BJPsych Open (2021)
7, e59, 1–7. doi: 10.1192/bjo.2021.17

# Psychological distress in the Greek general population during the first COVID-19 lockdown

Katerina Karaivazoglou, Georgia Konstantopoulou, Maria Kalogeropoulou, Theodoros Iliou, Theofanis Vorvolakos, Konstantinos Assimakopoulos, Philippos Gourzis and Panagiotis Alexopoulos

**Background**

SARS-CoV-2 has rapidly spread worldwide, threatening public health and financial and social life.

**Aims**

The current study's aim was to determine the prevalence of psychological distress and post-traumatic stress symptoms in the Greek population during the first COVID-19 lockdown, and to detect potential correlates.

**Method**

An anonymous online survey was conducted between 10 April and 4 May 2020, to collect information regarding people's psychological functioning and COVID-19-related perceptions.

**Results**

A total of 1443 individuals completed the survey; 293 (20%) reported clinically significant anxiety symptoms, 188 (12.9%) reported clinically significant depressive symptoms and 506 (36.4%) suffered from definite post-traumatic stress disorder. Anxiety symptoms were independently associated with female gender ($\beta = 1.281$, 95% CI 0.808–1.755, $P < 0.001$), educational level ($\beta = -1.570$, 95% CI −2.546 to −0.595, $P = 0.002$), perceived severity ($\beta = -1.745$, 95% CI −3.146 to −0.344, $P = 0.015$) and COVID-19-related worry ($\beta = 7.633$, 95% CI 6.206–9.060, $P < 0.001$). Depressive symptoms were strongly correlated with educational level ($\beta = -1.298$, 95% CI −2.220 to −0.377, $P = 0.006$), perceived severity ($\beta = -1.331$, 95% CI −2.579 to −0.082, $P = 0.037$) and COVID-19-related worry ($\beta = 4.102$, 95% CI 2.769–5.436, $P < 0.001$). Finally, post-traumatic stress symptoms were linked to female gender ($\beta = 6.451$, 95% CI 4.602–8.299, $P < 0.001$), educational level ($\beta = -5.737$, 95% CI −9.479 to −1.996, $P = 0.003$), psychiatric history ($\beta = -4.028$, 95% CI −6.274 to −1.782, $P < 0.001$) and COVID-19-related worry ($\beta = 23.865$, 95% CI 18.201–29.530, $P < 0.001$).

**Conclusions**

A significant percentage of the population reported clinically important anxiety, depressive and post-traumatic stress symptoms. Women, less-educated individuals and people with a psychiatric history appeared more vulnerable to the pandemic's psychological impact.

**Keywords**

COVID-19; psychological distress; post-traumatic stress; lockdown measures.



The dawn of 2020 found humanity struggling to cope with the emergence of a new coronavirus that rapidly spread around the globe, dramatically challenging healthcare resources, public health policies and eventually humankind's resilience from a physical, financial, cultural and psychological perspective. At the time of writing, there have been over 46 million confirmed cases of COVID-19 and over 1.2 million people have died from the infection.[1] Although human history is full of pandemic examples that caused great demographic and societal shifts worldwide, the high transmissibility and lack of effective prevention and treatment for COVID-19 has largely blindsided scientists, policy makers and governments, and led most countries to apply strict lockdown measures to prevent viral spread and protect public health.[2] Apart from the virus's morbid effects, especially for vulnerable populations including the elderly and those who are immunocompromised or with chronic disease, there has been great public debate regarding the direct and indirect effects of the pandemic on people's psychological health and quality of life.[3,4] Social distancing, school closure and general lockdown has caused a great strain on financial and social life, and individuals' psychological well-being. Contrary to the citizens of the Far East, Western societies were particularly unfamiliar and unprepared for the dramatic changes imposed by the viral threat, including restriction of social contacts and use of personal protective measures (masks and gloves) in all indoors activities. Research across a wide range of ethnic backgrounds has shown that during the first pandemic wave, a great percentage of individuals experienced intense stress reactions and increased levels of anxiety and depression symptoms.[5–7]

