

# Individual and social aspects of after-Covid-19 pandemic depression

Pasquale Anselmi, Daiana Colledani, Simone Di Zio, Luigi Fabbris, Egidio Robusto

## 1. Introduction

The Covid-19 pandemic proved to be a social shock. Although its main sanitary effects are going to vanish, many people still struggle to recover their previous normality. All over the world, an over-than-normal incidence of headaches, fatigue, nervousness, and a generalized feeling of bewilderment were found that make it difficult to complete daily tasks. These physical and psychological ailments are sometimes named long-term, or long-Covid effects, not only because they are late consequences of the pandemic, but also because they may last for long.

In this paper, we focus on people's depression. Scholars highlighted signs of mental ailments in people who were infected with the virus, especially among those who showed severe or just temporary inflammation symptoms. Mental ailments were often classified as a post-traumatic stress disorder. Though, other experts observed symptoms such as anxiety, insomnia, and food disturbances also in other people who crossed the pandemic without showing any, or just light sanitary symptoms. Moreover, it is puzzling why so many people showed depressive symptoms even when the pandemic was close to end.

That is why we conducted a social survey on the Italian population to 1) estimate the prevalence of depression feelings among adults; 2) reveal its possible causes; and 3) try to suggest a viable way to get out. The survey was conducted in the second half of 2021 when vaccines had cooled down but not extinguished the infection rate. This suggested that the virus would not definitely vanish even if its effects were "under reasonable control" and normal life could start again.

The research hypotheses of our study were as follows.

H1: *The rate of depressed people in the pandemic time is larger than that reported in the literature for the general Italian population before the pandemic.*

H2: *Depression was related to the disease on people and their families.*

Indeed, psychiatric disturbances have been observed on patients after Covid contagion (Ellul et al., 2020; Pezzini and Padovani, 2020; Iadecola et al., 2020).

H3: *Depression was related to the psychological stress caused by the pandemic.* People who were hospitalised after Covid contagion showed, on top of neuro-physical symptoms, higher levels of post-traumatic stress disorders, anxiety, sleep disturbances, irritability and rarer neuropsychiatric symptoms (Rogers et al., 2020; Mattioli et al., 2021; Mazza et al., 2021; Taquet et al., 2021). We hypothesise that the long lasting pandemic was related to psychological distress and depression also on people uninfected or with lighter contagion symptoms. Studies show that these conditions may come from emotional and mental stress, including: the stigma related to a COVID-19 infection, concerns about infecting other people, the psychological threat of a severe and potentially fatal illness, and social isolation. Also, people who stayed in hospital and in places where they could not interact with others showed higher social isolation and loneliness.

H4: *The pandemic impact was particularly high on population categories that are normally*

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*exposed to depression.* In the following, we test the pandemic effects on females, youngsters and higher educated people.

H5: *Ceteris paribus, depression is lower among people who benefitted of personal and social resources and is higher among those who have faced individual and social burdens.*

## 2. Method

### 2.1. Data and participants

A sample of 817 Italian adults was surveyed through a CAWI – Computer Assisted Web-based Interviewing technique. The data collection lasted from June to November 2021. The period can be considered close to the end of the official pandemic in Italy. The participants were recruited from different Italian regions and their participation in the study was anonymous and voluntary. Participants were approached through mailing lists and social networks. Following a snowball sampling procedure, each participant was asked to invite other persons to fill out the survey. The questionnaire was implemented on the LimeSurvey platform and all items were mandatory so that there were no missing data.

The majority of participants (mean age 38.87,  $SD = 18.87$ ) were females ( $N = 464$ , 56.8%), workers (46.4%), students (44.5%), not occupied (9.1%), and with a medium to high education level (basic education .9%, high school diploma 42.8%, university degree 35.9%, post lauream degree 20.4%).

### 2.2. Measures

All participants answered a questionnaire including the following measures, arranged in seven blocks.

**Y:** The Patient Health questionnaire-9 (PHQ-9; Kroenke et al., 2001). Based on the DSM-IV criteria for major depression, it is one of the most used instruments for screening and diagnosing depression. The PHQ-9 consists of 9 items that evaluate the frequency with which people experienced depression symptoms over the last two weeks (4-point scale from 0 “not at all” to 3 “nearly every day”). The instrument has been validated in several contexts and languages, showing good validity, reliability, and diagnostic accuracy (Costantini et al., 2021). A sum score of 10 or larger is usually taken to be indicative of major depression (Manea et al., 2012), with sensitivity between 0.66 and 0.85, and specificity between 0.79 and 0.90 (Manea et al., 2015)

**X<sub>A</sub>:** Health effects of the pandemic. The block includes the following descriptors: having been infected by Coronavirus ( $X_1$ ), showing psychological ( $X_2$ ) or physical ( $X_3$ ) consequences of contagion.

