

Original Article

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Changes on 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

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Abstract

Aims. To assess whether there is a change in the prevalence of depression and suicidal ideation after the strict lockdown measures due to the first wave of the COVID-19 pandemic in Spain, and to assess which are the factors associated with the incidence of a depressive episode or suicidal ideation during the lockdown.

Methods. Data from a longitudinal adult population-based cohort from Madrid and Barcelona were analysed ($n = 1103$). Face-to-face home-based (pre-pandemic) and telephone interviews were performed. Depression and suicidal ideation were assessed through an adaptation of the Composite International Diagnostic Interview (CIDI 3.0). Population prevalence estimates and multivariable logistic regressions were computed.

Results. Prevalence rates of depression changed significantly from before to after the COVID-19 outbreak (from 3.06% to 12.00%; $p = 0.01$) and per sex and age groups. Individuals reporting COVID-19 concerns (odds ratio [OR] = 3.11; 95% confidence interval [CI] = 1.45–6.69) and those feeling loneliness (OR = 1.99; 95% CI = 1.52–2.61) during the lockdown were at increased risk of developing depression during the confinement. Resilience showed a protective effect against the risk of depression (OR = 0.57; 95% CI = 0.39–0.83), while individuals perceiving social support during the confinement were at lower risk of developing suicidal thoughts (OR = 0.21; 95% CI = 0.09–0.46). Greater disability during the lockdown was also associated with the risk of suicidal ideation (OR = 2.77; 95% CI = 1.53–5.03).

Conclusions. Continuous reinforcement of mental health preventive and intervening measures is of global importance, particularly among vulnerable groups who are experiencing the most distress. Future research should strive to evaluate the long-term effects of the COVID-19 crisis on mental health.

Introduction

The COVID-19 outbreak and the policies to prevent its spread have disrupted the daily living of the population. The evidence regarding the mental health consequences of the confinement due to the COVID-19 pandemic in the general population is inconclusive (Bueno-Notivol *et al.*, 2021; Faust *et al.*, 2021; O'Connor *et al.*, 2021; Prati and Mancini, 2021; Tanaka and Okamoto, 2021; van der Velden *et al.*, 2021).

The lockdown in Spain was one of the most restrictive in Europe (García-Esquinas *et al.*, 2021). The Government imposed a State of Alarm starting on 15 March that established a national lockdown that included distancing measures such as the closure of non-essential customer-facing businesses and educational institutions (Real Decreto 463/2020). In order to avoid the saturation of the intensive care units, these initial measures were strengthened with another decree from the Government on 29 March (Real Decreto 10/2020). A period of 5 weeks started in which citizens were only allowed to leave their homes for essential work, to buy food and other staple products, or for emergencies. On 4 May, citizens were first authorized to leave their homes to exercise or walk, for a maximum of 1 hour a day, under strict conditions. From 10 May to 21 June, a progressive de-escalation of confinement measures led to the so-called “new normality” in which Spaniards were allowed to attend their jobs, gather in small groups and move between provinces as long as they complied with safe distancing and face covering requirements.

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During the first wave of the COVID-19 pandemic, several studies have investigated its mental health consequences in the Spanish adult population (Balanzá-Martínez *et al.*, 2021; Cecchini *et al.*, 2021; Garcia-Fernandez *et al.*, 2020; Gonzalez-Sanguino *et al.*, 2021; Justo-Alonso *et al.*, 2020; Losada-Baltar *et al.*, 2022; Mortier *et al.*, 2021; Pérez *et al.*, 2021; Planchuelo-Gomez *et al.*, 2020; Valiente *et al.*, 2021). Overall, these studies have shown a general worsening in mental health throughout the confinement, with prevalence estimates ranging from 9% to 46% among those reporting data on depressive symptoms. Younger age, being female, being a healthcare worker, low income, prior mental disorders, loneliness and substance use appeared as the strongest factors associated with mental health problems. However, the validity of these findings may be somewhat hindered by at least one of the following drawbacks: (i) non-probabilistic sampling approaches or convenience samples were evaluated through online surveys, which increases the risk of selection bias; (ii) cross-sectional design or lack of information on the pre-pandemic period, which does not allow for a proper assessment of the determinants of the observed changes in mental health indicators; and (iii) assessment of dimensional measures were solely of psychological distress.

The present study aims to assess whether there is a change in the prevalence of depression and suicidal ideation after the strict lockdown measures during the first wave of the COVID-19 pandemic in Spain, and to assess which are the factors associated with the incidence of a depressive episode or suicidal ideation during the lockdown. Our analysis is based on an adult population-based cohort from the provinces of Madrid and Barcelona, which was evaluated before the pandemic and once more after the first COVID-19 lockdown.

Method

Sample and recruitment

Non-institutionalized adults (i.e., 18+ years old) from the regions of Madrid and Barcelona participated in this study. These constitute the refreshment sample of the *Edad con Salud* project (ageingandhealth.com) (Lara *et al.*, 2022). They were recruited following a multistage stratified design consisting of (i) a random sample of municipalities (sampling probability proportional to population size); (ii) a random sample of census units from each municipality; and (iii) a random sample of households within each census track, and assigned to one of two age groups: 18–49, or 50+ (the second one oversampled). For each household, individuals in the assigned age group were invited to participate; the response rate was 68.0%. Sampling weights were generated for the sample to be representative of the target population, according to the population distribution obtained from the National Institute of Statistics.

Participants were interviewed at their homes between 17 June 2019 and 14 March 2020 (Pre-COVID measure). They were reached out again between 21 May and 30 June 2020 to respond to a telephone interview (Post measure). Trained interviewers conducted the Pre- and Post-measure interviews, using a Computer-Assisted Personal and Telephonic Interviewing system, respectively. Protocols were approved by the Clinical Research Ethics Review Committees of Parc Sanitari Sant Joan de Déu (Barcelona) and Hospital Universitario La Princesa (Madrid). All participants provided informed consent.

Some participants were unable to respond first-hand due to physical and/or mental limitations, and thus a relative or cohabitant answered in their name. Only first-hand respondents to both

interviews were included in these analyses; therefore, out of a sample of 1935 participants, 54 proxy respondents were discarded, making a sample of 1881 participants in the Pre measure. A total of 778 participants were excluded from the Post measure (81 participants did not provide recontact information, 110 participants could not be contacted, 9 were deceased, 39 were responded by a proxy respondent, 329 either rejected to respond to the Post-measure telephone interview or aborted it before finishing, and 210 had unspecified incidents), so the final Post-measure sample comprised 1103 participants.

Measures

Depressive symptoms were assessed with an adapted version of the Composite International Diagnostic Interview (CIDI) for Depression Screening (Kessler and Üstün, 2004). An algorithm following the ICD-10 criteria was used to diagnose depression in the previous 12 months (World Health Organization, 1993). For the Post-measure interview, an abbreviated version was used, and the items were adapted to ask for a 30-day time span in order to account for an onset while the lockdown measures were in effect. The assessment algorithm in the Pre measure was adapted to use the same item set as in the Post measure. Suicidal ideation comprised a single item asking whether the participant had had suicidal thoughts in the previous 12 months/30 days, for the Pre- and Post-measures periods, respectively.