According to a recent review, COVID-19-related psychological responses may include uncontrolled fear, pervasive anxiety, frustration, boredom and disabling loneliness, and are associated with quality of life impairment, which may lead to increased prevalence of anxiety, post-traumatic stress and depressive disorders.[4] Theoretical formulations and empirical data have shown that disease-related perceptions may strongly influence psychological and behavioural responses, including stress reactions and adherence to protective measures.[8] An earlier review showed that greater levels of perceived disease susceptibility and disease severity, and higher perceived efficacy of precautionary measures, predict increased adherence to protective behaviours, including personal hygiene, mask wearing, home disinfection, social distancing and vaccination.[9] According to earlier studies in Asian populations,[10,11] increased anxiety levels represented an additional factor that was strongly associated with the degree individuals adopt protective measures; however, in a recent survey focussing on the COVID-19 pandemic, adherence to protective measures was associated with fewer mental health symptoms.[7] In this context, the aim of the current study was to determine the prevalence of psychological distress and post-traumatic stress symptoms in the Greek general population during the first COVID-19 lockdown, and to detect potential demographic, cognitive and behavioural correlates.

## Method

The present cross-sectional study was a wide-scale, anonymous online survey designed and conducted by the Department of Psychiatry of the University Hospital of Patras, with the collaboration of the Special Office for Health Consulting Services and the Faculty of Education and Social Work, School of Humanities and Social Sciences, University of Patras; the Medical Informatics Laboratory, Faculty of Medicine, School of Health Sciences, Democritus University of Thrace; and the Department of Psychiatry, Democritus University of Thrace. The survey questionnaire was prepared in an online format with Google Form, and was distributed through social media and a number of press releases. The study was conducted from 10 April to 4 May 2020, a period during which the whole country was under strict lockdown measures in an attempt to control virus transmission. The study protocol conformed to the principles of the Helsinki Declaration, and it was approved by the Institutional Review Board of the University Hospital of Patras (approval number 162/27.04.2020).

### Instruments

The online survey included a brief description of the study's aim and theoretical background, and the declarations of anonymity, confidentiality and the voluntary nature of participation and a questionnaire encompassing the following domains: (a) sociodemographic and medical history data; (b) a set of questions assessing COVID-19-related beliefs and behaviours derived from the Standard Questionnaire on Risk Perception of an infectious disease outbreak, adapted for the COVID-19 pandemic according to the Effective Communication in Outbreak Management instructions;[12] (c) the Impact of Event Scale–Revised (IES-R)[13,14] and (d) the Hospital Anxiety and Depression Scale (HADS).[15,16] All participants were asked to confirm their willingness to participate voluntarily by answering a yes/no question.

COVID-19-related beliefs and behaviours were evaluated with a set of questions derived from the Standard Questionnaire on Risk Perception of an infectious disease outbreak. This instrument contains example questions for public surveys on risk perception of an outbreak of an infectious disease.[12] In the present investigation, we included questions assessing perception of disease severity, perception of disease susceptibility and disease-related concern, perception of efficacy and adherence to preventive measures. Questions were translated from English to Greek by two independent translators, and a team of experienced researchers reviewed the translations and yielded the final version of the questions that were eventually included in the survey.

Post-traumatic stress symptoms related to the COVID-19 pandemic were assessed with the use of the IES-R, which is a 22-item scale.[13] Respondents were asked to indicate how much they were distressed or bothered during the past week by each 'difficulty' listed, in regards with the pandemic outbreak. Each item is rated on a five-point scale ranging from zero ('not at all') to four ('extremely'). The IES-R yields a total score (ranging from 0 to 88) and subscale scores can also be calculated for the intrusion, avoidance and hyperarousal subscales. Cut-off scores for the detection of partial, probable and definite post-traumatic stress disorder (PTSD) were set at 24, 33 and 37, respectively.[13,14]

Psychological functioning was evaluated by the validated Greek version of the HADS, which comprises seven items for anxiety and seven items for depression. Each item is rated on a four-point scale (0–3) and each subscale is scored from 0 to 21.[15,16] Higher scores indicate greater symptom severity. We used a cut-off score of 11 to detect clinically significant anxiety and depression symptoms, to identify individuals at a significant risk of suffering from an anxiety or depressive disorder, based on the instructions of the initial validation study.[15] According to this cut-off score, subsyndromal anxiety or depression symptoms (HADS score 8–10) were not considered clinically significant.