**X<sub>B</sub>:** Personal resources against social shocks. This block includes: possessing a higher education degree ( $X_4$ ), living as a single ( $X_5$ ), living in a couple ( $X_6$ ), clearness of future vision ( $X_7$ ), and resilience ( $X_8$ ), which is a continuous variable obtained by adding up the responses obtained on a 5-point Likert scale to a set of 9 items related to individual self-effectiveness and resilience. These items were selected from the 25-item Connor-Davidson Resilience Scale (CD-RISC scale; Connor and Davidson, 2003) and translated in Italian by authors.

**X<sub>C</sub>:** Personal or familial problems related to social shocks. This block included: having a pre-existing psychic disease ( $X_8$ ), having worked or learned from remote ( $X_9$ ), belonging to a broken family ( $X_{10}$ ), and being scared for viral infection to themselves ( $X_{11}$ ) or to Italy as a whole ( $X_{12}$ ).

**X<sub>D</sub>:** Social resources to face pandemic effects. In this application, the block includes just one variable: trust in scientists during the pandemic ( $X_{13}$ ).

**X<sub>E</sub>:** Social problems caused by the pandemic. The block contained two variables: income ( $X_{14}$ ) and work ( $X_{15}$ ) during the pandemic.

**Z:** Control variables. This block involved the following variables: Gender=Male ( $Z_1$ ), age ( $Z_2$ : three large classes: till 34, 35-64, and 65 and over), and working as an employee ( $Z_3$ ).

### 2.3. Analytic approach

The relations between the considered variables were explored by estimating a path model. In the analysis, the dependent variable was the dichotomized score at the PHQ-9 test (1 = depression diagnosis, 0 = no diagnosis), the exogenous variables were three control variables (gender, age, occupation; see section 2.1), the first level predictors were the four sets of variables labelled as  $X_B$ ,  $X_C$ ,  $X_D$  and  $X_E$  in Section 2.1, while the second level predictors were the variables included in the block  $X_A$ , being hypothesized to be causally closer to  $Y$ .

The model was run using the maximum likelihood (ML) estimator (logistic regression was applied to estimate the paths linking the binary outcome to its predictors). In the analyses, all the direct paths were estimated, and the significance of direct and indirect effects was evaluated employing bootstrapping procedures (5,000 resamples) and the 95% bias-corrected confidence interval. All analyses were performed using Mplus 7.4 (Muthén and Muthén, 2012)

### 3. Results

The analysis of the collected data is reported in Tables 1 and 2. Table 1 shows how depression was diffused in Italy: at the time of the survey, which can be considered close to the end of the pandemic, the rate was very high: 29.6%. Among the 242 individuals obtaining a score of 10 or larger to the PHQ-9, 18 (7.44%) reported having a psychiatric diagnosis.

Table 2 shows the main relations between the criterion and the  $X_A$  variables, on the one hand, and the other regressors, control variables included, on the other hand. The main results are commented as follows.

**Table 1. Frequency distribution of respondents and depression rates in Italy in the second half of the Coronavirus pandemic by characteristics of Italians**

| <i>Characteristic</i>           | <i>Depression rate (%)</i> | <i>Sample frequency</i> |          |
|---------------------------------|----------------------------|-------------------------|----------|
|                                 |                            | <i>N</i>                | <i>%</i> |
| <i>Overall</i>                  | 29.6                       | 817                     | 100.0    |
| Female                          | 37.9                       | 464                     | 56.8     |
| Age: 18-34                      | 44.4                       | 428                     | 52.4     |
| “ 35-64                         | 14.2                       | 296                     | 36.2     |
| “ 65 or more                    | 10.8                       | 93                      | 11.4     |
| Employee                        | 13.6                       | 272                     | 33.3     |
| Suffered Covid infection        | 33.7                       | 95                      | 11.6     |
| Suffered psychological problems | 55.1                       | 265                     | 32.4     |
| Suffered physical problems      | 49.0                       | 100                     | 12.2     |
| Family: single                  | 30.3                       | 234                     | 28.6     |
| “ marital couple                | 29.1                       | 494                     | 60.5     |
| “ presence of children          | 22.7                       | 331                     | 40.5     |
| “ broken                        | 64.3                       | 14                      | 1.7      |
| Had a psychic disease           | 72.0                       | 25                      | 3.1      |

- First, the model showed to be highly useful in the prediction of the outcome variable ( $R^2 = 0.423$ ,  $p < .001$ ). It means that the selected variables enable to thoroughly predict depression diagnosis according to the results of the PHQ-9 score. The regressors can be classified into four groups, according to their social meaning: 1) variables describing the socio-economic conditions of individuals and families; 2) effects of Covid infection and its consequences; 3) chronic diseases and other problematic conditions of individuals; and 4) peoples' psychological strength.