The following covariates were also measured: age, sex, education level, whether the participant lived alone (both before and during the lockdown), whether the participant had cohabited/was cohabiting with a relative isolated by COVID-19, whether the participant had been/was concerned about a relative/friend infected by COVID-19, whether the participant had been infected with COVID-19 and its severity, whether the participant had enough quietness at home to get proper rest, whether the household economic situation had worsened due to COVID-19, whether the participant had been unemployed due to COVID-19, time a day spent in front of screens during the lockdown (working and non-working), Pre- and Post-measure levels of physical activity according to an abbreviated version of the Global Physical Activity Questionnaire version 2 (GPAQ-2) (Armstrong and Bull, 2006) and the following scales: Post-measure score in the Brief Resilience scale (Rodríguez-Rey *et al.*, 2016), Pre and Post measures of social support measured with the OSLO3 Social Support scale (Dalgard *et al.*, 2006), Pre and Post measures of loneliness measured with the UCLA Loneliness Scale (Hughes *et al.*, 2004), and Post measure of disability assessed with the 12-item World Health Organization Disability Assessment Schedule (WHODAS 2.0) (Luciano *et al.*, 2010). The Brief Resilience Scale was taken from the validated version by Rodríguez-Rey *et al.* (2016), while the rest of them have been validated in the original in English (as referenced) and were adapted for their use in the *Edad con Salud* cohort study. All of them had internal consistency indices (i.e., Cronbach's α) above .70, except for the OSLO3 Social Support scale, which had moderate ($\alpha = .653$) and low ($\alpha = .386$) reliability in the Pre and Post measures, respectively.

Data analysis

Sample descriptive statistics were computed for depression, suicidal ideation and all the covariates. Attrition in the Pre-measure sample was analysed for differences in socio-demographic and the two outcome variables: sex, depression and suicidal

ideation were tested with the χ^2 -test; bias-corrected Cramér's V (ϕ_c) was computed as a measure of effect size. For age, a two-sample T -test was performed, with Hedges' g as a measure of effect size.

Prevalence estimates – population-wise and disaggregated by sex and age (grouped in 18–29, 30–49 and 50+ year-olds) – were computed for depression and suicidal ideation in both measures. The differences between both measures were tested with a weighted McNemar's test of symmetry, using the complete data. Bonferroni correction was applied variable-wise to the disaggregated estimates.

To model the risk of incidence after the lockdown, the cases with depression or suicidal ideation in the Pre-measures period were filtered out from the dataset for its corresponding analysis. Then, we performed a weighted logistic regression model on the Post measure. All covariates stated in the section 'Measures' were initially considered. In the case of suicidal ideation, the Pre and Post measures of depression were also considered as covariates. The following procedures were applied for fitting the models: First, in order to archive better numerical convergence, all interval-level variables were standardized, and categorical covariates that yielded complete separation (Albert and Anderson, 1984) were discarded. Covariates were tested individually with univariate weighted logistic regression models and the Rao-Scott (1984) Likelihood-ratio test (without Bonferroni correction, in order to decrease Type-II error risk). Among the significant covariates, the ordinal ones were tested for non-linearity with the Wald test, comparing the general model with a model with the linear term only. Whenever the test was non-significant, only the linear term was included. Afterwards, a multivariate weighted logistic model was fit with all the significant covariates. A backward-step procedure was then run, dropping covariates according to the Akaike information criterion statistic. Demographic variables such as sex and age were fixed. In the model of suicidal ideation, the measures of depression were also fixed. Finally, the resulting model was refit to the subset of complete cases in the covariates selected by the backward-step procedure. As the procedure may select a different subset of covariates for each model, the number of complete cases may also differ.

A significance level of $\alpha = .05$ was used. All significance tests were performed applying Bonferroni correction for multiple comparisons (unless stated otherwise). All the analyses were conducted in R v. 4.2.2 (R Core Team, 2019). Package survey v. 4.1-1 (Lumley, 2004) was used to fit the models.

Results

Sample descriptives

Participants with data in both measures differed from the ones excluded in the Post measure in sex ($\chi^2 = 15.80$, p -value $< .001$) and age ($\chi^2 = 5.59$, p -value $< .001$). The proportion of men excluded (48.8%) was relatively higher than the ones included (39.6%), and the participants excluded were older (mean = 59.6, $sd = 19.8$) than the ones included (mean = 54.8, $sd = 16.4$). However, the effect size was negligible for sex ($\phi_c = .089$), and small for age ($g = 0.270$). No significant differences were found in depression between the included and the excluded sample ($\chi^2 = 0.22$, p -value = .638, $\phi_c = .000$). Regarding suicidal ideation, the excluded sample differed significantly from the included one (0.64% versus 2.18%, respectively; $\chi^2 = 7.07$, p -value = .008); the effect size was also negligible though ($\phi_c = .052$). The descriptive

Table 1. Socio-demographic and health characteristics before and after the confinement

Variable	Pre-confinement	Post-confinement	p -Value*
Age, mean (sd)	54.82 (16.35)		
Sex (Female), n (%)	666 (60.38)		
Education level, n (%)			
Less than primary	97 (8.79)		
Primary	283 (25.66)		
Secondary	466 (42.25)		
Tertiary	257 (23.30)		
Depression, n (%)	38 (3.45)	102 (9.25)	$< .001$
Suicidal ideation, n (%)	24 (2.20)	23 (2.09)	.853
Resilience, mean (sd) ^a		3.51 (0.63)	
Living alone, n (%)	163 (14.78)	131 (11.88)	$< .001$
Social support, mean (sd) ^a	78.34 (17.91)	76.20 (16.41)	$< .001$
Loneliness, mean (sd) ^a	12.07 (25.13)	12.69 (23.97)	.489
COVID-19 cohabitant, n (%) ^b		43 (3.90%)	
COVID-19 concern, n (%) ^c		268 (24.30)	
COVID-19 infection, n (%) ^d			
Not infected		1093 (99.09)	
Infected		7 (0.63)	
Infected & hospitalized		3 (0.27)	
Disability, mean (sd) ^a		8.72 (13.43)	
Working screen time (hours), mean (sd)		3.93 (2.16)	
Non-working screen time (hours), mean (sd)		1.23 (2.62)	
Home quietness, n (%)		1030 (93.64)	
Economy worsened, n (%)		331 (30.15)	
Unemployed, n (%)		179 (16.29)	
Physical activity, n (%)			
Low	353 (32.09)	910 (82.50)	$< .001$
Moderate	384 (34.91)	76 (6.89)	$< .001$
High	363 (33.00)	117 (10.61)	$< .001$

n = number of participants; sd = standard deviation.

^aThese variables are measured in a 0–100 scale.

^bCohabited/ing with relative isolated by COVID-19.

^cConcerned about relative/friend infected by COVID-19.

^dSeverity of COVID-19 infection.

* p -Values correspond to a paired-sample T -test for the quantitative variables, and a McNemar's test of symmetry for the categorical ones.

