdin, 2020; Wang et al., 2020; Xiong et al., 2020) were mostly cross-sectional (Xiong et al., 2020) and associations were sometimes only significant in univariate models (Newby et al., 2020; Wang et al, 2020). Also, individuals' pre-pandemic history of mental health problems was often not taken into account or collected retrospectively which can introduce recall bias (McCracken et al, 2020; Newby et al., 2020; Ozdin and Bayrak Ozdin, 2020). So, direct evidence of COVID-19 infection as a risk factor associated with an increase in mental health risk is limited.

Individuals with pre-existing mental health disorders may be at increased risk when it comes to the effects of the lockdown on mental health (Campion et al., 2020; Holmes et al., 2020; Pierce et al., 2020; Vindegaard and Benros, 2020). A systematic review investigating the COVID-19 pandemic and mental health showed that patients with pre-existing psychiatric disorders reported worsening in symptoms (Vindegaard and Benros, 2020). However, in this area as in others longitudinal data are scarce.

Another risk factor related to the pandemic and well-known for its association with mental health difficulties is loneliness (Holmes et al., 2020; Lloyd-Evans et al., 2020; Meltzer et al., 2013). Because of the social distancing measures, an increase in loneliness is expected and this is likely to impact the mental health situation during lockdown. Besides loneliness, the current COVID-19 crisis also impacts society at large, requiring people to change their social behavior.

1.4. RESILIENCE FACTORS

Although exposure to stress such as the COVID-19 pandemic leads to negative effects with a potential increase of mental health problems particularly when (multiple) risk factors are present, some people maintain or recover their (mental) health even after such exposure (Bonanno and Diminich, 2013). Resilience is the ability to cope with the negative effects of stress in order to preserve mental health or quickly recover through adaptation processes (Kalisch et al., 2020). There is however a lack of knowledge regarding the role of resilience factors during situations of protracted crisis such as the COVID-19 pandemic. In addition, individuals adopting protective behaviours against COVID-19 transmission appear less likely to have symptoms of anxiety and depression (Alkhamees et al., 2020). Still, little is known about resilience across specific vulnerable groups and regarding the role of pre-COVID-19 factors. Accurate identification of risk groups based on pre-pandemic characteristics would enable preparation for future pandemics (Pollock et al., 2020).

1.5. VULNERABLE GROUPS FOR COVID-19 RELATED DISTRESS

Specific sub-groups may have been particularly impacted by the COVID-19 pandemic, such as frontline (health)care workers (Huang and Zhao, 2021), young people (Pidd, 2020; Wang et al., 2020), persons belonging to socio-economically disadvantaged or minority groups (Donnelly and Farina, 2021), individuals with psychiatric comorbidities (Yao, Chen, and Xu, 2020), and pregnant and postpartum women (Wu et al., 2020).

Ensuring the mental health of (frontline) healthcare workers is essential due to their critical role in COVID-19 preparedness, response and recovery (UN, 2020). Frontline healthcare workers not only have a higher risk of being infected with COVID-19, they also face a high workload during the pandemic and they initially lacked protective materials. Also, several studies have reported varying and high levels of depression, PTSD, and insomnia in healthcare

workers during COVID-19 across several countries worldwide including Italy (Lai et al., 2020; Huang and Zhao, 2020; Qi et al., 2020; Liu et al., 2020; Lu et al., 2020; Tan et al., 2020; Tian et al. 2020; Mazza et al., 2020). Risk factors for worse mental health and increased psychological distress in (frontline) healthcare workers include less experience as a health worker, being a nurse (instead of a doctor), higher levels of contact with affected patients but also inadequate training, insufficient organizational support and compensation, and societal stigma (Kisely et al., 2020).

Young people have also been hit hard by the epidemic control measures (Pidd, 2020; Wang et al., 2020; Huang and Zhao, 2021). Young people often live alone and, as a result, may suffer from an increase in loneliness, a lack of physical activity and an increase in screen time use (Marques de Miranda et al., 2020). Also, university students have been reported to experience increased levels of mental health problems (Wathelet et al., 2020; Alkhamees et al., 2020). Little information is available, however, about the psychological impact of lockdown on university students and the risks of exacerbated isolation and psychological vulnerability (Beck et al., n.d.; Husky et al., 2020). A few studies have reported high prevalence of depressive symptoms, anxiety symptoms and stress during the Covid-19 lockdown among university students (Cao et al., 2020; Husky et al., 2020; Odriozola-González et al., 2020; Tang et al., 2020), but it is unknown whether the impact is different in this population compared to non-students. Family functioning might also be disrupted by the closing of schools and increased rates of family domestic violence have been reported in different settings, especially towards children (Usher et al., 2020).

Among people with pre-existing psychiatric conditions, the emotional responses brought on by the pandemic and its management may also be substantial (The Lancet, 2020; Yao, Chen, and Xu, 2020).
People with a low income or who experienced a decrease in income because of the pandemic are also more likely to have depression and anxiety symptoms, particularly when there is a lack of policies aiming to protect employees' income, as was found in both the US and China (Donnelly and Farina, 2021; Lai et al., 2020).

The COVID-19 pandemic has exacerbated stressors faced by vulnerable populations, especially migrant workers and other socioeconomically deprived populations. Persons living under fragile circumstances and/or who belong to an ethnic minority population (such as migrants) have been found to have an elevated risk of dying from COVID-19 (Public Health England, 2020; Tai et al., 2021). The pandemic has prompted migrant workers to worry more about food, shelter, healthcare, the wellbeing of their family, loss of income, and developing or spreading the virus (Singh, 2020). Distance from family and its resulting loneliness as well as concerns for family members' health have generated further distress (Choudhari, 2020).
Under pre-pandemic circumstances, members of these communities already face unique circumstances that contribute to feelings of distress. Vulnerable populations typically experience a higher prevalence of common mental disorders and a lower quality of life than non-vulnerable members of the local population (Hargreaves et al., 2019). Many migrant workers left their country in order to provide for their families; separation from loved ones and concerns of providing adequate financial support can lead to distress in migrants (Zhou et al., 2020). As a result of their outsider status, nearly 40% of migrants experience discrimination in the workplace (Girling, Liu, & Ward, 2010), leading to psychological stress (Noor & Shaker, 2017). Moreover, language barriers contribute to distress in these populations because they can create difficulties in finding and accessing work, housing, healthcare, and support resources (Choudhari, 2020). People belonging to a vulnerable population may adopt destructive or avoidant coping mechanisms to address their stressors, compounding feelings of distress (Noor & Shaker, 2017). As a result, these populations face more stress and distress than non-migrant populations and deserve special attention in studies centred on mental health.
Recent research demonstrates how the COVID-19 pandemic has decreased psychological wellbeing and increased distress in these vulnerable populations by aggravating common stressors. The widespread effects of COVID-19 further worsen physical and mental wellbeing by reducing the likelihood that vulnerable populations will access healthcare. Lockdowns contribute to less frequent access to mental healthcare services by migrant and socioeconomically deprived populations, as well as decreasing follow-up adherence (Aragona et al., 2020; Aragona et al., 2021). There is an urgent need to empirically understand the extent to which the COVID-19 pandemic and related societal changes have so far affected the mental health of these susceptible populations.

1.6. RESPOND WORK PACKAGE 2: IDENTIFYING RISK AND RESILIENCE GROUPS

RESPOND is centred around core questions regarding the short and long-term impacts of the pandemic on mental health and health inequalities. The first aim of RESPOND is to identify specific vulnerable groups at risk of immediate and long-term adverse mental health impact of the COVID-19 pandemic, as well as relevant resilience factors. This report describes the first results of analyses conducted using epidemiological data which were collected and analysed within the RESPOND consortium.

Partners within WP2 of RESPOND have examined whether there is a change in the prevalence rates of mental health conditions before and during the pandemic (e.g. (symptoms of) anxiety and depression (i.e. psychological distress), suicidal ideation and behaviour) in the general adult EU population (e.g. Belgium, France, Spain). They have also gathered data regarding risk factors (e.g. socio-demographic/economic factors, COVID-19 infection severity, (lack of) social- activity and support, feelings of detachment, living situation, loss of income) associated with psychological distress as well as resilience and wellbeing (coping strategies and basic value orientations) in the general population, or specific vulnerable groups. More specifically, based on an impressive set of existing mostly longitudinal pan-European datasets, this WP2 report presents rapid results on the identification of vulnerable groups that are at greatest risk of adverse mental health effects (e.g., frontline health and care workers, patients with pre-existing mental health problems or comorbidities and people from precious socio-economic backgrounds).

1.7. METHOD

This report presents an overview of recent studies carried out by WP2 partners of the RESPOND project aiming to identify groups vulnerable to the impact of the COVID-19 pandemic as well as risk factors of increased psychological distress and reductions in wellbeing, as well as factors associated with resilience.

We present results of studies carried out in the general population, followed by data from specific subgroups including healthcare workers, young people and persons with pre-existing mental health problems (chapter 2). Finally, we show evidence of resilience factors (chapter 3).

We end with an overall conclusion, and recommendations (chapter 4).

2. FACTORS ASSOCIATED WITH VULNERABILITY TO PSYCHOLOGICAL DISTRESS IN THE CONTEXT OF THE COVID-19 EPIDEMIC IN THE GENERAL POPULATION

UCLouvain aimed to give a global picture of the situation regarding psychological distress during the different confinement measures against the spread of COVID-19.[1] Since the first principle of any intervention in health is "first do no harm", the "COVID and I" study examined the consequences of these measures on the mental health of the population. We analysed the level of psychological distress in the four waves in March, April, June and September 2020.

Method

As of 21 March 2020, the "COVID and I" study examined mental health patterns in relation to COVID-19 in Belgium. Data was collected on four occasions from the same participants: in March 2020, three days after the implementation of the first lockdown; in April 2020, at the peak of the pandemic's first wave; in June 2020, during lockdown easing, and in November 2020, during the second wave. Of all respondents, 6,337 people took part in the four survey waves. Psychological distress was measured using a scientifically validated tool (the 12-item General Health Questionnaire) to identify people at risk of psychological distress in the general population.

Statistical analyses

Statistical methods were used which allowed us to break down the measured changes in psychological distress into three main sources:

- *variation linked to the temporality of the pandemic (March, April, June and November 2020)*
- *intra-individual variations (linked to changing personal characteristics, for example social isolation or exposure to COVID-19)*
- *inter-individual variation (linked to stable characteristics such as age, gender, social situation, etc.)*

Results

At the start of lockdown and during the first wave of the pandemic in March and April 2020, 48% and 46% of individuals indicated being at risk of psychological distress, respectively. The easing of the lockdown in June 2020 was associated with a decrease in the proportion of psychological distress with a rate of 32%. However, when the pandemic resumed and policies were tightened in November, 47% of the population experienced psychological distress again.