**Table 2. Estimates and significance of the regression coefficients between  $Y$  and  $X_A$  variables and the other predictors included in the model (\*\* $p. < 0.001$ ; \* $p. < 0.01$ ; \* $p. < 0.05$ ;  $^{\circ} p. < 0.10$ ; NS= Not significant; AIC: 12126; Adjusted BIC: 12453; RMSEA < 0.001)**

| <i>Predictor</i>                         | <i>Y: PHQ</i>        | <i>X<sub>1</sub>: Infect</i> | <i>X<sub>2</sub>: Psychol.</i> | <i>X<sub>3</sub>: Physical</i> |
|--|----------------------|------------------------------|--------------------------------|--------------------------------|
| Z1: Male                                 | -0.06**              | 0.002 <sup>NS</sup>          | -0.094**                       | -0.044 <sup>°</sup>            |
| Z2: Age (class))                         | -0.045**             | -0.023 <sup>°</sup>          | -0.046**                       | -0.008 <sup>NS</sup>           |
| Z3: Working as an employee               | -0.096**             | 0.006 <sup>NS</sup>          | -0.104**                       | -0.040 <sup>NS</sup>           |
| X1: Infected during the pandemic         | 0.075 <sup>°</sup>   | =                            | =                              | =                              |
| X2: Showed psychological consequences    | 0.238***             | =                            | =                              | =                              |
| X3: Showed physical consequences         | 0.039 <sup>NS</sup>  | =                            | =                              | =                              |
| X4: Higher education degree              | -0.052 <sup>°</sup>  | -0.014 <sup>NS</sup>         | -0.026 <sup>NS</sup>           | 0.026 <sup>NS</sup>            |
| X5: Living single                        | -0.142**             | 0.015 <sup>NS</sup>          | -0.169**                       | -0.071*                        |
| X6: Living marital couple                | -0.121**             | -0.030 <sup>NS</sup>         | -0.193***                      | -0.067 <sup>°</sup>            |
| X7: Resilience score                     | 0.013***             | 0.007***                     | -0.005*                        | 0.002 <sup>NS</sup>            |
| X8: Had a psychic disease                | 0.266**              | 0.026 <sup>NS</sup>          | 0.078 <sup>NS</sup>            | 0.093 <sup>NS</sup>            |
| X9: Active in remote learning or working | 0.062 <sup>°</sup>   | 0.020 <sup>NS</sup>          | 0.068 <sup>°</sup>             | 0.036 <sup>NS</sup>            |
| X10: Lived in a broken family            | 0.232*               | -0.064 <sup>NS</sup>         | 0.466***                       | 0.122 <sup>NS</sup>            |
| X11: Feared for his own infection        | -0.059 <sup>NS</sup> | 0.058 <sup>°</sup>           | 0.001 <sup>NS</sup>            | 0.036 <sup>NS</sup>            |
| X12: Feared for infection in Italy       | 0.099**              | -0.064*                      | 0.031 <sup>NS</sup>            | -0.035 <sup>NS</sup>           |
| X13: Trust in scientists                 | -0.059 <sup>°</sup>  | -0.031 <sup>NS</sup>         | 0.078*                         | 0.045 <sup>°</sup>             |
| X14: Income reduced during pandemic      | 0.029 <sup>NS</sup>  | -0.112*                      | 0.004 <sup>NS</sup>            | 0.021 <sup>NS</sup>            |
| X15: Work reduced during pandemic        | -0.095 <sup>°</sup>  | 0.130**                      | 0.044 <sup>NS</sup>            | -0.028 <sup>NS</sup>           |