Table 2. Prevalence rate estimates in the Pre and Post measures of depression and suicidal ideation, for the population, and disaggregated by sex and age group

Segment	Depression			Suicidal ideation		
	Pre (sd)	Post (sd)	p-Value	Pre (sd)	Post (sd)	p-Value
Total	3.06% (0.45%)	12.00% (1.45%)	< .001	1.56% (0.34%)	2.78% (0.65%)	.239
Sex						
Male	2.40% (0.59%)	10.73% (2.44%)	< .001	1.17% (0.40%)	3.11% (1.14%)	.110
Female	3.66% (0.66%)	12.98% (1.76%)	< .001	1.91% (0.52%)	2.52% (0.74%)	.964
Age						
18–29	2.58% (1.13%)	18.13% (4.34%)	.001	2.21% (1.07%)	4.09% (1.97%)	.878
30–49	2.70% (0.85%)	14.25% (2.96%)	< .001	0.93% (0.55%)	3.31% (1.21%)	.018
50+	3.52% (0.54%)	7.92% (1.15%)	< .001	1.85% (0.44%)	1.87% (0.71%)	.243

sd = standard deviation.

statistics for both outcome variables and the covariates for the sample included in the analysis are shown in Table 1.

Prevalence rates

Estimated prevalence rates are given in Table 2. For depression, the prevalence increased from 3.06% in the Pre to 12.00% in the Post measure. According to the McNemar's test, the difference was significant ($\chi^2 = 64.67$, p -value < .001), as was for men ($\chi^2 = 26.22$, p -value < .001) and women ($\chi^2 = 38.73$, p -value < .001) considered separately. When considering the differentiated age groups, the difference was more prominent for the 18–29 (increasing from 2.58% to 18.13%) and the 30–49 (increasing from 2.70% to 14.25%) groups. Although the increase in the 50+ group was still significant (from 3.52% to 7.92%; $\chi^2 = 19.86$, p -value < .001), it was much less prominent when compared with the younger groups.

For suicidal ideation, the prevalence rate estimate increased from 1.56% in the Pre to 2.78% in the Post measure, but this difference was not significant ($\chi^2 = 1.39$, p -value = .239). After Bonferroni correction, none of the disaggregated estimates was significant either.

Risk of depression after the lockdown

The final regression model for depression was fit with a sample size of 1037. Its covariates are given in Table 3, along with their odds ratios (ORs). The coefficient for COVID-19 concern was found to be significant, along with the Post measures of Loneliness and Resilience.

The OR for COVID-19 concern was 3.115 ($z = 2.91$, p -value = .004); that is, the risk of developing depression was expected to be 211.5% higher for those who reported being concerned about a relative or friend infected by COVID-19 than for those who did not. For Loneliness (Post), the OR was 1.992 ($z = 4.97$, p -value < .001), which means that an increase of 1 standard deviation in the Post measure of the UCLA Loneliness Scale was associated with an increase of 99.2% in the OR of receiving a positive diagnosis of depression in the Post measure. In the case of Resilience (Post), the OR was 0.573 ($z = -2.90$, p -value = .004), meaning that an increase of 1 standard deviation in the Post measure of the Brief Resilience Scale was associated with a decrease of 42.7% in the OR of receiving a positive diagnosis of depression in the Post measure.

Table 3. Logistic regression model of depression after the confinement in participants without depression before the confinement

Term	OR	(95% CI)	z	p-Value
(Intercept)	0.07	(0.03–0.16)	-6.26	< .001
Age (Pre)	0.97	(0.95–0.99)	-2.45	.014
Sex	0.75	(0.37–1.52)	-0.79	.428
Resilience (Post)	0.57	(0.39–0.83)	-2.90	.004
Loneliness (Pre)	1.09	(0.81–1.49)	0.57	.566
Loneliness (Post)	1.99	(1.52–2.61)	4.97	< .001
COVID-19 concern	3.11	(1.45–6.69)	2.91	.004
Disability (Post)	1.55	(1.02–2.35)	2.06	.039
Working screen time (hours)	0.89	(0.78–1.01)	-1.86	.064
Economy worsened	1.87	(0.89–3.96)	1.64	.101

OR = odds ratio; CI = confidence interval; Resilience = Brief Resilience Scale; Loneliness = UCLA Loneliness Scale; Disability = 12-item WHO Disability Assessment Schedule

Risk of suicidal ideation after the lockdown

This model was fit with a sample size of 921; its covariates and their coefficients (as ORs) are shown in Table 4. After Bonferroni correction, the significant covariates were the Post measures of social support and disability. The OR of social support was 0.206 ($z = -3.81$, p -value < .001). This implies that an increase of 1 standard deviation in the Post measure of the Oslo-3 Social Support Scale was associated with a decrease of 79.4% in the OR of reporting having suicidal ideation in the Post measure. The OR for disability was 2.773 ($z = 3.36$, p -value = .001), implying an increase of 177.3% for a 1-standard-deviation increase in the Post measure of the WHODAS 2.0 scale.

Discussion

The present study is the first to assess changes on mental health during the first wave of the COVID-19 pandemic in Spain by using a population-based cohort. Overall, our results showed significant differences in the prevalence of depression from before to after the COVID-19 outbreak. Interestingly, the rates of suicidal ideation did not significantly increase compared to pre-pandemic. The study findings also indicate that individuals reporting COVID-19

Table 4. Logistic regression model of suicidal ideation after the confinement in participants without suicidal ideation before the confinement

Term	OR	(95% CI)	z	p-Value
(Intercept)	0.00	(0.00–0.00)	–7.37	< .001
Age (Pre)	0.92	(0.85–0.99)	–2.20	.028
Sex	0.21	(0.02–1.97)	–1.36	.173
Resilience (Post)	0.43	(0.17–1.05)	–1.85	.065
Social support (Pre)	0.74	(0.36–1.49)	–0.85	.395
Loneliness (Pre)	1.30	(0.56–2.98)	0.61	.543
Social support (Post)	0.21	(0.09–0.46)	–3.81	< .001
Disability (Post)	2.77	(1.53–5.03)	3.36	.001
Physical activity (Pre) (Ref. Low)				
Moderate	0.37	(0.05–2.71)	–0.97	.330
High	3.66	(0.50–26.63)	1.28	.200
Depression (Pre)	4.45	(0.17–118.40)	0.89	.373
Depression (Post)	3.35	(0.20–56.97)	0.84	.403

OR = odds ratio; CI = confidence interval; Resilience = Brief Resilience Scale; Social support = OSLO3 Social Support Scale; Loneliness = UCLA Loneliness Scale; Disability = 12-item WHO Disability Assessment Schedule Physical activity = GPAQ-2 abbreviated.

concerns and those feeling lonely during the lockdown exhibited a significant increase in the risk of developing depression. Resilience showed a protective effect against the risk of depression, while individuals perceiving social support during the confinement were at lower risk of developing suicidal thoughts. Greater disability during the lockdown was also associated with the risk of suicidal ideation.