Throughout the sanitary crisis, a large group of individuals (27%) never reached the threshold of psychological distress. On the other hand, 15% of respondents were in a situation of persistent psychological distress during the four phases of the survey. The overall transitions in psychological distress over the four survey periods are showcased. Thus, we can see that, for a segment of the population, a significant decrease in the level of psychological distress was observed between April and June 2020, followed by a further increase between June and November 2020. The results indicate that the role of intra-personal factors with regard to changes in psychological distress during the March-November 2020 period is very high (47%), while the time factor, linked to the survey period, is low (3%). Individuals' stable characteristics (age, gender, etc.) accounted for 46% of the variance in psychological distress throughout 2020. Thus, a significant part of the changes in psychological distress is linked to specific groups of the population, such as youngsters and women. This result indicates that individuals present different vulnerabilities at different times during the

[1] Title: The psychological distress of the general population during the sanitary crisis linked to COVID-19: Results from March to November 2020
Authors: V Lorant, P Smith, K Seeber, K Van den Broeck and P Nicaise
Publication: in preparation

pandemic: psychological vulnerabilities oscillate strongly for a given individual from one measurement time to another, but not necessarily at the same time. Second, individuals have vulnerabilities related to factors that do not vary over time. Two of these stable factors, in particular age and gender, were investigated in relation to the number of episodes of psychological distress measured over the period March-November 2020. Women and young people experienced more episodes of psychological distress between March and November. The relationship with age is almost linear: the younger the age group, the higher the average number of episodes of psychological distress. Younger populations had twice as many episodes of psychological distress than older groups. Women have on average one and a half times more episodes compared to men. As for time-varying factors, exposure to the risks of COVID-19, isolation, social support and activities were investigated. The last three factors have a greater explanatory effect than the first: 24% of the differences in psychological distress can be explained by isolation, low social support and low frequency of activities, whereas exposure to COVID-19 explains less than 1% of the changes in psychological well-being in this study.

Strengths and limitations

The strengths of this study are:

- *A longitudinal analysis*
- *A large sample size*
- *The use of variance decomposition useful in designing policies aiming to support the population at large but also the most vulnerable groups.*

The main limitation of this study is:

- *The possibility of selection bias and selective attrition.*

Another study from UCLouvain brought out risk factors of psychological distress in Belgium during the COVID-19 pandemic which strongly hit the country.[2] The aim of this paper was to investigate the risk of psychological distress associated with the COVID-19 pandemic and suppression measures during the early days of lockdown. They compared the level of psychological distress at the beginning of that period with a pre-pandemic health survey and assessed the psychological effects of exposure to the COVID-19 pandemic and changes in social activity and support.

Method

An online survey was distributed to the general population in Belgium three days after the beginning of the lockdown. 20,792 respondents participated. Measurements were compared to a representative sample of individuals extracted from the Belgian Health Interview Survey of 2018. Bootstrapping was performed and analyses were reweighted to match the Belgian population in order to control for survey selection bias.

The psychological distress of the population was measured using the GHQ-12 scale. Social activities and support were assessed using the Social Participation Measure, the Short Loneliness Scale, and the Oslo Social Support Scale. An index of subjective exposure to the COVID-19 pandemic was constructed, as well as a measure of the change in occupational status.

Statistical analyses

The statistical analysis was a three-step process. First, we estimated the level of psychological distress by age and gender group. Then, we performed linear and logistic regressions in order to examine the association between psychological distress and the independent covariates (exposure to COVID-19, lockdown measures, social and labour conditions), controlling for socio-demographic characteristics and the existence of a previous long-term illness. Finally, we assessed the risk of psychological distress associated with COVID-19 and subsequent lockdown measures by comparing the ratios found in our sample with those found in a pre-COVID-19 benchmark, the BE.HIS2018 sample. As the composition of the two samples differed, the rate of psychological distress in the two samples was calculated conditioning for age, gender, level of education, and employment status using a conditional logistic regression. We also included the social support score in order to control for the potential bias affecting those with a lower level of social support, who may have been more likely to participate in the survey. We bootstrapped 1,000 samples, stratified on the three-way national distribution for age group, gender, and level of education, and calculated a 95% bootstrapped confidence interval using the percentile method (37). If our sample was too sensitive to unobserved features, the odds ratio would be greater (in absolute value) in our sample than in the BE.HIS2018 sample. We, therefore, tested this hypothesis by regressing the Oslo Social Support Scale on psychological distress, controlling for the other socio-demographic variables, and we compared the results of the two samples.

Results

Half of study respondents reported psychological distress in the early days of the lockdown. A longer period of lockdown was associated with higher risk of distress. Women and younger age groups were more at risk than men and older age groups, as were respondents who had been exposed to COVID-19. Changes in occupational status and a decrease in social activity and support also increased the risk of psychological distress. Comparing the results with those of the 2018 Belgian Health Interview shows that the early period of the lockdown corresponded to a 2.3-fold increase in psychological distress (95% CI: 2.16-2.45).

[2] Title: Psychological distress associated with the COVID-19 pandemic and suppression measures during the first wave in Belgium
Authors: V Lorant, P Smith, K Van den Broeck, P Nicaise
Publication: BMC Psychiatry, under review

Strengths and limitations

The key strengths of this study are:

- *A unique opportunity to provide an early assessment of population mental health at the beginning of the lockdown, in a country harshly exposed to the COVID-19 pandemic.*
- *Comparison with a pre-COVID19 national survey, helping to shed light on the changes, at the population level.*
- *Statistical analyses aiming to disentangle different pathways explaining differences in the level of mental health symptoms during lockdown vs. pre-COVID19.*

The main limitations are:

- *Selection bias of study participants, more likely to be female, highly educated and younger than the general population.*
- *The possibility that unobserved variables may have affected the measurements. In particular, people who felt a sense of unease due to the COVID-19 pandemic or the lockdown measures might be overrepresented in comparison with the general population. To estimate the direction and magnitude of this possible bias, we examined the effect of a well-known risk factor of psychological distress that was available both in our sample and in the BE.HIS2018 sample, i.e. the score on the Oslo Social Support Scale.*

Partners from UAM and FSJD performed a survey on the risk and resilience factors of depression and suicidal ideation before and after the COVID-19 outbreak. They also explored the effect of lockdown on lifestyle risk factors.[3] Although a few studies have investigated the mental health consequences of the lockdown during the first wave of the pandemic in the Spanish adult population, the validity of these findings may be somewhat hindered by non-probabilistic sampling approaches or convenience samples, cross-sectional design or lack of information on the pre-pandemic period, and assessment of dimensional measures of psychological distress only. Therefore, this study aims to assess whether there is a change in the prevalence rates of mental health conditions after the strict lockdown measures in Spain and to assess which are the factors associated with the incidence of these mental health problems during the lockdown.

Method

A sample of non-institutionalized adults (i.e. 18+ years old) living in the regions of Madrid and Barcelona participated were recruited following a multistage stratified design, with sampling probability proportional to population size. 1,103 Respondents were initially interviewed between June 17, 2019 and March 14, 2020 and were contacted again between May 21, 2020 and June 30, 2020.

Outcomes included in this study were depression, generalized anxiety disorder, panic disorder, suicidal ideation and (experienced) wellbeing. Depression, generalized anxiety disorder, and panic disorder were assessed with a set of items derived from the World Health Organization World Mental Health Composite International Diagnostic Interview (WHO WMH-CIDI). Suicidal ideation was assessed with one item from the WHO WMH-CIDI (Haro et al., 2006). Well-being was assessed with the Cantril Self-Anchoring Striving Scale (Cantril, 1965) while experienced well-being (positive and negative affect) was assessed with items related to the experience of positive and negative emotions the previous day (Miret et al., 2012).

Exposure variables included were loneliness, social support, disability, physical activity and adherence to Mediterranean diet. Loneliness was assessed with the 3-item UCLA loneliness scale. Social support was ascertained with the OSLO social support scale. Disability was assessed with the 12-item WHODAS. Physical activity was assessed with a set of items derived from the GPAQ. Finally, adherence to the Mediterranean diet was assessed with the Mediterranean Diet Adherence Screener (MEDAS). Covariates included were: age, sex, education level, marital status, household income, worsening of the economic situation due to the pandemic, characteristics of the house, residential setting (urban or rural), living alone or not, working status.

Statistical analyses

As appropriate, linear, logistic or multinomial regressions by adjusting for multiple confounding variables were performed to explore changes in the outcome variables from the pre-pandemic to the lockdown period, and to identify their associated factors.

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[3] Title: Changes in health behaviors, mental and physical health among older adults under severe lockdown restrictions during the first wave of the COVID-19 pandemic in Spain.
Authors: JL Ayuso-Mateos, D Morillo, JM Haro, B Olaya, E Lara, M Miret
Publication: International Journal of Behavioral Nutrition and Physical Activity; submitted.

Title: Changes in depression and suicidal ideation under severe lockdown restrictions during the first wave of the COVID-19 pandemic in Spain: a longitudinal study in the general population. Submitted to Epidemiology and Psychiatric Sciences
Authors: E García-Esquinas, R Ortolá, I Gine-Vázquez, JA Carnicero, A Mañas, E Lara, A Alvarez-Bustos, G Vicente-Rodriguez, M Sotos-Prieto, B Olaya, F José Garcia-Garcia, N Gusi, JR Banegas, I Rodríguez-Gómez, EA Struijk, D Martínez-Gómez, A Lana, JM Haro, JL Ayuso-Mateos, L Rodríguez-Mañas, I Ara, M Miret, A Rodríguez-Artalejo.
Publication: In preparation

Results

Prevalence rates of depression and suicidal ideation did not change significantly from before to after the COVID-19 outbreak. However, the rates of depression among young people increased significantly over time. Younger individuals and those feeling loneliness during the lockdown were at increased risk of developing depression during lockdown. Individuals receiving high levels of social support appeared to be resilient and were at lower risk of developing suicidal thoughts.

Additionally, a study conducted among four Spanish population-based cohorts including Edad con Salud, showed that strict lockdown was not associated with a deterioration in lifestyle risk factors, except for physical activity and sedentary behaviour, the effects of which seemed to reverse with the end of the most restrictive anti-pandemic measures.