### Statistical analysis

Statistical analysis was performed with the SPSS package for Windows (release 22.0). Numerical data were expressed as medians and interquartile ranges, and categorical data as counts and percentages. All variables were tested for normal distribution by the Kolmogorov–Smirnov test. First, we computed Spearman's correlations for continuous variables and Mann-Whitney *U*-test or Kruskal–Wallis test for categorical variables, to assess associations between HADS and IES-R scores, demographic and medical history data, and COVID-19-related beliefs. Subsequently, all variables who proved to be significantly associated with anxiety, depression and post-traumatic stress symptoms scores entered three separate multivariable linear regression analyses, using HADS anxiety score, HADS depression score and IES-R total score as the dependent variable on each predictive model. For predictors who were not continuous or dichotomous, we used 'dummy' coding to create a set of separate binary variables that entered the regression analysis. Collinearity between independent variables was tested based on variance inflation factors and tolerances for individual variables.

## Results

In total, 1468 individuals accessed the questionnaire link and 1443 (98.3%) completed the survey; 391 (27.1%) men responded to the online survey and answered the questionnaire. Participants' demographic and medical history information are presented in Table 1. Based on HADS scores, 293 (20%) individuals reported clinically significant anxiety symptoms and 188 (12.9%) individuals reported clinically significant depressive symptoms. According to the IES-R scores, 272 (19.6%) individuals suffered from partial COVID-19-related PTSD, 121 (8.7%) individuals suffered from probable COVID-19-related PTSD and 506 (36.4%) individuals suffered from definite COVD19-related PTSD. Participants' psychological burden is depicted in Supplementary Table 2 available at https://doi.org/10.1192/bjo.2021.17. A total of 63.4% of responders believed that COVID-19 is a severe infection, and 54.8% would consider their medical condition as serious if infected with SARS-CoV-2. Further, 70.1% of participants strongly believed that they would get infected without the protective measures, 89.3% considered the efficacy of protective measures as high and 98.3% complied to the protective measures. Finally, 36.2% of the sample believed that it was highly possible to get infected by SARS-CoV-2 and 57.6% expressed significant worry about getting infected. Supplementary Table 3 presents participants' COVID-19-related beliefs.

In simple correlational analysis, anxiety symptoms were associated with female gender ($P < 0.001$), lower educational level ($P = 0.024$), a history of psychiatric disease ($P = 0.019$), increased perceived severity of the disease (0.022), increased perceived severity of personal situation in case of COVID-19 infection ($P < 0.001$), increased perceived infection risk ($P < 0.001$), increased COVID-19-related worry ($P < 0.001$) and increased adherence to protective measures ($P = 0.026$). Likewise, depressive symptoms were correlated with female gender ($P = 0.009$), lower educational level ($P = 0.049$), family status ($P = 0.005$), comorbid chronic physical disease ($P = 0.013$), increased perceived severity of personal condition in case of COVID-19 infection ($P < 0.001$), increased perceived infection risk ($P = 0.002$), increased COVID-19-related worry ($P < 0.001$) and increased adherence to protective measures ($P = 0.019$).

**Table 1** Background characteristics

| Characteristic | *n* (%), *N* = 1468 |
|---|---|
| Gender, male | 391 (27.1) |
| Age group, years | |
| 18–30 | 417 (28.8) |
| 31–40 | 304 (21.0) |
| 41–50 | 399 (27.6) |
| 51–60 | 247 (17.1) |
| 61–70 | 64 (4.4) |
| ≥70 | 16 (1.1) |
| Educational level | |
| Secondary education | 71 (5.0) |
| University degree | 419 (29.5) |
| Postgraduate degree | 551 (38.9) |
| PhD | 304 (21.4) |
| Other | 73 (5.1) |
| Residence (nomenclature of territorial units for statistics) | |
| Attica | 258 (17.9) |
| Aegean/Crete | 53 (3.7) |
| Northern Greece | 202 (14.0) |
| Central Greece | 930 (64.4) |
| Family status | |
| Single | 660 (45.8) |
| Married | 645 (44.7) |
| Widowed | 16 (1.1) |
| Divorced | 121 (8.4) |
| Chronic physical disease, yes | 434 (30.1) |
| Current psychiatric disease, yes | 150 (10.4) |
| History of psychiatric disease, yes | 219 (15.2) |