Most of the studies tracking longitudinal changes in mental health from before to during the pandemic have shown increases in the prevalence rate of depression and suicidal ideation (Daly *et al.*, 2022; McGinty *et al.*, 2020b; Niedzwiedz *et al.*, 2021; Novotny *et al.*, 2020; Pierce *et al.*, 2020; Planchuelo-Gomez *et al.*, 2020; Winkler *et al.*, 2020), while others did not report differences above pre-pandemic levels (Kwong *et al.*, 2021; van der Velden *et al.*, 2020) or even decreased estimates (van der Velden *et al.*, 2021). It is worth noting previous studies generally measured psychological distress or depressive symptoms rather than using diagnostic mental health interviews. According to a meta-analysis of longitudinal studies investigating the psychological impact of the COVID-19 pandemic (COVID-19 Mental Disorders Collaborators, 2021), the prevalence of major depressive disorder significantly increased in 2020. These findings contrast with those of Prati and Mancini (2021), who found the initial effect of lockdowns on mental health to be relatively small, with no evidence of a significant increase in suicide risk.

The first emotional reactions may represent feelings of fear, anger or sadness in response to an unprecedented situation rather than a mental disorder. More fine-grained analyses have shown that mental health problems remained stable or declined throughout the initial lockdown period (Bryan *et al.*, 2020; Chandola *et al.*, 2022; Daly *et al.*, 2022; Gonzalez-Sanguino *et al.*, 2021; Hyland *et al.*, 2020; McGinty *et al.*, 2020a; Somma *et al.*, 2021; van der Velden *et al.*, 2021; Wang *et al.*, 2020), which would be consistent with the notion of a progressive adjustment for managing and overcoming stressful events. However, these are findings based on the very early stage of the COVID-19 outbreak and different

conclusions may hold for the comparisons among rate estimates of mental health conditions in the mid- and long-term. In this regard, few observational studies so far have provided data on the trajectories of depression over an extended timeframe. For example, Rosa *et al.* (2022) found in four UK cohorts of different ages that depressive symptoms remained stable from May 2020 to September 2020, but then increased during the winter lockdown in 2021. In a similar vein, Landi *et al.* (2022) showed a quadratic trajectory of depression in an Italian community sample, with increasing symptom levels during the mandatory lockdown periods (spring 2020 and winter 2021). The work of Mayerl *et al.* (2022), carried out among an Australian sample of older adults aged 60+ years, further suggested that most participants appeared to be either resilient or have recovered relatively quickly from the effects of the pandemic across the entire period of observation (from May 2020 to December 2021). On the other hand, Tanaka and Okamoto (2021) examined whether suicide mortality changed during the pandemic using high-frequency data covering the entire Japanese population. The authors found that there was an initial drop in suicide deaths from February to June 2020, then followed by an increase during the second wave (July to October 2020). Similarly, the Spanish Statistical Office revealed that suicide remained the leading cause of external death during the first few months of 2020. However, there was a drop of 8.8% as compared with the same period in 2019 (Spanish Statistical Office, 2021). Initial declines in suicidal behaviours are not unexpected and may be explained by reduced stress derived from workplaces and social interactions, government financial support and limited access to lethal means (Tanaka and Okamoto, 2021). Furthermore, Pirkis *et al.* (2022), who synthesized sex- and age-specific suicide trend data from 33 countries over the first 9–15 months of the pandemic, found no evidence of a change in suicide trends from before to during the pandemic in most countries/areas-within-countries.

Specific groups appear to be disproportionately affected by the COVID-19 pandemic. That is the case of individuals reporting feelings of loneliness. Prior studies have repeatedly documented the intimate link between loneliness and depression (de la Torre-luque *et al.*, 2019; Lee *et al.*, 2021; van den Brink *et al.*, 2018). The consistency of results among other COVID-19-related research is also noteworthy (Chandola *et al.*, 2022; Creese *et al.*, 2021; Gonzalez-Sanguino *et al.*, 2021; Kantor and Kantor, 2020; Novotny *et al.*, 2020; Palgi *et al.*, 2020; van der Velden *et al.*, 2021; Ward *et al.*, 2023). Even though little is known yet about the mechanisms underlying this association, there is evidence that loneliness may compromise emotion processing and regulation, can lead to decreased cognitive function and alter metabolic, endocrine and immune responses (de la Torre-luque *et al.*, 2021; Hawkey and Cacioppo, 2010; Lara *et al.*, 2019), all of which have been associated with depression. In our current situation, the risk of loneliness over depression is expected to be heightened. Individuals reporting concerns about COVID-19 were also more likely to develop depression, in line with evidence showing that COVID-19-related fear entailed a threat to mental health (Li *et al.*, 2020; Rossi *et al.*, 2020). Uncertainties about the future, hopelessness and misinformation about the outbreak may have contributed to this association (Voitsidis *et al.*, 2021). In the opposite corner, the identification of the protective effect of resilience on depression accords with recent reports (Cenat *et al.*, 2021; Killgore *et al.*, 2020; Lenzo *et al.*, 2020; Novotny *et al.*, 2020; Ran *et al.*, 2020). Resilience is the process of effectively coping with uncertainty and hardship. While this finding may be well-suited for designing interventions to mitigate the risk of depression, it remains to be further investigated who

are these resilient people and what factors characterize resilience (Huisman *et al.*, 2017). Furthermore, social support is among the best well-documented variables to influence suicidal behaviour (Calati *et al.*, 2019; Hegerl and Heinz, 2019). Early research has also proposed a similar association between social support and suicidal ideation in the context of COVID-19 (Bryan *et al.*, 2020; Fitzpatrick *et al.*, 2020; Gratz *et al.*, 2020; Papadopoulou *et al.*, 2021). For instance, Gratz *et al.* (2020), having analysed data from a nationwide community sample of 500 adults from 45 states, claimed that it is not loneliness but an absence of belongingness and significant connections that accounts for the association of the lockdown to greater suicide risk. In this sense, Joiner's Interpersonal Theory of Suicide (Joiner *et al.*, 2005) proposed that the lack of social connectedness may lead to a potentially lethal suicidal attempt. More recently, Klonsky and May (2015) suggested that there is a three-step process towards suicidal attempts where connectedness protects against the escalation of ideation among individuals suffering both psychological pain and hopelessness. Greater disability during the confinement was also related to suicidal ideation. Individuals with limited functioning are thought to be at higher risk of suicidal ideation (Russell *et al.*, 2009). Within the context of the COVID-19 pandemic, these individuals may have showed greater vulnerability to morbidity and mortality related to the SARS-CoV-2 virus, and thus have been forced to follow more stringent physical distancing measures. It is also possible that they encountered higher difficulties to follow their daily routines as compared with individuals without functional impairment, and coped less efficiently against the COVID-19 stressors (Sheffler *et al.*, 2021). In this situation, the perception of being a burden to others and low social belonging, factors that account for the association between these variables (Espinosa-Salido *et al.*, 2021), may have been exacerbated. In this regard, Iob *et al.* (2020), using data from almost 45,000 adults in the UK, reported that people with disabilities and/or chronic physical illness reported higher thoughts of suicide between March and April 2020. In addition, an Indonesian nationwide survey found that individuals with disability had 2.18 times higher chance of experiencing self-harm and suicidal ideation than those without disability (Liem *et al.*, 2022).