Strengths and limitations

The strengths of the study are:

- *Data consist of a Spanish population-based cohort representative of the non-institutionalized adults.*
- *This project includes a baseline evaluation of all participants, a year prior the pandemic.*
- *Data were collected through structured face-to-face home-based interviews (pre-pandemic) and telephone interviews.*
- *A large variety of validated instruments and sociodemographic variables to cover a broad-ranging research of potentially vulnerable groups has been included.*
- *Ongoing project that will provide information to more comprehensively understand changes in mental health at the mid- and long-terms.*

The main limitation of this study is:

- *All measures were collected retrospectively through self-report.*

A survey conducted in the Spanish general adult population carried out by Fundació Sant Joan de Déu, shows the role of living situation and social support in the level of mental health during the COVID-19 pandemic.[4] This study aimed to investigate whether social support and living situation have a moderate effect on the association between detachment and affective disorders symptoms (anxiety and depression) during the COVID-19 lockdown.

Method

This study was part of the MIND-COVID project that collected data from a cross-sectional survey conducted in a random and representative sample of the Spanish general adult population. A nationally representative sample of 3,305 Spanish adults was interviewed during the COVID-19 lockdown.

The inclusion criteria were being 18 years or older, non-institutionalized, having no language barriers to Spanish, and having access to either a mobile or a landline telephone.

Professional and trained interviewers administered the survey with computer-assisted telephone interviews (CATI) between the 1st and the 30th of June 2020.

The main predictor in this study was detachment assessed through a single-item question. Outcomes assessed were symptoms of anxiety and depression. Anxiety symptoms were measured through GAD-7 and depressive symptoms through PHQ-8. Moderating factors included social support assessed through OSSS-3 and living situation (living as a couple, living with another, living alone, living as a couple or alone with dependent people).

Finally, covariates included were sex, age, and physical health status

Statistical analyses

Data were weighted with post-stratification weights to restore distribution of the adult general population of Spain according to age groups, sex and geographic area, to compensate for survey non-response and ensure the representativeness of the sample. Missing item-level data were imputed using multivariate imputation by fully conditional specification methods. Descriptive analyses included weighted proportions and unweighted frequencies for categorical variables and means and standard deviation for scales. Means of depression and anxiety scales were calculated according to all variable categories and the effect sizes were calculated through Cohen's d. Bivariate Tobit regression models were fitted to evaluate whether sex, age groups, living situation, education level, physical health, social support and detachment are associated with symptoms of anxiety and depression. Additionally, we tested for interactions between detachment and social support and living situation .

Results

People living alone showed lower levels of anxiety, whereas people living with another person (but not a partner) showed higher levels of depression. Detachment was strongly associated with both symptoms of anxiety and depression. Social support had a statistically significant moderation effect in that association.

[4] Title: Living situation and social support in the level of mental health during COVID-19 pandemic in the Spanish general population.
Authors: J Domènech-Abella, A Gabarrell-Pascuet, P Cristóbal-Narváez, M Felez-Nobrega, P Mortier, G Vilagut, B Olaya, J Alonso, JM Haro
Publication: Journal of Affective Disorders; under review

Strengths and limitations

The strengths of this study include:

- *Use of a large representative sample of Spanish adults from a variety of socio-economic backgrounds*
- *Ability to control for confounding factors.*

Limitations include:

- *Cross-sectional design, which limits the possibility of examining causal relationships*
- *Collection of some variables retrospectively through self-reports, which may result in recall or reporting bias*
- *Possible selection bias due to participants' particular interest in COVID-19 and its consequences*
- *Detachment which has been relatively understudied and there is a lack of scientific literature to compare our findings to.*

The Vrije Universiteit Amsterdam in collaboration with Institut National de la Santé et de la Recherche Médicale (INSERM), Freie Universität Berlin, Karolinska Institutet Stockholm, Koç University Istanbul, London School of Hygiene & Tropical Medicine, Padjadjaran University, Bandung Indonesia, Sapienza University Rome, Università di Verona, Stellenbosch University South Africa, Universitat Jaume I Castellón Spain, University Hospital Zurich, University of Macao China, University of New South Wales Sydney Australia, Yale University USA conducted the cross-country COMET study to evaluate whether distress (anxiety, depression) during the current COVID-19 outbreak is predicted by a variety of factors, including demographic characteristics (e.g., gender, age, education), infections with COVID-19, loss of income, substance abuse, domestic violence, contamination fear, basic value orientations, social support and coping strategies. [5]

Method

The study was carried out across fourteen countries: The Netherlands, Italy, France, Spain, Germany, Sweden, Switzerland, United Kingdom, Turkey, South Africa, Indonesia, China, Australia and the United States. The study was approved by the Ethics Review Board of the Faculty of Behavioural and Movement Sciences of the Vrije Universiteit Amsterdam, the Netherlands.

The COMET (**CO**VID-19 **Me**n**t**al Health Survey) study has four waves; the first in May and June 2020, the second in September-October 2020, the third in December 2020-January 2021 and the fourth is planned for March-April 2021. Participants will be recruited through universities mailing lists and/or different social networks (as Facebook, Instagram, Twitter, etc.). After being asked online informed consent, they were invited to complete a series of self-report questionnaires through Survalyzer.

We assessed the following independent variables: socio-demographic variables and variables related to COVID-19 exposure and adherence to the epidemic-control measures using a questionnaire specifically designed for the study, contamination fear with the Padua Inventory, symptoms of posttraumatic stress disorder (PTSD) with the 4-item version of the PTSD Checklist DSM-5 (PCL-5), past year substance use with the Substance Use Brief Screen (SUBS). In addition, we assessed basic value orientations with the Portrait Values Questionnaire (PVQ-11), social support with the Oslo Social Support Scale (OSSS-3) and coping strategies with six subscales from the Brief COPE (Distraction, active coping, use of emotional support, use of instrumental support, venting, positive reframing and planning). All questionnaires were available in Dutch, English, German, Italian, French, Spanish, Swedish, Turkish, Cantonese, and Bahasa Indonesia.

The dependent variable was psychological distress operationalized as having an increased depression score (>=10) on the Patient Health Questionnaire (PHQ-9) or an increased anxiety score (>=10) on the Generalized Anxiety Disorder scale (GAD-7). This resulted in a dichotomous distress outcome (0=absent, 1=present)

Statistical analyses

We used Random Forest (RF) algorithm which is an ensemble learning method for classification and regression that addresses issues of over-identification and predicts the presence of psychological distress based on a set of covariates (gender, age, education, infections with COVID-19, loss of income, substance abuse, domestic violence, contamination fear, basic value orientations, social support and coping strategies).

[5] Title: Forecasting distress and amidst the COVID-19 pandemic, a multi-country approach.
Authors: M Sijbrandij, M Patanè, I Pinucci, I Cornelisz, C van Klaveren, I Leijen, P Cuijpers, C Acarturk, D Andriani, C Barbui, L Bertuzzi, E Bjorkenstam, R Bryant, S Burchert, L Butler-Kruger, D Campos, S Deguen, A Huizink, R Farell, D Fuhr, B Hall, C Knaevelsrud, G Kurt, M Melchior, E Mittendorfer-Rutz, N Morina, A Postpitchil, C Sanz Miguel, C Panter-Brick, D Papola, M Pasquini, F Purba, S Quero, B Roberts, S Schumacher, S Seedat, H Setyowiboyo, L Tarsitani, F Tedeschi, J van der Waerden
Publication: In preparation

Results

A total number of 8,366 respondents completed the survey (6,305 females, 1,893 males, 8 transgender males, 4 transgender females, 64 other or prefer to not answer). Mean age was 40.1 (SD 15.4). Countries where participants were living at the time of the survey were Italy (n=1,391; 16.6%), China (n=756; 9.2%), Australia (n=727; 8.8%), Turkey (n=684; 8.3%), France (n=681; 8.3%), Germany (n=642, 7.8%), the Netherlands (n=605; 7.3%), Indonesia (n=602; 7.3%), South Africa (n=589; 7.1%), Spain (n=390; 4.7%), Sweden (n=291, 3.5%), United States (n=280; 3.4%), Switzerland (n=145; 1.8%), United Kingdom (n=138; 1.7%) and other countries (n=331; 4.0%).

A total number of 58 (0.7%) participants reported they had been infected by COVID-19, whereas 601 (7.3%) indicated they were likely infected but no formal test was done. A minority of 106 (1.3%) participants reported they did not adhere to the COVID-19 restrictions at all, 2,693 (32.7%) most of the time, and 5,440 (66.0) always. A total number of 2,739 (34.2%) participants had high psychological distress.

At wave 3 (December 2020-January 2021), 3,997 (47.8%) participants completed the survey. Within the wave 3 sample, 1,296 (32.4%) participants met the cut-off for increased psychological distress.

Preliminary RF prediction analyses demonstrated that higher psychological distress at wave 1 (May-June 2020) was predicted by the following eight basic value orientations (higher power, lower self-direction, lower stimulation, higher conformity, lower hedonism, lower tradition, higher achievement, and higher security), younger age, lower social support, the use of prescription medication during the past year, more fear of contamination and higher loneliness during the pandemic.

Distress at wave 3 (December 2020-January 2021) was predicted by lower tradition, higher achievement, higher security, lower social support, younger age, higher contamination fear and higher loneliness.

It is concluded that distress (depression and anxiety) during the pandemic, both during the initial phase (May-June 2020 as well as the more protracted phase (December 2020-January 2021), was adequately forecasted by a number of basic value orientations, by a younger age, the fear of being contaminated, low levels of social support, and higher levels of loneliness. These findings may help to adequately identify groups at risk for experiencing high levels of distress, that may be offered effective psychological intervention strategies to reduce their levels of distress.

Future analyses of the COMET dataset will include predictors for adherence to the lockdown measures, and inclusion of the fourth wave measurements that will be done in March and April 2021.

Strengths and limitations

Strengths of this study include:

- *A large sample size*
- *A multi-country focus*
- *The longitudinal design*

Limitations include:

- *The sample was self-selected and recruited through social media. This may have resulted in a very high representation of females, and highly educated people (about three-third has a university degree).*

In Spain, a study carried out by Fundació Sant Joan de Déu, was performed to explore the relationship between social support, detachment, symptoms of emotional disorders and suicidal thoughts and behaviours.[6] Since studies about the relationships among detached feelings, social support and anxiety and depression in suicidal thoughts and behaviours (STB) are limited, the present study aims to assess whether detachment is a mediator in the relation between low social support and STB; and if so, to examine whether emotional disorders' symptoms (i.e. anxiety and depressive symptoms) have a mediating effect on these associations.

Method

This study was part of the MIND-COVID project that collected data from a cross-sectional survey conducted in a random and representative sample of the Spanish general adult population. A nationally representative sample of 3,305 Spanish adults was interviewed during the COVID-19 lockdown. The inclusion criteria were (1) being 18 years or older, (2) non-institutionalized, (3) having no language barriers to Spanish and (4) having access to either a mobile or a landline telephone. Professional and trained interviewers administered the survey with computer-assisted telephone interviews (CATI) between the 1st and the 30th of June 2020.