- Female gender and young age highly predicted depressive symptoms: females, at all ages, are more exposed to depression than males; youth are more exposed to depression than the older population. These aspects are socially relevant but are not new in the literature (Elbay et al, 2020), so we add just marginal comments in the following.
- Possessing a higher education title and belonging to a robust family setup showed to be protective factors against depression. The vast majority of the people involved in the present work had a high educational level. However, the positive role of education against depression has also been supported by other studies involving both high- and low-educated individuals (Bjelland et al., 2008; Chen et al., 2020). Also, having had an active role as a remote worker or remote learner was a protective factor. These results are commonsense because a feeling of strength and the active participation in the mass innovation put to the test during the pandemic showed, in various contexts, a positive effect on people's mental health.
- Though, being single is as significant as living in a couple as depression is concerned and having children is unrelated to depression. This may sound counterintuitive because scholars associated living single with loneliness and then with mental disease risks. Instead, it may be conjectured that the pandemic improved singles' trend to leave in a connected community and this protected them against loneliness and, consequently, depression.
- Symmetrically, bad health and a problematic familial situation are risk factors for depression: people who had a full-blown psychic disease or belonged to a broken family showed significant depression risk. Besides, the percentage of the psychically impaired was about 3% and those belonging to a broken family were 1.7% of the sample, while depressed people were close to 30%. Hence, these problematic groups of people are at top risk of depression but do not compose the depressed mass. In a similar vein, reduction of income and unemployment due to the pandemic are negative conditions but income reduction was not significant and unemployment was negatively related to depressive symptoms. As a whole, these results suggest that cogent sources of such a diffused malaise should be searched by scouting other non-conventional social aspects. Fear of viral infection may be one of them, even though it did not relate to one's own

infection but to that of other Italians. This may mean that depression does not follow worries for an own infection but for the vulnerability threat that the virus can hit anytime, now and in the future. Moreover, it could be observed that the percentage of depressed people (about 30% according to the PHQ-9 score) is much higher than that reported in the literature for the Italian population before the pandemic (i.e., 6%; <https://www.epicentro.iss.it/mentale/epidemiologia-italia>).

- Psychological strength descriptors were resilience attitude and trust in scientists. These indicators and a higher education counterbalanced the risk of depression for the majority of Italians. Resilience, in particular, showed to be the mental habit of people is able to push away the malaise.
- Another relevant outcome corroborates the general feeling stemming from our results that social and psychological aspects neatly overcome the infective ones in determining people's mental disturbances at the end of the pandemic. Having been infected mildly correlated with mental disturbances while the physical consequences are irrelevant. Instead, the new and disconnected time people have passed and they fear could continue in a vague future is the determinant factor of depression.
- We could add that reporting psychological damages is quite the same as reporting depressive symptoms. Indeed, the clinical picture obtained from the parallel analysis of (computed) depression and (self-reported) psychological damages (columns 2 and 4 of Table 2, respectively) shows identical risk and protection sources; even the significance levels of the main variables coincide. Also, the proportion of people reporting psychological damages is just a bit larger than that of depressed individuals, though the correlation between the two variables is 0.387, significant but not so cogent. This means that, in Italy, there still is a diffused malaise that the PHQ depression test was not able to capture.

#### **4. Discussion and conclusion**

In this work, we aimed to estimate the depression rate among the Italians at the end of the Coronavirus pandemic and to highlight the correlates of the depression. We have found a rate of 29.6% depression, which is dramatically high. It is much higher among females, the youth, and broken or unstructured families. Similar elevated depressive symptoms and similar risk groups were measured in many other countries at more or less the same time (Klaser et al., 2021; Taquet et al., 2021; Medda et al., 2022), and after the previous COVID pandemic (see the survey in Vindegaard and Benros, 2020).

Clinical follow-ups show that survivors of COVID-19 appear to be at increased risk of psychiatric sequelae, while a psychiatric diagnosis may be an independent risk factor for the disease (Santomauro et al., 2021). Though, the general population studies show just marginal cases of influence of the disease over mental health.

It is to be mentioned that the depression rate varied over time according to emergency situations. It was lower in the early months of 2020 when the pandemic blew but, hoped it, lasted a few months. If we apply the same rationale, the rate should decrease now that people are less afraid of the virus. Though our data showed that the health threat was important at the beginning of the pandemic, when the Coronavirus busted into people's lives, in the long run, it was something else that caused such a generalized malaise and depression. Maybe, it was the threat of hidden long-run consequences of the disease, the risk the virus would recur at any cold season, the lack of socialization and the loss of the sense of community while keeping physical distancing, the perception that the virus is changeable enough to puzzle for long time scientists and governments, the financial concerns for future employment and financial defaults, a never-ending emergency, or a combination of all these sources that may have grown people's insecurity and rendered ineffective their psychological resources. It is certain that, either one was affected by the virus or not, the pandemic has affected everybody in some way.

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