It will take time to know what the ultimate impact of the COVID-19 outbreak is on mental health. The psychological toll of the pandemic is unquestionable, but the reality is complex. Its consequences are predicted to gradually appear, including rising unemployment, financial loss, reduced participation or inadequate supplies derived from significant cuts in spending on social and healthcare. The effects on mental conditions are expected to stay and peak later, with variations across populations and nations (Ayuso-Mateos *et al.*, 2021; Brooks *et al.*, 2020; John *et al.*, 2020). Continuous reinforcement of preventive and intervening mental health measures is thus of global importance. In this regard, a position paper detailed several mental health research priorities in response to the demands of COVID-19 (Holmes *et al.*, 2020). These include the collection of high-quality data on the mental health effects of the pandemic across the whole population and vulnerable groups, together with the development, assessment and refinement of driven strategies to address its psychological, social and neuroscientific aspects.

Strengths and limitations

This research has an important number of strengths. First, the use of an adult population-based cohort following a probabilistic sampling approach. Moreover, this sample comprises subjects

of all educational levels and age ranges, as compared to recent published studies that tend to over-represent highly educated people and under-represent the oldest old population. Second, this study is one of the few including a baseline evaluation of the participants some months before the pandemic outbreak. Third, data from our study were collected through structured face-to-face home-based interviews and telephone interviews, unlike most prior studies, relying on web-based surveys instead. Fourth, we used a standardized assessment tool providing a clinical diagnosis of major depression, while the majority of previous research assessed depressive symptoms through screening tests or non-validated instruments. Finally, we used a large variety of validated instruments and socio-demographic variables to cover a broad-ranging research of potentially vulnerable groups. Our findings need to also be interpreted in the context of their shortcomings. As with all COVID-19-related research, the present study is limited by a short follow-up period, which reduced the power to evaluate the effects of the confinement on depression and suicidal behaviour. However, ours is an ongoing project that will provide information to a more comprehensive understanding of the changes in mental health in the mid- and long-term. We also acknowledge that some measures were collected retrospectively through self-report, which may be affected by recall or reporting bias, especially for the longer recall period. Finally, as this survey did not intend to generate clinical diagnoses for all mental disorders, some individuals presenting for example bipolar disorder or schizophrenia may have been included in our analytical sample.

Conclusions

The COVID-19 pandemic has put at the forefront the imperative of taking care for others, particularly among vulnerable groups who are experiencing the most distress. Altogether, our results point to the value of the social factors as strongly associated with mental health conditions, with loneliness and social support maybe representing different risk pathways. Promoting a sense of connectedness, experiences of companionship and meaningful relationships show promise in mental health prevention, especially in times of physical distancing and lockdowns. Future research should strive to evaluate the long-lasting effects of the COVID-19 crisis on mental health.

Availability of Data and Materials. Data supporting the findings of this study are available upon reasonable request.

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Competing interests. None declared.

Ethical standards. The protocols were approved by the Clinical Research Ethics Review Committees of both Parc Sanitari Sant Joan de Déu (Barcelona), and Hospital Universitario La Princesa (Madrid). All participants provided

written informed consent for their participation and the treatment of their personal data. The ones that participated in the Post-measures period gave further verbal consent before the telephonic interview.