Outcomes assessed were suicidal thoughts and behaviours (STB). A modified version of the C-SSRS (Columbia Suicide Severity Rating Scale) was used to assess STB in the preceding thirty days. STB included either having passive suicidal ideation (i.e. "wish to be dead or go to sleep and never wake up"), active suicidal ideation (i.e. "any thoughts about killing yourself, thoughts about how you would do that (for example by ingesting pills or jumping from a window) or having a specific plan and intent to do it") and suicidal behaviours (i.e. "make any suicide attempts, which stands for any self-injurious act committed with at least some wish to die").

Variables of interest included were detachment, symptoms of depression and anxiety, social support and partner status. Detachment was determined with a single-item question regarding how often did the person feel detached (never, sometimes, seldom, often, always) during lockdown. Depressive and anxiety symptoms were measured through the PHQ-8 (8-item Patient Health Questionnaire Depression Scale) and GAD-7 (7-item Generalized Anxiety Disorder Scale), respectively. Components of Social support were assessed using the OSSS-3 (Oslo Social Support Scale), which included questions about social network size, relations of reciprocity and neighbourhood support. Partner status was also covered by asking participants to indicate whether or not they lived with an intimate partner.

Socio-demographic factors were used as covariates and included age, sex and educational level. Health measures used as covariates included quality of life information (i.e. respondents' health perception regarding pain and malaise and their ability to carry daily activities) and physical health problems.

Statistical analyses

To compensate for survey non-response and guarantee representativeness of the sample, post-stratification corrections were made. Missing values were addressed using a single multivariate imputation by chained equations. Descriptive analyses were implemented to characterize the study sample. Unadjusted and adjusted logistic regression models were fitted to explore if any of the independent variables were significantly associated with having had any STB in the past thirty days (dependent variable). Mediation analyses using the KHB method were run to evaluate the possible mediation effects between the variables of interest and the outcome. Stata version SE 13 was used to perform all the analyses.

[6] Title: The role of social support, detachment, depressive and anxiety disorders' symptoms on suicidal thoughts and behaviours during COVID-19 lockdown in Spain: potential pathways.
Authors: A Gabarrell-Pascuet, M Felez-Nobrega, P Cristóbal-Narváez, P Mortier, G Vilagut, B Olaya, J Alonso, JM Haro, J Domènech-Abella
Publication: Manuscript submitted; In revision

Results

Social network components (social network size, relations of reciprocity, neighbourhood support and partner status) were significantly related to STB with a significant mediation effect of detachment (19% - 28%). Symptoms of emotional disorders significantly mediated the association between detachment and STB (52% - 58%), and the relationship between social support and STB (34%). Compared to anxiety symptoms, depressive symptoms appeared to be a slightly stronger mediating factor.

Strengths and limitations

Strengths of this study are:

- *Use of clinically validated screening instruments were used to assess, guaranteeing validity and reproducibility.*
- *Representativeness of the general adult population.*
- *Adjustment for a wide range of covariates, granting a high reliability of the obtained results.*

The main limitations are:

- *A cross-sectional design and self-reported data which may affect the findings' generalizability and limit conclusions regarding causality.*
- *The sample does not include institutionalized populations.*
- *Pre-pandemic data about detachment were not collected*
- *Detachment has been relatively understudied, so we cannot compare our findings to other studies.*

A study conducted by INSERM, Paris examined whether the experience of a COVID-19 infection symptom was associated with symptoms of anxiety and depression during the lockdown.[7] The objective of this study is to examine the associations between different measures of the COVID-19 symptomatology and anxiety/depression during the first COVID-19 lockdown in a cohort of middle-aged adults in France, taking into account other risk factors including comorbidity, prior mental health problems and socio-economic characteristics. We hypothesize that the relationship between COVID-19 symptoms and anxiety/depression varies depending on individuals' socio-demographic characteristics.

Method

The TEMPO COVID-19 project, which is nested within the TEMPO (Trajectoires ÉpidéMiologiques en POpulation) cohort, collected nine waves of data starting on the 24th of March 2020, one week after France declared COVID-19 related lockdown. The TEMPO cohort has been described elsewhere (Melchior et al., 2014; Redonnet et al., 2012), but briefly it was set up in 2009 to follow-up young adults (22-35 years) who had taken part in a study of children's psychological problems and access to mental health care in 1991. TEMPO participants aged 4 to 16 years were recruited in 1991 by drawing lots among the offspring of participants of another epidemiological cohort (GAZEL) (Goldberg, Leclerc, and Zins, 2015). They were then followed via self-completed questionnaires in 1999, 2009, 2011, 2015 and 2018 (Aljandaleh et al., 2020). From March 24, 2020 invitations and reminders to participate were sent to a total of 1224 participants with valid email addresses. Questionnaires were sent weekly for the first five waves of data collections, biweekly for data collections six, seven and eight, and in the Fall of 2020 for wave nine, to better understand French adults' mental health situation during the pandemic. This study is based on 729 individuals who participated in at least one of the first seven waves of data collection.

Outcome variable is Symptoms of Anxiety/Depression: Participants' symptoms of anxiety/depression were assessed using the specific subscale of the Adult Self Report (ASR) Achenbach System. System. Eight items were included in wave 1 and 13 items in waves 2 to 7 of the TEMPO COVID-19 project. Each item is scored 0 to 2 and the level of symptoms is calculated by summing all relevant items. To be rendered comparable between waves, ASR scores were standardized from 0 to 100. Following ASR guidelines, we dichotomized the score using the 85th percentile, people with higher scores being considered anxious/depressed.

Exposure variables are COVID-19 infection symptoms. In each wave of the TEMPO COVID-19 questionnaire, participants were asked whether they had experienced COVID-19 infection symptoms and if yes, which ones (from a list including fever, cough, muscle soreness, respiratory problems, loss of taste, loss of smell and fatigue) and the date at which these symptoms started. In the first questionnaire, we asked about the presence of COVID-19 symptoms at any point in time. From the 2nd questionnaire onwards we only asked about the presence of COVID-19 symptoms in the preceding 7 days. Based on this information, we derived four measures: 1) the presence of COVID-19 infection symptoms (yes vs. no), 2) the timing of COVID-19 infection symptoms (none, before the beginning of lockdown (< March 17, 2020), after the beginning of lockdown (≥March 17, 2020), 3) the number of COVID-19 infection symptoms, 4) the type of COVID-19 symptoms (none, mild, respiratory distress).

Covariates included participants' demographic, socioeconomic and health characteristics. Level of education was divided into 3 categories: "≤High School degree", "2 to 4 years university degree", and "≥5 years university degree". Household configuration during lockdown was divided into 3 categories: "Living with a partner + children", "Living with a partner (without children)" and "Other". Household income level/month during lockdown was dichotomized in two categories: ">2500 €" vs. "≤2500 €". Employment stability during lockdown was defined as follows: "Permanent contract or civil servant" or "Self-employed" were considered as stable, any other occupational status was considered

[7] Title: Impact of COVID-19 infection symptoms on occurrence of anxiety/depression among the French general population
Authors: M Mary-Krause, JJ Herranz Bustamante, M Héron, A Juhl Andersen, T El Aarbaoui, M Melchior
Publication: PLOS One; submitted

as unstable. Working status during lockdown was considered using three categories: “Working from home / Changed working patterns”, “Working as usual” and “Unemployed”.

History of anxiety/depression prior to 2020 was assessed using TEMPO data collected in 2009, 2011 or 2018. For each individual, the most recent information available was taken into account. Anxiety/depression were assessed by the ASR in 2009 and 2018 and by the Mini-International Neuropsychiatric Interview (MINI) in 2011. Scores from different scales were standardized from 0 to 100 and dichotomized according to the 85th percentile of the most recent information available, corresponding to a mean score of 34.

Statistical analyses

We tested bivariate and multivariate associations between symptoms of COVID-19 infection and anxiety/depression using generalized estimation equation (GEE) models with a logit link, binomial distribution and unstructured correlation matrix. Four different GEE models were implemented, one for each of the four measures of COVID-19 infection symptoms, retaining all covariates found to have a p-value<0.2 in bivariate analyses. Third, interactions between COVID-19 infection symptoms and a) sex, b) income level, c) diabetes and/or overweight/obesity, d) anxiety/depression prior to 2020 and all variables included in the final models were tested.

Results

Symptoms of COVID-19 were reported by 17.1% of participants (n=125) during the course of follow-up, 7.3% (n=53) after the beginning of lockdown, with an average number of 2.7 symptoms (standard deviation SD=1.5), and 3.6% (n=26) had respiratory distress.

After adjustment, the experience of any COVID-19 infection symptoms was associated with anxiety/depression during lockdown (66% increased odds), as were COVID-19 infection symptoms after the beginning of lockdown (91% increased odds), and the number of COVID-19 infection symptoms (19% increased odds for each additional symptom). All types of COVID-19 symptoms were associated with anxiety/depression: mild symptoms: OR=1.71, 95% CI=0.96-3.05, respiratory distress: OR=1.96, 95% CI=0.93-4.15.

We found a statistical significant interaction between the experience of symptoms of COVID-19 and participants’ sex. After stratifying on sex, we observed a stronger association between COVID-19 infection symptoms and anxiety/depression in men than in women (respectively OR=3.67, 95% CI=1.39-9.71 and OR=1.30, 95% CI=0.80-2.12).

Strengths and limitations

The study’s main strengths are:

- *Longitudinal design with pre-COVID-19 mental health assessments*
- *Regular follow-up starting with the first lockdown in March 2020*
- *Diverse study population recruited throughout France*
- *Use of statistical models well-suited for longitudinal analyses which take into account data complexity*

This study also has some limitations:

- *TEMPO participants are a sample of individuals whose parents also participate in a long-term epidemiological study (the GAZEL cohort) (Goldberg et al., 2007) and are not representative of the French population. Indeed, due to selective attrition, women are over-represented (65%), as are persons with high socio-economic level, and in good health. Nevertheless, TEMPO participants are a heterogeneous group and sufficiently diverse in terms of geography and socio-economic characteristics to produce generalizable results, but the estimates of associations between symptoms of COVID-19 and anxiety/depression we report may be underestimated.*
- *Levels of mental health difficulties such as depression and anxiety in the TEMPO cohort are comparable to those observed in the general population (Allchin et al., 2016; Melchior et al., 2014), making this an appropriate sample to study these topics.*

- *All data were collected through online questionnaires during lockdown, and participants' responses were self-reported. Nevertheless, the ASR has been established to evaluate internalizing problems under such conditions (Achenbach and Rescorla, 2003).*

2.1. HEALTH AND FRONTLINE CARE WORKERS

Partners from UAM described how healthcare workers are a population at risk during the COVID-19 pandemic.[8] The COVID-19 HCW Study is a global mental health initiative comprising 30 countries around the globe that aims to explore the determinants of the mental health outcomes in a sample of people working at health centres with a wide range of duties (e.g., doctors, nurses, cleaning staff, management, administrative staff).