References

- Albert A and Anderson JA (1984) On the existence of maximum likelihood estimates in logistic regression models. *Biometrika* 71(1), 10.
- Armstrong T and Bull F (2006) Development of the World Health Organization Global Physical Activity Questionnaire (GPAQ). *Journal of Public Health* 14(2), 5.
- Ayuso-Mateos JL, Mediavilla R, Rodriguez KR and Bravo MF (2021) Informing the response to COVID-19 in Spain: Priorities for mental health research. *Revista de Psiquiatría y Salud Mental* 14(2), 79–82.
- Balanzá-Martínez V, Kapczinski F, de Azevedo Cardoso T, Atienza-Carbonell B, Rosa AR, Mota JC, Jurema C, Motak L and De Boni R (2021) The assessment of lifestyle changes during the COVID-19 pandemic using a multidimensional scale. *Revista de Psiquiatría y Salud Mental* 14(1), 16–26.
- Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N and Rubin GJ (2020) The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet* 395(10227), 912–920.
- Bryan CJ, Bryan AO and Baker JC (2020) Associations among state-level physical distancing measures and suicidal thoughts and behaviors among U.S. adults during the early COVID-19 pandemic. *Suicide & Life-Threatening Behavior* 50(6), 1223–1229.
- Bueno-Notivol J, Gracia-García P, Olaya B, Lasheras I, Lopez-Anton R and Santabarbara J (2021) Prevalence of depression during the COVID-19 outbreak: A meta-analysis of community-based studies. *International Journal of Clinical and Health Psychology* 21(1), 100196.
- Calati R, Ferrari C, Brittner M, Oasi O, Olie E, Carvalho AF and Courtet P (2019) Suicidal thoughts and behaviors and social isolation: A narrative review of the literature. *Journal of Affective Disorders* 245, 653–667.
- Cecchini JA, Carriedo A, Fernandez-Rio J, Mendez-Gimenez A, Gonzalez C, Sanchez-Martinez B and Rodriguez-Gonzalez P (2021) A longitudinal study on depressive symptoms and physical activity during the Spanish lockdown. *International Journal of Clinical and Health Psychology* 21(1), 100200.
- Cenat JM, Noorishad PG, Kokou-Kpolou CK, Dalexis RD, Hajizadeh S, Guerrier M, Clormeus LA, Bukaka J, Birangui JP, Adansikou K, Ndengeyingoma A, Sezibera V, Derivois D and Rousseau C (2021) Prevalence and correlates of depression during the COVID-19 pandemic and the major role of stigmatization in low- and middle-income countries: A multinational cross-sectional study. *Psychiatry Research* 297, 113714.
- Chandola T, Kumari M, Booker CL and Benzeval M (2022) The mental health impact of COVID-19 and lockdown-related stressors among adults in the UK. *Psychological Medicine* 52(14), 2997–3006.
- COVID-19 Mental Disorders Collaborators (2021) Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *The Lancet* 398(10312), 1700–1712.
- Creese B, Khan Z, Henley W, O'Dwyer S, Corbett A, Vasconcelos Da Silva M, Mills K, Wright N, Testad I, Aarstrand D and Ballard C (2021) Loneliness, physical activity and mental health during Covid-19: A longitudinal analysis of depression and anxiety in adults over 50 between 2015 and 2020. *International Psychogeriatrics* 33(5), 505–514.
- Dalgard OS, Dowrick C, Lehtinen V, Vazquez-Barquero JL, Casey P, Wilkinson G, Ayuso-Mateos JL, Page H, Dunn G and The ODIN Group (2006) Negative life events, social support and gender difference in depression. *Social Psychiatry and Psychiatric Epidemiology* 41(6), 444–451.
- Daly M, Sutin AR and Robinson E (2022) Longitudinal changes in mental health and the COVID-19 pandemic: Evidence from the UK Household Longitudinal Study. *Psychological Medicine* 52(13), 2549–2558.
- de la Torre-luque A, de la Fuente J, Prina M, Sanchez-Niubo A, Haro JM and Ayuso-Mateos JL (2019) Long-term trajectories of depressive symptoms in old age: Relationships with sociodemographic and health-related factors. *Journal of Affective Disorders* 246, 329–337.
- de la Torre-luque A, Lara E, de la Fuente J, Rico-Urbe LA, Caballero FF, Lopez-García P, Sanchez-Niubo A, Bobak M, Koskinen S, Haro JM and Ayuso-Mateos JL (2021) Metabolic dysregulation in older adults with depression and loneliness: The ATHLOS study. *Psychoneuroendocrinology* 123, 104918.
- Espinosa-Salido P, Perez Nieto MA, Baca-García E and Provencio Ortega M (2021) Systematic review of the indirect relationships of thwarted belongingness and perceived burdensomeness in suicide. *Clínica y Salud* 32(1), 8.
- Faust JS, Shah SB, Du C, Li SX, Lin Z and Krumholz HM (2021) Suicide deaths during the COVID-19 stay-at-home advisory in Massachusetts, March to May 2020. *JAMA Network Open* 4(1), e2034273.
- Fitzpatrick KM, Harris C and Drawve G (2020) How bad is it? Suicidality in the middle of the COVID-19 pandemic. *Suicide & Life-Threatening Behavior* 50(6), 1241–1249.
- García-Esquinas E, Ortolá R, Gine-Vázquez I, Carnicero JA, Mañas A, Lara E, Alvarez-Bustos A, Vicente-Rodríguez G, Sotos-Prieto M, Olaya B, José García-García F, Gusi N, Banegas JR, Rodríguez-Gómez I, Struijk EA, Martínez-Gómez D, Lana A, María Haro J, Ayuso-Mateos JL, Rodríguez-Mañas L, Ara I, Miret M and Rodríguez-Artalejo F (2021) Changes in health behaviors, mental and physical health among older adults under severe lockdown restrictions during the COVID-19 pandemic in Spain. *International Journal of Environmental Research and Public Health* 18(13), 7067.
- García-Fernandez L, Romero-Ferreiro V, Lopez-Roldan PD, Padilla S and Rodríguez-Jimenez R (2020) Mental health in elderly Spanish people in times of COVID-19 outbreak. *The American Journal of Geriatric Psychiatry* 28(10), 1040–1045.
- Gonzalez-Sanguino C, Ausin B, Castellanos MA, Saiz J and Munoz M (2021) Mental health consequences of the Covid-19 outbreak in Spain. A longitudinal study of the alarm situation and return to the new normality. *Progress in Neuro-Psychopharmacology & Biological Psychiatry* 107, 110219.
- Gratz KL, Tull MT, Richmond JR, Edmonds KA, Scamaldo KM and Rose JP (2020) Thwarted belongingness and perceived burdensomeness explain the associations of COVID-19 social and economic consequences to suicide risk. *Suicide & Life-Threatening Behavior* 50(6), 1140–1148.
- Hawkey LC and Cacioppo JT (2010) Loneliness matters: A theoretical and empirical review of consequences and mechanisms. *Annals of Behavioral Medicine* 40(2), 218–227.
- Hegerl U and Heinz I (2019) Reflections on causes of suicidal behaviour. *Epidemiology and Psychiatric Sciences* 28(5), 469–472.
- Holmes EA, O'Connor RC, Perry VH, Tracey I, Wessely S, Arseneault L, Ballard C, Christensen H, Cohen Silver R, Everall I, Ford T, John A, Kabir T, King K, Madan I, Michie S, Przybylski AK, Shafran R, Sweeney A, Worthman CM, Yardley L, Cowan K, Cope C, Hotopf M and Bullmore E (2020) Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet Psychiatry* 7(6), 547–560.
- Hughes ME, Waite LJ, Hawkey LC and Cacioppo JT (2004) A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging* 26(6), 8.
- Huisman M, Klokgeters SS and Beekman ATF (2017) Successful ageing, depression and resilience research; a call for a priori approaches to investigations of resilience. *Epidemiology and Psychiatric Sciences* 26(6), 574–578.
- Hyland P, Shevlin M, McBride O, Murphy J, Karatzias T, Bentall RP, Martínez A and Vallières F (2020) Anxiety and depression in the Republic of Ireland during the COVID-19 pandemic. *Acta Psychiatrica Scandinavica* 142(3), 249–256.
- Iob E, Steptoe A and Fancourt D (2020) Abuse, self-harm and suicidal ideation in the UK during the COVID-19 pandemic. *The British Journal of Psychiatry* 217(4), 543–546.
- John A, Pirkis J, Gunnell D, Appleby L and Morrissey J (2020) Trends in suicide during the covid-19 pandemic. *The BMJ* 371, m4352.
- Joiner TE, Jr., Brown JS and Wingate LR (2005) The psychology and neurobiology of suicidal behavior. *Annual Review of Psychology* 56, 287–314.
- Justo-Alonso A, García-Dantas A, González-Vázquez A, Sánchez-Martín M and Del Río-Casanova L (2020) How did different generations cope with the COVID-19 pandemic? Early stages of the pandemic in Spain. *Psicothema* 32(4), 11.

- Kantor BN and Kantor J (2020) Mental health outcomes and associations during the COVID-19 pandemic: A cross-sectional population-based study in the United States. *Frontiers in Psychiatry* 11, 569083.
- Kessler RC and Üstün TB (2004) The World Mental Health (WMH) Survey Initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *International Journal of Methods in Psychiatric Research* 13(2), 9.
- Killgore WDS, Taylor EC, Cloonan SA and Dailey NS (2020) Psychological resilience during the COVID-19 lockdown. *Psychiatry Research* 291, 113216.
- Klonsky ED and May AM (2015) The three-step theory (3ST): A new theory of suicide rooted in the “ideation-to-action” framework. *International Journal of Cognitive Therapy* 8(2), 16.
- Kwong ASE, Pearson RM, Adams MJ, Northstone K, Tilling K, Smith D, Fawns-Ritchie C, Bould H, Warne N, Zammit S, Gunnell DJ, Moran PA, Micali N, Reichenberg A, Hickman M, Rai D, Haworth S, Campbell A, Altschul D, Flaig R, McIntosh AM, Lawlor DA, Porteous D and Timpson NJ (2021) Mental health before and during the COVID-19 pandemic in two longitudinal UK population cohorts. *The British Journal of Psychiatry* 218(6), 334–343.
- Landi G, Pakenham KI, Crocetti E, Tossani E and Grandi S (2022) The trajectories of anxiety and depression during the COVID-19 pandemic and the protective role of psychological flexibility: A four-wave longitudinal study. *Journal of Affective Disorders* 307, 69–78.
- Lara E, Caballero FF, Rico-Urbe LA, Olaya B, Haro JM, Ayuso-Mateos JL and Miret M (2019) Are loneliness and social isolation associated with cognitive decline? *International Journal of Geriatric Psychiatry* 34(11), 1613–1622.
- Lara E, Miret M, Olaya B, Caballero FF, Morillo D, Moneta MV, Haro JM and Ayuso-Mateos JL (2022) Cohort profile: The Spanish Longitudinal Study on Ageing and Health (Edad Con Salud). *International Journal of Epidemiology* 51(4), e189–e199.
- Lee SL, Pearce E, Ajnakina O, Johnson S, Lewis G, Mann F, Pitman A, Solmi F, Sommerlad A, Steptoe A, Tymozuk U and Lewis G (2021) The association between loneliness and depressive symptoms among adults aged 50 years and older: A 12-year population-based cohort study. *The Lancet Psychiatry* 8(1), 48–57.
- Lenzo V, Quattropiani MC, Musetti A, Zenesini C, Freda MF, Lemmo D, Vegni E, Borghi L, Plazzi G, Castelnuovo G, Cattivelli R, Saita E and Franceschini C (2020) Resilience contributes to low emotional impact of the COVID-19 outbreak among the general population in Italy. *Frontiers in Psychology* 11, 576485.
- Liem A, Prawira B, Magdalena S, Siandita MJ and Hudiyana J (2022) Predicting self-harm and suicide ideation during the COVID-19 pandemic in Indonesia: A nationwide survey report. *BMC Psychiatry* 22(1), 304.
- Li J, Yang Z, Qiu H, Wang Y, Jian L, Ji J and Li K (2020) Anxiety and depression among general population in China at the peak of the COVID-19 epidemic. *World Psychiatry* 19(2), 249–250.
- Losada-Baltar A, Martinez-Huertas JA, Jimenez-Gonzalo L, Pedrosa-Chaparro MDS, Gallego-Alberto L, Fernandes-Pires J and Marquez-Gonzalez M (2022) Longitudinal correlates of loneliness and psychological distress during the lockdown situation due to COVID-19. Effects of age and self-perceptions of aging. *The Journals of Gerontology Series B, Psychological Sciences and Social Sciences* 77(4), 652–660.
- Luciano JV, Ayuso-Mateos JL, Aguado J, Fernandez A, Serrano-Blanco A, Roca M and Haro JM (2010) The 12-item World Health Organization Disability Assessment Schedule II (WHO-DAS II): A nonparametric item response analysis. *BMC Medical Research Methodology* 10(1), 45.
- Lumley T (2004) Analysis of complex survey samples. *Journal of Statistical Software* 9(1), 19.
- Mayerl H, Stolz E and Freidl W (2022) Trajectories of loneliness, depressive symptoms, and anxiety symptoms during the COVID-19 pandemic in Austria. *Public Health* 212, 10–13.
- McGinty EE, Presskreischer R, Anderson KE, Han H and Barry CL (2020a) Psychological distress and COVID-19-related stressors reported in a longitudinal cohort of US adults in April and July 2020. *JAMA* 324(24), 2555–2557.
- McGinty EE, Presskreischer R, Han H and Barry CL (2020b) Psychological distress and loneliness reported by US adults in 2018 and April 2020. *JAMA* 324(1), 93–94.
- Mortier P, Vilagut G, Ferrer M, Alayo I, Bruffaerts R, Cristóbal-Narváez P, Del Cura-gonzález I, Doménech-Abella J, Felez-Nobrega M, Olaya B, Pijoan JI, Vieta E, Pérez-Solà V, Kessler RC, Haro JM and Alonso J (2021) Thirty-day suicidal thoughts and behaviours in the Spanish adult general population during the first wave of the Spain COVID-19 pandemic. *Epidemiology and Psychiatric Sciences* 30, e19.
- Niedzwiedz CL, Green MJ, Benzeval M, Campbell D, Craig P, Demou E, Leyland A, Pearce A, Thomson R, Whitley E and Katikireddi SV (2021) Mental health and health behaviours before and during the initial phase of the COVID-19 lockdown: Longitudinal analyses of the UK Household Longitudinal Study. *Journal of Epidemiology and Community Health* 75(3), 224–231.
- Novotny JS, Gonzalez-Rivas JP, Kunzova S, Skladana M, Pospisilova A, Polcrova A, Medina-Inojosa JR, Lopez-Jimenez E, Geda YE and Stokin GB (2020) Risk factors underlying COVID-19 lockdown-induced mental distress. *Frontiers in Psychiatry* 11, 603014.
- O'Connor RC, Wetherall K, Cleare S, McClelland H, Melson AJ, Niedzwiedz CL, O'Carroll RE, O'Connor DB, Platt S, Scowcroft E, Watson B, Zorzea T, Ferguson E and Robb KA (2021) Mental health and well-being during the COVID-19 pandemic: Longitudinal analyses of adults in the UK COVID-19 Mental Health & Wellbeing study. *The British Journal of Psychiatry* 218(6), 326–333.
- Palgi Y, Shrira A, Ring L, Bodner E, Avidor S, Bergman Y, Cohen-Fridel S, Keisari S and Hoffman Y (2020) The loneliness pandemic: Loneliness and other concomitants of depression, anxiety and their comorbidity during the COVID-19 outbreak. *Journal of Affective Disorders* 275, 109–111.
- Papadopoulou A, Efstathiou V, Yotsidi V, Pomini V, Michopoulos I, Markopoulou E, Papadopoulou M, Tsigkaropoulou E, Kalemi G, Tournikioti K, Douzenis A and Gournellis R (2021) Suicidal ideation during COVID-19 lockdown in Greece: Prevalence in the community, risk and protective factors. *Psychiatry Research* 297, 113713.
- Pérez S, Masegosa A and Hernández-Espeso N (2021) Levels and variables associated with psychological distress during confinement due to the coronavirus pandemic in a community sample of Spanish adults. *Clinical Psychology & Psychotherapy* 28(3), 606–614.
- Pierce M, Hope H, Ford T, Hatch S, Hotopf M, John A, Kontopantelis E, Webb R, Wessely S, McManus S and Abel KM (2020) Mental health before and during the COVID-19 pandemic: A longitudinal probability sample survey of the UK population. *The Lancet Psychiatry* 7(10), 883–892.
- Pirkis J, Gunnell D, Shin S, Del Pozo-Banos M, Arya V, Aguilar PA, Appleby L, Arafat SMY, Arensman E, Ayuso-Mateos JL, Balhara YPS, Bantjes J, Baran A, Behera C, Bertolote J, Borges G, Bray M, Brečić P, Caine E, Calati R, Carli V, Castelpietra G, Chan LF, Chang SS, Colchester D, Coss-Guzmán M, Crompton D, Ćurković M, Dandona R, De Jaegere E, De Leo D, Deisenhammer EA, Dwyer J, Erlangsen A, Faust JS, Fornaro M, Fortune S, Garrett A, Gentile G, Gerstner R, Gillisen R, Gould M, Gupta SK, Hawton K, Holz F, Kamenshchikov I, Kapur N, Kasal A, Khan M, Kirtley OJ, Knipe D, Kölves K, Kölzer SC, Krivda H, Leske S, Madeddu F, Marshall A, Memon A, Mittendorfer-Rutz E, Nestadt P, Neznanov N, Niederkrotenthaler T, Nielsen E, Nordentoft M, Oberlacher H, O'Connor RC, Papsdorf R, Partonen T, Phillips MR, Platt S, Portzky G, Psota G, Qin P, Radeloff D, Reif A, Reif-Leonhard C, Rezaeian M, Román-Vázquez N, Roskar S, Rozanov V, Sara G, Scavacini K, Schneider B, Semenova N, Sinyor M, Tambuzzi S, Townsend E, Ueda M, Wasserman D, Webb RT, Winkler P, Yip PSE, Zalsman G, Zoja R, John A and Spittal MJ (2022) Suicide numbers during the first 9–15 months of the COVID-19 pandemic compared with pre-existing trends: An interrupted time series analysis in 33 countries. *EClinicalMedicine* 51, 101573.
- Planchuelo-Gomez A, Odrizola-Gonzalez P, Irurtia MJ and de Luis-garcia R (2020) Longitudinal evaluation of the psychological impact of the COVID-19 crisis in Spain. *Journal of Affective Disorders* 277, 842–849.
- Prati G and Mancini AD (2021) The psychological impact of COVID-19 pandemic lockdowns: A review and meta-analysis of longitudinal studies and natural experiments. *Psychological Medicine* 51(2), 201–211.
- Ran L, Wang W, Ai M, Kong Y, Chen J and Kuang L (2020) Psychological resilience, depression, anxiety, and somatization symptoms in response to