Method

The study population consists of a non-probabilistic sample of people working at healthcare centres with both clinical and non-clinical duties. Baseline assessment was performed during the first wave of the pandemic (mainly May and June 2020) and the first follow-up assessment is due by January 25th, 2021. The assessment was performed on-line.

Outcomes include depression (PHQ-9), psychological distress (GHQ-12), suicidal thoughts and behaviours (C-SSRS), resilience (BRS), acute stress disorder, PTSD (PC-PTSD-5), substance abuse (prescribed and non-prescribed), fear of getting infected, fear of infecting relatives and friends. Exposures include work-related determinants (work position, workload, redeployment, reported access to protective equipment, decision making on patient prioritization, type of job), infection-related determinants (being infected with COVID-19, being in isolation, loved-ones or colleagues infected or dead), trust-related determinants (institutions, politicians) and household-related determinants (care burden, household composition). Covariates include region (with different levels of cumulative incidence), gender, age, discrimination, violence, psychiatric history

Statistical analyses

Both logistic and continuous mixed models adjusted for potential confounding sources were used to test associations between exposures and the outcomes. Baron and Kenny's procedure was used for mediation analyses. Other types of research questions may require different statistical methods.

Results

To date, our results show that HCWs are a population at risk of mental health problems: one in three may have depression and seven in ten are psychologically distressed. Adjusted analyses show that exposures at the workplace level, such as reported access to protective equipment or decision making on patient prioritization, are linked to poor mental health.

Ongoing analyses reveal that one in three respondents have felt discriminated against and 7% have suffered violence since the beginning of the pandemic. Adjusted analyses show that HCWs that experienced discrimination had more emotional distress, more depressive symptoms, and more death wishes, than those who did not feel discriminated against.

[8] Title: Role of access to personal protective equipment, treatment prioritization decisions, and changes in job functions on health workers' mental health outcomes during the initial outbreak of the COVID-19 pandemic.
Authors: R Mediavilla, G Martínez-Alés, JL Ayuso-Mateos, M-F Bravo-Ortiz, and the C-19 HCW working group.
Publication : Manuscript submitted
Title: Association between experienced discrimination and mental health outcomes among healthcare workers during the COVID-19 pandemic.
Authors: R Mediavilla, G Martínez-Alés, JL Ayuso-Mateos, M-F Bravo-Ortiz, and the C-19 HCW working group.
Publication : In preparation

Strengths and limitations

The strengths of our study include:

- *Large sample with different types of HCWs (from cleaning staff to hospital managers)*
- *Sound instruments used to estimate mental health outcomes*
- *Baseline assessment conducted right after a pandemic peak in one of the European hotspots of the pandemic (Spain).*

The main limitation is:

- *Risk of bias due to non-probabilistic sampling and the risk of reverse causation bias. Follow-up assessments will refine the sampling strategy and provide longitudinal data, reducing risk of bias.*

2.2. YOUNG PEOPLE

UCLouvain performed an online survey which demonstrated mental distress among young people at the beginning of the COVID-19 pandemic.[9] The outbreak of the COVID-19 pandemic in 2020 and its associated measures led to high levels of mental distress in the general population. Previous research indicated that young people are especially vulnerable to a wide range of mental health problems during the pandemic, but little is known about the underlying mechanisms. This study examined mental distress and its contributing factors among young Belgian people.

Method

An online survey was widely distributed in Belgium during the first wave of COVID-19 in March, and 16–25-year-olds were selected as a subsample. Mental distress was assessed using the 12-item General Health Questionnaire (GHQ-12), and a threshold of 4 was used to discriminate mental distress cases from non-cases. Bivariate and multivariable logistic regression analyses were performed to evaluate possible predictors of mental distress, including demographics, chronic condition, history of mental health problems, social support, exposure to COVID-19, and several changes in everyday activities.

Results

A total of 2,008 respondents were included, of which the majority was female (78.09%) and studying (66.82%). The results indicate that about two thirds (65.49%) experienced mental distress. In the multivariable regression model, significant ($p < 0.01$) predictors of mental distress were female gender (OR = 1.78), low social support (OR =2.17), loneliness (OR = 5.17), a small (OR = 1.63), or large (OR = 3.08) increase in social media use, a small (OR = 1.63) or large (OR = 2.17) decrease in going out for drinks or food, and a decrease in doing home activities (OR = 2.72).

Strengths and limitations

This study's major strength is:

- *A valuable insight about the contributing factors of mental distress among youth in transition age during a period of sharp increase in mental distress for Belgian youth.*

LImitations of the study are:

- *A level of mental distress that was perhaps already higher in the sample, even before the outbreak of COVID-19.*
- *An overrepresentation of girls in the sample may give an overestimation of the true prevalence of mental distress among young people.*
- *An internet-based sample is in general not representative, for example because of selfselection bias and because the most vulnerable may not be reached.*
- *A screening is not equal to a diagnosis, and that mental distress describes a wide range of troubling symptoms but is not equal to a clinical mental disorder.*

[9] Title: Mental distress and its contributing factors among young people during the first wave of COVID-19: a Belgian survey study
Authors: E Rens, P Smith, P Nicaise, V Lorant and K Van den Broeck
Publication: Rens E, Smith P, Nicaise P, Lorant V and Van den Broeck K (2021) Mental Distress and Its Contributing Factors Among Young People During the First Wave of COVID-19: A Belgian Survey Study. Front. Psychiatry 12:575553. doi: 10.3389/fpsyt.2021.575553

The University of Bordeaux described how students are particularly vulnerable during the COVID-19 pandemic in France.[10] The objectives of this study were to estimate the effect of lockdown on mental health conditions (depressive symptoms, anxiety symptoms, suicidal thoughts and perceived stress) in college students and to compare their frequency and associated factors to a sample of non-students recruited in the same study.

Method

This study is based on the Confins e-cohort (www.confins.org), a prospective online population-based cohort study set up in France in April 2020 and still ongoing. Eligibility criteria included being older than 18 and living in metropolitan France until the end of the first general lockdown (May 11, 2020). Enrolled participants signed into a secured web-site and completed questionnaires online. This study is based on baseline data collected during the general lockdown in France (until May 11, 2020).

Outcomes of mental health conditions were depressive symptoms measured using the Patient Health Questionnaire-9 (PHQ-9) (Kroenke et al., 2001; Pfizer, n.d., Arthurs et al., 2012). A validated cut-off of 10 has been used to define the presence of depressive symptoms (Kroenke et al., 2001; Manea et al., 2012). In addition, anxiety symptoms were measured using the Generalized Anxiety Disorder- 7 (GAD-7) (Spitzer et al., 2006, Micoulaud-Franchi et al., 2016). A validated cut-off of 10 has been used to define the presence of anxiety symptoms (Kroenke et al., 2001). Suicidal thoughts during the last seven days were reported. Perceived stress rated on a 10 points-scale with 0 representing the lowest level of stress and 10 the highest. A cut-off of 7 has been used to define high perceived stress (corresponding approximately to the third quartile of the distribution).

Sociodemographic information included sex and age (in years), familial situation (in a relationship or not) and education level were gathered. Participants reported if they were currently college students and those who were were asked specific information according to their academic situation (e.g. cursus, university year). Other variables possibly influencing on mental health were also recorded like working or studying in the medical field, having an history of psychiatric disorder (among depression, bipolar disorders, generalized anxiety), history of another disease at risk for severe forms of Covid-19 (among cardiovascular, respiratory, chronic digestive disease, cancer and diabetes).

Statistical analyses

Multivariate models were adjusted for age, sex and variables not related to the COVID- 19 pandemic or lockdown as well as variables related to the Covid-19 pandemic or lockdown. Our missing data analysis procedures used missing at random assumptions. We used the multivariate imputation by chained equations (MICE) method of multiple multivariate imputation in SAS software (PROC MI and MIANALYZE) (Janssen et al., 2010; Rubin and Schenker, 1991; Schafer, 1997).

Results

Among participants enrolled in the Confins cohort, 2,309 were eligible for the study and 2,260 were ultimately included in the analyses pertaining to depressive and anxiety symptoms and 1,919 to that pertaining to suicidal thoughts and perceived stress. Students represented 59% of the total sample (n=1,335 vs 925 non-students). Mean age in the student sample was about 23.3 years vs 40.1 among non-students. The sex ratio was similar (3/4 female) in both samples. Students less frequently reported having a stable partner (48.1% vs 76.3%) and were more frequently at risk

[10] Title: Higher risk of mental health deterioration during the Covid-19 lockdown among students rather than non-students. The French Confins study
Authors: J Arsandaux, I Montagni, M Macalli, N Texier, M Pourriel, R Germain, A Mebarki, S Kinouani, M Tournier, S Schuck, C Tzourio
Publication: In preparation

of severe forms for Covid-19 (35.4% vs 24.0%). Both groups were similar regarding prior history of psychiatric disorders (about 23%), educational level (with a majority of more than a second-year university level) and the proportion of individuals working or studying in health domains (about 40%). Although non-students spent the lockdown more frequently in their usual place of residence than students (88.2% vs 63.4%), the quality of lockdown accommodation (e.g. surface, outdoor space) was similar for both. Students were less frequently than non-students in a high-risk region (11.3% vs 31.2%) and they were enrolled in the cohort later (mostly during weeks 16-17). During the first lockdown, mental health conditions were different between the two populations. Students presented more frequently with depressive symptoms (32.5% vs 16.2%), anxiety symptoms (24.0% vs 14.7%), suicidal thoughts (11.7% vs 7.6%) and perceived stress (33.1% vs 22.1%) than non-students. In multivariate models, student status was associated with an increased probability of reporting depression (fully adjusted OR=1.58; 95%CI=1.17;2.14), anxiety (OR fully adjusted=1.51; 95%CI=1.10;2.07), and perceived stress (fully adjusted OR=1.70, 95%CI=1.26;2.29), independently from covariates related or not to the Covid-19 pandemic or lockdown. For suicidal thoughts, the odd ratios were in the same range (fully adjusted OR=1.57; 95%CI=0.97;2.53) but did not reach significance.