- COVID-19: A study of the general population in China at the peak of its epidemic. *Social Science & Medicine* **262**, 113261.
- Rao JNK and Scott AJ** (1984) On chi-squared tests for multiway contingency tables with cell proportions estimated from survey data. *The Annals of Statistics* **12**, 15.
- R Core Team** (2019) R: A language and environment for statistical computing. <https://www.R-project.org/> (accessed 21 January 2021).
- Real Decreto 10/2020** Real Decreto 10/2020, de 29 de marzo, por el que se regula un permiso retribuido recuperable para las personas trabajadoras por cuenta ajena que no presten servicios esenciales, con el fin de reducir la movilidad de la población en el contexto de la lucha contra el COVID-19.
- Real Decreto 463/2020** Real Decreto 463/2020, de 14 de marzo, por el que se declara el estado de alarma para la gestión de la situación de crisis sanitaria ocasionada por el COVID-19.
- Rodríguez-Rey R, Alonso-Tapia J and Hernansaiz-Garrido H** (2016) Reliability and validity of the Brief Resilience Scale (BRS) Spanish version. *Psychological Assessment* **28**(5), e101–e110.
- Rosa L, Godwin HJ, Cortese S and Brandt V** (2022) Predictors of longer-term depression trajectories during the COVID-19 pandemic: A longitudinal study in four UK cohorts. *Evidence Based Mental Health* **25**(4), e3.
- Rossi A, Panzeri A, Pietrabissa G, Manzoni GM, Castelnuovo G and Mannarini S** (2020) The anxiety-buffer hypothesis in the time of COVID-19: When self-esteem protects from the impact of loneliness and fear on anxiety and depression. *Frontiers in Psychology* **11**, 2177.
- Russell D, Turner RJ and Joiner TE** (2009) Physical disability and suicidal ideation: A community-based study of risk/protective factors for suicidal thoughts. *Suicide & Life-Threatening Behavior* **39**(4), 440–451.
- Sheffler JL, Joiner TE and Sachs-Ericsson NJ** (2021) The interpersonal and psychological impacts of COVID-19 on risk for late-life suicide. *The Gerontologist* **61**(1), 23–29.
- Somma A, Krueger RF, Markon KE, Gialdi G, Colanino M, Ferlito D, Liotta C, Frau C and Fossati A** (2021) A longitudinal study on clinically relevant self-reported depression, anxiety and acute stress features among Italian community-dwelling adults during the COVID-19 related lockdown: Evidence of a predictive role for baseline dysfunctional personality dimensions. *Journal of Affective Disorders* **282**, 364–371.
- Spanish Statistical Office** (2021) Deaths according to cause of death – Advance January–May 2019 and 2020. https://www.ine.es/en/prensa/edcm_ene_may_19_20_en.pdf (accessed 18 January 2021).
- Tanaka T and Okamoto S** (2021) Increase in suicide following an initial decline during the COVID-19 pandemic in Japan. *Nature Human Behaviour* **5**(2), 229–238.
- Valiente C, Contreras A, Peinado V, Trucharte A, Martínez AP and Vázquez C** (2021) Psychological adjustment in Spain during the COVID-19 pandemic: Positive and negative mental health outcomes in the general population. *The Spanish Journal of Psychology* **24**, e8.
- van den Brink RHS, Schutter N, Hanssen DJC, Elzinga BM, Rabeling-Keus IM, Stek ML, Comijs HC, Penninx B and Oude Voshaar RC** (2018) Prognostic significance of social network, social support and loneliness for course of major depressive disorder in adulthood and old age. *Epidemiology and Psychiatric Sciences* **27**(3), 266–277.
- van der Velden PG, Contino C, Das M, van Loon P and Bosmans MWG** (2020) Anxiety and depression symptoms, and lack of emotional support among the general population before and during the COVID-19 pandemic. A prospective national study on prevalence and risk factors. *Journal of Affective Disorders* **277**, 540–548.
- van der Velden PG, Hyland P, Contino C, von Gaudecker HM, Muffels R and Das M** (2021) Anxiety and depression symptoms, the recovery from symptoms, and loneliness before and after the COVID-19 outbreak among the general population: Findings from a Dutch population-based longitudinal study. *PLoS One* **16**(1), e0245057.
- Voitsidis P, Nikopoulou VA, Holeva V, Parlapani E, Sereslis K, Tsipropoulou V, Karamouzi P, Giakoulidou A, Tsopaneli N and Diakogiannis I** (2021) The mediating role of fear of COVID-19 in the relationship between intolerance of uncertainty and depression. *Psychology and Psychotherapy* **94**(3), 884–893.
- Wang C, Pan R, Wan X, Tan Y, Xu L, McIntyre RS, Choo FN, Tran B, Ho R, Sharma VK and Ho C** (2020) A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain, Behavior, and Immunity* **87**, 40–48.
- Ward M, Briggs R, McGarrigle CA, De Looze C, O'Halloran AM and Kenny RA** (2023) The bi-directional association between loneliness and depression among older adults from before to during the COVID-19 pandemic. *International Journal of Geriatric Psychiatry* **38**(1), e5856.
- Winkler P, Formanek T, Mlada K, Kagstrom A, Mohrova Z, Mohr P and Csemy L** (2020) Increase in prevalence of current mental disorders in the context of COVID-19: Analysis of repeated nationwide cross-sectional surveys. *Epidemiology and Psychiatric Sciences* **29**, e173.
- World Health Organization** (1993) The ICD-10 Classification of Mental and Behavioural Disorders. Diagnostic Criteria for Research. Geneva: World Health Organization.