Strengths and limitations

The strengths of our study include:

- *Large sample*
- *Standardized assessment tools used to ascertain mental health conditions*
- *Adjustment for multiple covariates.*

Some limitations include:

- *Possible sampling bias since participants were volunteers, which could limit generalization of the findings.*
- *Cross-sectional design which makes it impossible to determine if the lockdown directly impacts mental health. However, we considered prior history of psychiatric disorders, and additionally factors related to lockdown conditions were associated with mental health disturbances, suggesting that lockdown in itself probably plays a role especially for students (Pierce et al., 2020).*

2.3. PERSONS WITH PRE-EXISTING MENTAL HEALTH PROBLEMS

INSERM (France) examined how pre-existing symptoms of depression and anxiety were linked with symptoms of depression and anxiety during the COVID-19 pandemic.[11] This study aimed to examine the association between preexisting symptoms of anxiety/depression and symptoms of anxiety/depression during the COVID-19 outbreak among a mid-aged French population. Additionally, they sought to identify other factors associated with anxiety/depression symptoms during lockdown, including loneliness.

Method

The outcome is anxious/depressive symptoms during lockdown, measured using 8 to 13 items from the Anxious/Depressed syndrome scale based on the Adult Self Report (ASR)-Achenbach System, which is part of the broadband scale Internalizing problems (Achenbach). The values on the 85th percentile for each data collection were calculated, and the mean of these values resulted in a cut-off corresponding to a score of 34, which we used to create a comparable dichotomous measure across study waves.

The exposure is pre-existing symptoms of anxiety/depression. Information on pre-existing symptoms of anxiety/depression was included using the last available measure from prior waves either 2018, 2011 or 2009 of the TEMPO cohort. In 2018 and 2009 participants also completed the ASR including the same items as in the first wave of data collection during lockdown. In 2011 participants reported information on major depression and generalized anxiety disorder subscales of the Mini-International Neuropsychiatric Interview (MINI).

Covariates on demographic, occupational, and economic characteristics were collected in the first questionnaire answered during lockdown. Covariatesincluded in the statistical analysis were socio-demographic and socio-economic variables (marital status, living situation, level of education attained and occupational status, household income and financial difficulties. Furthermore, participants were asked to fill out the UCLA (University of California, Los Angeles) 3-item Loneliness Scale (Russell, Peplau, and Cutrona, 1980), which was used to identify whether participants were feeling lonely or not. Lastly, we identified whether participants lived in an area with a high level of COVID-19 infections in March-May 2020, where 'yes' included Paris region or Eastern France and 'no' elsewhere in France (Santé-Publique-France, 2020).

Statistical analyses

Bivariate and multivariate generalized estimation equation (GEE) models were used to examine the relationship between the exposure and outcome. Factors adjusted for in the final model were: sex, living situation, occupational status, household income and loneliness. Supplementary multivariate GEE models were performed including a smaller population where information on anxiety/depression were available in the past three waves of TEMPO data collection prior lockdown (2009, 2011, and 2018).

Results

Among the 729 participants to the TEMPO COVID-19 project, 27.2% (n=195) reported symptoms of anxiety/depression during lockdown. In multivariate analyses, individuals with symptoms of anxiety/depression measured prior to lockdown had 6.04 higher odds [95% CI=4.02-9.09] of symptoms of anxiety/depression during lockdown. Furthermore, the likelihood of symptoms of anxiety/depression during lockdown was elevated among women (OR 2.07 [95% CI=1.30-

[11] Title: Symptoms of anxiety/depression during the COVID-19 pandemic and associated lockdown in the community: longitudinal data from the TEMPO cohort in France
Authors: A Juhl Andersen, M Mary-Krause, J Herranz Bustamante, M Héron, T El Aarbaoui, M Melchior
Publications: BMC Psychiatry; submitted.

3.30]), subjects with low household income (OR 1.98 [1.07-3.66]) and persons who reported being lonely (OR 10.02 [95% CI=6.40-15.69]).

Strengths and limitations

The strengths of the study include:

- *A longitudinal study design with measures of symptoms of anxiety/depression prior to the COVID-19 pandemic.*
- *Validated measurement of symptoms of anxiety/depression.*
- *Inclusion of key confounders.*

This study also has some limitations:

- *Somewhat limited size and composition of the study sample. The TEMPO cohort includes middle-aged adults, a majority of whom work with a stable contract, and have a high household income compared to the general French population. While the sample is diverse enough to compare different groups, the role of preexisting mental health difficulties with regard to well-being during the COVID-19 pandemic may be stronger in the general population. Furthermore, the size of the study population may be limited to identify some associations, particularly interactions between prior symptoms of anxiety/depression and socioeconomic conditions which should be tested again in larger samples.*
- *Information on prior symptoms of anxiety/depression was not available for all subjects in 2018, which lead us to use information collected in 2011 and 2009, possibly inducing information bias. However, supplementary analyses showed that the timing of measurement of prior symptoms of anxiety/depression did not modify our findings.*

Partners from VUMC compared the mental health impact of the COVID-19 pandemic on people with and without depressive, anxiety, or obsessive-compulsive disorders.[12] They aimed to compare between people with a different number and chronicity of mental health disorders the perceived impact of the COVID-19 pandemic on mental health and the extent to which individuals were able to positively cope with the situation, and changes in symptoms of depression, anxiety, worry, and loneliness from before to during the COVID-19 pandemic.

Methods

Respondents were from The Netherlands Study of Depression and Anxiety (NESDA), The Netherlands Study of Depression in Older Persons (NESDO), and The Netherlands Obsessive Compulsive Disorder Association (NOCDA).

NESDA is an ongoing, longitudinal study examining development and course of depression and anxiety disorders among persons aged 18-65 years with a depression and/or anxiety disorder (n=2,329), biological siblings (n=367), and mentally healthy individuals (n=652). Between 2004 and 2007, participants were recruited from the community, primary care, and specialized mental health care in the Netherlands, and followed up after 2, 4, 6, and 9 years.

NESDO is a longitudinal study on depression in older persons, aged 60-93 years. From 2007 until 2010, 378 individuals with a depressive disorder were recruited through specialised mental health care. Persons without lifetime diagnoses of depression, anxiety, or dementia, nor another clinically overt psychiatric disorder (e.g., psychosis, severe addiction, bipolar disorder) (n=132) were recruited from primary care. Face-to-face assessments were performed after 2 and 6 years.

NOCDA is a longitudinal study on OCD outcome consisting of 419 persons aged 18-65 years with a lifetime diagnosis of OCD recruited from mental healthcare institutions. Baseline assessments were carried out between 2004 and 2009, and follow-up examinations took place after 2, 4, and 6 years.

Between April 1 and May 13, 2020, online questionnaires were sent out bi-weekly to 2,748 active, alive participants in the three studies who gave permission to be contacted for further research activities. A total of 1,517 (57.5%) participants filled in the online questionnaire at least once. For the current study we used the first response per respondent.

Measures

Sex, age, and education (basic [elementary school]; intermediate [lower vocational to general secondary education]; high [college or university]) were obtained from the regular baseline waves of the three cohorts. Age was adjusted for time elapsed since the baseline assessment. To take into consideration the alignment of the three cohorts and data availability, we used data of the 2-, 4-, 6-, and 9-year follow-ups of NESDA, the baseline and 2- and 6-year follow-ups of NESDO, and the 2-, 4-, and 6-year follow-ups of NOCDA. Of all these previous waves, data collection was carried out between 2006 and 2016.

Mental disorder status in NESDA and NESDO was assessed with the DSM-IV based Composite Interview Diagnostic Instrument used to diagnose mental disorders (Wittchen, 1994). In NOCDA, the Structured Clinical Interview for DSM-IV Axis I Disorders was used (Spitzer, 1992). Lifetime and current (6-month recency) presence of six disorders was assessed at all previous waves in all three cohorts: Major Depressive Disorder, Dysthymia, General Anxiety Disorder, Panic

[12] Title: The mental health impact of the COVID-19 pandemic on people with and without depressive, anxiety, or obsessive-compulsive disorders: a longitudinal study of three Dutch case-control cohorts
Authors: K-Y Pan, A Kok, M Eikelenboom, M Horsfall, F Jörg, RA Luteijn, D Rhebergen, P van Oppen, EJ Giltay, , B W.J.H. Penninx,
Publication: Pan KY, Kok A, Eikelenboom M, Horsfall M, Jörg F, Luteijn R, Rhebergen D, van Oppen P, Giltay E, Penninx B. The mental health impact of the COVID-19 pandemic on people with and without depressive, anxiety, or obsessive-compulsive disorders: a longitudinal study of three Dutch case-control cohorts. Lancet Psychiatry. 2020.8(2);121-129. DOI: 10.1016/S2215-0366(20)30491-0.

Disorder, Social Phobia, and Agoraphobia. The OCD diagnosis was additionally added in NOCDA only. In addition to specific type mental disorders, we utilised the longitudinal data to classify the overall burden of mental disorders in two indicators: severity and chronicity.

Mental health outcomes were assessed with four validated symptom severity scales used in previous waves: the 16-item Quick Inventory of Depressive Symptoms (QIDS)(Rush et al., 2003) for depressive symptoms, the 21-item Beck Anxiety Inventory (BAI)(Beck et al., 1988) for anxiety symptoms, the 11-item Penn State Worry Questionnaire (PSWQ)(Meyer et al., 1990) for worry, and the 6-item de Jong Gierveld Loneliness scale (Gierveld and Tilburg, 2006) for loneliness.

Statistical analyses

Characteristics of the study population were compared between persons with and without lifetime mental disorders using Chi-square tests or t-tests. To address the first aim, we used exploratory factor analysis (EFA) with Principal Axis Factoring and Oblimin rotation to examine dimensionality of the COVID-19-specific items. The EFA distinguished three dimensions in the COVID-19-specific items, which we labelled "Perceived mental health impact" (n=9 items; Cronbach's α=0·85), "Fear of COVID-19" (n=6 items; Cronbach's α=0·73), and "Positive coping" (n=5 items; Cronbach's α=0·61). Linear regression was used to compare COVID-19-specific dimension scale scores between persons with different number and chronicity of mental disorders. To address our second aim, we calculated average scores of QIDS, BAI, PSWQ, and loneliness scale in the preceding waves to represent baseline levels prior to the COVID-19 pandemic. When there was only one measurement available in the previous waves, that value was used. We used mixed models with random intercept to compare changes in QIDS, BAI, PSWQ, and loneliness scale from before to during the COVID-19 pandemic across groups. Interaction terms of time and group indicated whether changes in symptoms differed across groups. We obtained estimated marginal means to quantify changes in symptoms by the number and chronicity of mental disorders. All models were adjusted for age, sex, education, living situation, and the date of the response.

Results

Among the 1,517 respondents of the online questionnaire (mean age 56.1 [SD 13.2]; 64% female), 1,181 (78%) had a lifetime mental (depressive, anxiety, and/or obsessive-compulsive) disorder. Compared to those without, persons with lifetime mental disorders were younger, more likely to be female, had a lower educational level, and, during the COVID-19 pandemic, were more likely to live alone and to currently be on or in need of treatment for mental health.

Both mental disorder burden variables showed a graded dose-response relationship, indicating that individuals with more severe or chronic mental disorders reported more mental health impact, more fear of COVID-19, and less positive coping with the pandemic.

Overall, both before and during the COVID-19 crisis, these four symptom scores were significantly higher in persons with more severe and more chronic disorders. Compared to the pre-COVID-19 levels, symptoms of depression, worry, and loneliness increased during the pandemic (β 0.26, 95% confidence interval [CI] 0.07–0.44; β 0·66, 95% CI 0.25–1.07; β 0.22, 95% CI 0.11–0.33). Judging by the significant interaction of time and group, the before-during COVID-19 change in these four scales differed across mental disorder status. Specifically, persons without severe/chronic mental disorders tended to demonstrate an increase in all four symptom scores during the COVID-19 pandemic. In contrast, in persons with the largest mental disorder burden, there was no overall significant increase in symptom severity. In fact, in a few analyses (depressive symptoms and severity/chronicity indicator; worry and severity indicator), persons with the most severe/chronic mental disorders even showed an average significant decrease in symptom severity.

Strengths and limitations

Strengths of this study include:

- *Well-characterized psychiatric status based on multiple diagnostic interviews and the use of COVID-19-specific items and four validated symptom scales to assess multiple dimensions of emotional response to the COVID-19 crisis. The current study related longitudinal mental health data of more than ten years prior to COVID-19*

within the same individuals to symptom levels during the COVID-19 pandemic. This allowed for a valid check on the true changes in mental health symptoms due to the COVID-19 pandemic.

Main limitations are the following:

- *Non-respondents were more likely to have a pre-existing mental disorder, which could affect our findings towards an underestimation of mental health impact of persons with mental disorders.*
- *No standardized assessment tool was applied to ascertain mental disorders during the COVID-19 pandemic. Instead, we evaluated the severity and chronicity of mental disorders based on previous waves.*
- *Assessment time frame of the four symptom severity scales differed between NESDA, NESDO, and NOCDA, and thus caution is warranted when comparing trajectories of these scores.*

3. RESILIENCE FACTORS

LIR partners performed a systematic review and meta-analysis about risk, but also protective factors linked to mental burden during the SARS-CoV-2 pandemic.[13] The SARS-CoV-2 pandemic has been reported to affect mental health in the general public. This systematic review and meta-analysis aimed to assess its impact on mental health during the early pandemic phase by comparing pandemic with pre-pandemic data of general population, healthcare workers and patient samples, and to identify potential risk and protective factors. The resilience factors that are described in this report are social support, physical exercise and a lockdown at home (for students).

Method

Systematic database literature searches in PubMed, PsycINFO, and Web of Science were done (last update on May 29, 2020) in order to identify survey studies reporting mental burden during the SARS-CoV-2 pandemic in the general population, healthcare workers, or patients (any disorder or illness). Both cross-sectional as well as longitudinal surveys were eligible. If no pre-pandemic comparative data were reported, we searched PubMed and PsycINFO for corresponding publications. We also traced reference lists of primary studies.

Eligible outcomes included anxiety, depression, posttraumatic stress, sleep, general psychic distress. Metanalysis focused on the four most prevalent outcomes reported, i.e., psychic distress, anxiety, depression and sleep. Studies were only considered for pairwise meta-analysis if we were able to identify adequate pre-pandemic comparative data.

Statistical analyses

As a first step, the studies included in the meta-analysis were synthesized in narrative and tabular form, and a descriptive analysis of prevalence rates for mental health symptoms (ie, proportion of participants beyond a cut-off score reported in the included study) and of risk and protective factors was done. If adequate comparative data for any of the primary outcomes were available, pairwise meta-analyses were performed for the general population, healthcare workers, and patients, respectively. Due to multiple uses of comparative pre-pandemic data, a multilevel meta-analysis approach was applied for the general population and healthcare workers, pandemic data being clustered according to prepandemic comparators.

Results

104 studies were identified (including 208,261 individual participants), 43 of which went into quantitative meta-analyses (71,613 individual participants).

According to cut-off values, we identified increased levels of mental burden in all three participant groups, i.e., the general population, healthcare workers, and patients, regarding each of the symptoms, during the pandemic – without comparing to their respective pre-pandemic situations. Proportions of participants beyond cut-off values varied considerably between the primary studies (e.g., anxiety in the general population: 0.7 to 64.0%).

In pairwise meta-analyses of pandemic and pre-pandemic data, we found evidence of a small increase of anxiety (SMD 0.40, p=.002) and a moderate increase of depressive symptoms (SMD 0.67) in the general population, but not relating

[13] Title: Mental burden and its risk and protective factors during the early phase of the SARS-CoV-2 pandemic: systematic review and meta-analyses.
Authors: AM Kunzler, N Röthke, L Günthner, J Stoffers-Winterling, O Tüscher, M Coenen, E Rehfuess, G Schwarzer, H Binder, C Schmucker, JJ Meerpohl, K Lieb
Publication: Angela M Kunzler; Nikolaus Röthke; Lukas Günthner; Jutta Stoffers-Winterling; Oliver Tüscher; Michaela Coenen; Eva Rehfuess; Guido Schwarzer; Harald Binder; Christine Schmucker; Joerg J Meerpohl; Klaus Lieb. Mental burden and its risk and protective factors during the SARS-CoV-2 pandemic: systematic review and meta-analyses. Globalization and Health, in press.

to stress or sleep-related symptoms. No evidence of significant changes was observed in the populations of health care workers and patients. If low-quality studies were excluded from the analyses, the anxiety and depression effect estimates in the general population increased.

We identified no evidence of subgroup differences according to age or stressor exposure. However, elevated sleep-related symptoms were observed in isolated individuals. In healthcare workers, there was no evidence of a moderating effect of COVID-19 patient contact. Different groups of patients (COVID-19, psychic disorders) and pregnant women did not differ in terms of anxiety or depression. However, individuals with psychic disorders reported more stress.

Across all included surveys, pre-existing mental disorders, female sex, and concerns about COVID-19 infection were reported as the most prevalent risk factors, whereas older age, a good academic situation and higher education were listed as protective factors. Across all three populations, higher levels of anxiety and depression were found if pre-pandemic comparison data dated back five or more years (Kunzler et al.).

Strengths and limitations

The main strengths are:

- *The number of studies reporting on protective factors was limited, especially in the populations of healthcare workers and patients. However, the number of included studies from certain countries was low (e.g., k=2 Italy-located studies, k=0 studies from Spain).*

The main limitations are:

- *Substantial between-study heterogeneity that could only be partially explained in subgroup analyses. This heterogeneity probably resulted from differences between pandemic studies (e.g., countries, sociocultural differences in the perception of mental burden, pandemic outbreak severity, subpopulations, outcome measures) and variability between the comparative studies (e.g., study design, outcome measures), respectively. Meta-analysis on the level of individual participant data (IPD) could be a next step to account for clinical heterogeneity, allowing for more advanced methods to identify risk and protective factors.*

The DynaCORE-C study[14] uses a resilience framework, founded on a definition of resilience as maintenance or quick recovery of mental health during and after times of adversity. In this perspective, resilience is an outcome consisting of good mental health despite stressor exposure, and its operationalization and quantification necessarily involve an assessment of the stressors individuals are confronted with. On this basis, one can then try to identify the social, psychological, and biological factors associated with that outcome. To identify resilience factors during the current COVID-19 pandemic, we assessed different psycho-social factors and their association with outcome-based resilience during the initial lockdown in spring 2020.

Method

Participants older than 18 years of all genders without further exclusion criteria were recruited using an online snowball sampling approach starting on March 22, 2020. The questionnaire was initially only available in German and English and was expanded to 24 languages. A total of 15,790 valid and complete datasets was available by April 20.

Predictors: Positive appraisal style, perceived social support, a perceived increase in social support during the Corona crisis, optimism, perceived general self-efficacy, perceived good stress, neuroticism (inverse), behavioural coping style, and positive appraisal specifically of the Corona crisis

Outcomes: We used a residualization approach to determine outcome resilience. Exposure to stressors during the last 2 weeks was assessed using 11 questions on general stressors and 29 questions on COVID-19 specific stressors. (Change in) mental health during the last two weeks was assessed using the GHQ-12. A regression line, predicting mental health from stressor exposure, was fit. Individual stressor reactivity was calculated as the residual of a given data point from this regression line. Outcome resilience was defined as the inverse of this stressor reactivity.

Covariates included were age, gender, country of residence, household income, education, occupation, occupational status, relationship status, people in household, people <18y in household, general health status, opinion about authorities' measures.

Statistical analyses

Separate multiple linear regression analyses for each resilience factor including covariates on resilience outcome. Mediation analyses to test whether the effect of perceived social support on resilience is positively mediated by its effect on positive appraisal style, and whether the effect of positive appraisal style on resilience is positively mediated by its effect on perceived good stress recovery. LASSO (least absolute shrinkage and selection operator) regularized regression analysis to identify the set of strongest resilience factors in the multivariate context.

Results

Positive appraisal style, perceived social support, a perceived increase in social support during the Corona crisis, optimism, perceived general self-efficacy, perceived good stress, behavioural coping style and positive appraisal specifically of the Corona crisis were positively related with outcome resilience, neuroticism was strongly negatively related with outcome resilience. The effect of perceived social support on resilience was positively mediated by its effect on positive appraisal style and the effect of positive appraisal style on resilience was positively mediated by its effect on perceived good stress recovery. The LASSO regularized regression analysis highlighted the role of perceived

[14] Title: The impact of COVID-19 lockdown on mental health outcomes in Germany: A longitudinal observation of different mental health trajectories and protective factors
Authors: KF Ahrens, RJ Neumann, B Kollmann, J Brokelmann, A Malyshau, D Weichert, B Lutz, CJ Fiebach, M Wessa, R Kalisch, MM Plichta, K Lieb, O Tüscher, A Reif
Publication: Ahrens KF, Neumann RJ, Kollmann B, Plichta MM, Lieb K, Tüscher O, Reif A. Differential impact of COVID-related lockdown on mental health in Germany. World Psychiatry. 2021 Feb;20(1):140-141. doi: 10.1002/wps.20830. PMID: 33432755

good stress recovery, positive appraisal style and neuroticism as the strongest predictors for resilience. Exploratory subgroup analyses revealed that descriptively, effect sizes decreased with increasing household income and years of education and were generally larger in participants with a past or present mental health diagnosis. Effect sizes however never changed sign between covariate factor levels.

Strengths and limitations

Strengths:

- *A large dataset*
- *A preregistered study with a data analysis plan and clear hypotheses*
- *Consideration of actual individual stressor exposure.*

Limitations:

- *A cross-sectional study with all variables assessed at the same time point*
- *Self-selected non-representative sample*
- *Retrospective assessment of changes in mental health over the last two weeks (memory bias).*

Resilience will be further studied in future analyses. The strength of this approach lies in identifying not only the effect of stressor exposure on individuals but clearly delineate the deviation of an 'expected stress response'. This accounts for normal adjustments and coping after an exposure and corrects for individual differences in the level of stressor exposure.

The present study[15] investigated the impact of COVID-19 related lockdown measures in a longitudinal German sample of 1200 subjects, assessed since 2017. The conceptual resilience framework is the same as in Veer et al. 2021.

Method

During lockdown, 523 participants (age 18-50) completed additional weekly online questionnaires on e.g., mental health and stressor exposure in addition to the usual quarterly assessments.

Predictors assessed were positive appraisal style, perceived social support, a perceived increase in social support during the Corona crisis, optimism, perceived general self-efficacy, perceived good stress, neuroticism (inverse), behavioural coping style, and positive appraisal specifically of the Corona crisis

Outcome assessed was thechange in mental health during the 8 weeks weekly observation using the GHQ-28.

Covariates included were age, gender, country of residence, household income, education, occupation, occupational status, relationship status, people in household, people <18y in household, general health status, opinion about authorities' measures.

Statistical analyses

Predictors for and distinct trajectories of mental health outcomes were determined, using multilevel models and latent growth mixture models, respectively.

Results

In the total sample, perceived stress and daily hassles load significantly decreased during lockdown, while mental health improved. Positive pandemic appraisal, social support, and adaptive cognitive emotion regulation predicted improved mental health. Three groups ("adaptive", "stable", "vulnerable") with different mental health responses to initial lockdown measures were identified. Subgroups differed in perceived stress and corona-specific positive appraisal. While most participants remained mentally healthy, we also observed interindividual differences. Health services should especially identify and allocate resources to vulnerable individuals.

Strengths and limitations (of study)

Strengths and limitations

Strengths:

- *Among the first studies to longitudinally investigate the impact of the COVID-19 pandemic-related lockdown measures applying both a high sampling rate and investigating a pre-existing sample.*
- *The sample was deep-phenotyped prior to the COVID-19 pandemic, which allows for a benchmark comparison. This enabled the identification of heterogeneous mental health trajectories through latent class analyses, thereby adding important information to the finding that mental health can also improve during lockdown*

[15] Title: The impact of COVID-19 lockdown on mental health outcomes in Germany: A longitudinal observation of different mental health trajectories and protective factors
Authors: KF Ahrens, RJ Neumann, B Kollmann, J Brokelmann, A Malyshau, D Weichert, B Lutz, CJ Fiebach, M Wessa, R Kalisch, MM Plichta, K Lieb, O Tüscher, A Reif
Publications: In preparation

under certain conditions. The identification of vulnerable subjects in times of adversity is of utmost importance, to prevent the manifestation of mental disorders.

Limitations:

- *Potential selection bias, since only a subsample from the LORA study was willing to participate in the presented study. Notably though, participants in the current study were representative of the full LORA sample in terms of socio-demographic aspects. Nonetheless, these participants might have differed from the total LORA sample in the amount of experienced micro-stressors, their stressor load, or other factors during the lockdown not evident from the data at hand.*
- *The investigated period of eight weeks is rather short. It covers the full time of the lockdown measures and about 2 weeks after restrictions had been relaxed.*

4. CONCLUSION AND RECOMMENDATIONS

Bringing together a large number of cohorts, the RESPOND consortium identified a wide range of vulnerable groups, where a single cohort may have had limitations regarding both width and specificity. Our results confirm that women, young people, health workers, individuals who experience loneliness and those with pre-existing mental health issues are particularly at risk of mental health difficulties in the context of the COVID-19 epidemic. It is important to note that most of these characteristics are overrepresented among migrants, whether they are asylum seekers and refugees or labor migrants. Within this group, multiple risk factors of poor mental health converge and may therefore lead individuals to be overexposed to the social and economic impact of the pandemic. Nevertheless, there still are grey areas that will require further investigation in the future. In particular, long-term mental health outcomes and the relationship between mental health and management of the epidemic will need to be investigated in future studies.

Within the general population, RESPOND consortium members showed an overall deterioration of mental health since the COVID-19 pandemic began. In Spain, lockdown was associated with a deterioration of physical activity and a development of a sedentary lifestyle, although prevalence rates of depression and suicidal ideation did not change significantly from before to after the outbreak of COVID-19. In Belgium, however, UCLouvain demonstrated that a longer period of lockdown was associated with a higher risk of distress. Globally, studies show similar characteristics putting individuals at high risk: being a woman, being young, having financial and work-related struggles and being lonely. Results also showed that experiencing any COVID-19 infection symptoms (INSERM), having pre-existing symptoms of depression and anxiety (INSERM, LIR), fearing contamination (VUA), increased the risk of developing symptoms of depression and anxiety.

Data produced by UAM showed that health care workers experience more emotional distress, more depressive symptoms and more death wishes, especially when they feel discriminated against. The systematic review and meta-analysis conducted by LIR partners also showed that, more globally, levels of mental burden increased in healthcare workers.

VUMC produced results regarding the impact of the COVID-19 pandemic on people with mental health disorders in the Netherlands. Within this population, many risk factors are similar to the general population. Also, characteristics of the population with lifetime mental disorders are similar to those of individuals who show a significant increase of mental distress during the pandemic, i.e. female sex, younger age, and higher likelihood of living alone. However, it has also been demonstrated that persons with more severe or chronic mental disorders expressed more fear of COVID-19 and were more impacted by the COVID-19 pandemic in terms of mental health.

Many aspects of the control measures affected young people and the results presented here show that they are a vulnerable group. The variety of cohorts helps us better understand how young people experienced the COVID-19 pandemic. In particular, the COMET study shows that this phenomenon occurs in different parts of Europe and the world. The Confins study (University of Bordeaux), which includes a large percentage of students, shows that compared to young people who are not at university, students developed more severe COVID-19 infections and had a higher level of symptoms of depression, anxiety, suicidal thoughts and perceived stress. Furthermore, an online survey performed by UCLouvain showed risk factors specific to young people: increase in social media use, decrease in going out for drinks or food and decrease in doing home activities.

Many of the results collected in the context of the RESPOND consortium during the COVID-19 pandemic were compared with data collected prior to the health crisis, which is a key strength. In particular, several analyses emphasize the role of preexisting mental health difficulties, which could be targeted by interventions aiming to mitigate the mental health impact of the epidemic. Future analyses , which are described in the Data Analysis plan, will serve to examine the long-term impact of preexisting mental health difficulties and other characteristics associated with psychological distress.

Finally, people with fragile circumstances, who are socio-economically disadvantaged, belong to migrant or ethnic minority groups constitute a specifically vulnerable group in terms of their risk profiles and characteristics. However, within the cohort studies presented in this report, these specific subgroups were not included, making it difficult to

draw any conclusions regarding vulnerability for COVID-19 related distress. Nevertheless, there are studies besides the RESPOND project, that show that migrant populations are highly affected by the COVID-19 pandemic and lockdown measures (Choudhari, 2020). Precarious living conditions, limited possibility to socially distance in order to prevent infection, and the socio-economic effects of the crisis are likely to be especially severe in migrant populations. The pandemic further reduced access to mental health care for migrant populations, who tended to have very poor access to mental health services prior to the epidemic (Aragona et al., 2020; Aragona et al., 2021). The World Health Organization has issued interim guidance for health authorities on how healthcare providers can best address the particular risks and vulnerabilities faced by migrant populations during the COVID-19 pandemic (WHO, 2020), but further research is needed to identify and scale up appropriate mental health support resources for migrants and other socioeconomically deprived groups.

Regarding resilience, partners from FSJD and UAM showed that social support is an important resilience factor. The DynaCORE-C study focused on psychological resilience to the COVID-19 pandemic. Their results show also that perceived social support in an important factors increasing resilience and predicting good stress recovery. Other resilience factors highlighted by the team include positive appraisal style, optimism, perceived general self-efficacy, perceived positive stress, behavioural coping style and positive appraisal of the COVID-19 epidemic. Neuroticism was the only factor negatively associated with resilience.

The link between mental health problems and adherence to the restrictions related to COVID-19 is also mentioned in this report. Adherence to epidemic-control measures is included as an independent variable in the COMET study. As the Data-Analysis Plan describes, specific analyses regarding adherence to the COVID-19-related restrictions will be performed during the RESPOND project. For example, the impact of mental health disorders and substance use patterns on adherence to COVID-19 control measures and lockdown will be analyzed.

Throughout the report, some non-intended consequences of the epidemic-control decisions are also revealed. Loneliness is cited as a risk factor for psychological distress (INSERM, VUA) and the report shows that loneliness levels increased during the COVID-19 pandemic (UAM/FSJD, VUMC). Variations in lifestyle have also been shown. A strict lockdown was associated with a deterioration in lifestyle risk factors (UAM/FSJS), a decrease in the performance of home activities, and an increase in social media which were all revealed to be risk factors for mental distress. Furthermore, isolation and low rates of home activities are among factors which play an important explanatory role with regard to psychological distress (UCLouvain).

Future analyses planned in the context of the RESPOND project are described in the Data-Analysis Plan. They will be conducted throughout the RESPOND project by all partners involved, with the aim of identifying long-term patterns of mental health and related outcomes in the context of the COVID-19 epidemic and its aftermath. Whenever possible, these studies will compare and combine data from several cohorts. Finally, subject to feasibility, analyses may be based on a database merging the data of different cohorts to increase reliability and reproducibility.

Based on these data, it appears that certain groups should be accompanied in a way that helps them deal with the stress associated with the COVID-19 pandemic and reduce the risk of psychological distress and psychiatric disorder. One aspect is to provide adequate opportunities for mental health screening and access to health care. Additionally, the current context calls for the development of low threshold interventions that are cost-effective, sustainable and can be delivered outside of the healthcare context – which tends to be overwhelmed because of the pandemic. This is the aim of other parts of RESPOND, to be developed during the course of the project.

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