COVID-19-related post-traumatic stress symptoms were significantly associated with female gender ($P < 0.001$), lower educational level ($P = 0.011$), a history of psychiatric disease ($P = 0.001$), increased perceived severity of the disease ($P < 0.001$), increased perceived severity of personal condition in case of COVID-19 infection ($P < 0.001$), increased perceived infection risk ($P < 0.001$), increased COVID-19-related worry ($P < 0.001$), increased perceived infection risk without protective measures ($P = 0.006$), increased perceived efficacy of protective measures ($P = 0.016$) and increased adherence to protective measures ($P = 0.001$). Table 2 includes all associations between anxiety, depression and COVID-19-related post-traumatic stress symptoms scores, background characteristics and COVID-19-related beliefs.

In multivariate linear regression analysis, female gender ($P < 0.001$); postgraduate degree ($P = 0.002$) and PhD degree ($P = 0.002$); increased perceived severity of personal condition in case of COVID-19 ($P = 0.015$); and slight worry ($P = 0.003$), enough worry ($P < 0.001$) and great worry ($P < 0.001$) about COVID-19 emerged as significant predictors of anxiety levels, and accounted for 20.2% of the variance in anxiety scores. In a similar vein, postgraduate degree ($P = 0.001$) and PhD ($P = 0.006$) degree, married ($P = 0.024$) and divorced ($P = 0.028$) family status, enough ($P = 0.019$) and great (<0.001) worry about COVID-19, and levels two to four of perceived severity of personal situation in case of COVID-19 infection above the level of minimal severity ($P = 0.049$, $P = 0.018$ and $P = 0.037$) remained as independent predictors of depression levels, and accounted for 10.4% of the variance in depression scores. Likewise, female gender ($P < 0.001$); postgraduate degree ($P = 0.003$) and PhD degree ($P = 0.003$); a history of psychiatric treatment ($P < 0.001$); slight ($P = 0.007$), enough ($P < 0.001$) or great ($P < 0.001$) COVID-19-related worry; and adherence to protective measures ($P = 0.049$) independently predicted COVID-19-related post-traumatic stress symptoms, and explained 20.6% of the variance in IES-R total score. Tables 3–5 include all potential predictors of anxiety, depression and COVID-19-related post-traumatic stress symptom scores.

## Discussion

In the current study, a significant percentage of the population reported clinically important anxiety and depressive symptoms, whereas >45% suffered from clinically significant COVID-19-related PTSD symptoms during the lockdown measures. The vast majority of participants adhered to protective measures during the lockdown period and considered COVID-19 a serious, threatening, worrisome condition with a high possibility of transmission, especially without the application of protective measures. In addition, anxiety levels were strongly linked to female gender, educational level and increased perceived severity and worry about COVID-19, whereas depression levels were correlated with educational level, family status and increased perceived severity of personal situation in case of COVID-19 infection. Moreover, the direct psychological impact of the pandemic, as measured by COVID-19-related post-traumatic stress symptoms, was strongly associated with female gender, lower educational level, the presence of psychiatric disease history, the degree of COVID-19-related worry and adherence to protective measures. In contrast, chronic physical disease history, perceived infection risk and perceived efficacy of protective measures failed to independently predict participants' psychological burden.

The high prevalence of PTSD, anxiety and depression symptoms reported in the current study corroborate previous research focussing on the psychological impact of the COVID-19 pandemic. Various studies from a wide range of ethnic and sociocultural backgrounds have shown that during the first wave of the pandemic, people experienced increased levels of anxiety, depression, post-traumatic stress, general psychological distress and insomnia.[3] According to a recent systematic review and meta-analysis, anxiety prevalence ranged between 8 and 55%, whereas depression prevalence ranged between 10 and 60%. Moreover, clinically significant post-traumatic symptoms were present in 30–35% of individuals.[17,18] According to our findings, the Greek population responded to the first wave of the COVID-19 pandemic and the lockdown measures mostly with a post-traumatic stress reaction, encompassing symptoms of intrusion, avoidance and hyperarousal and, to a lesser extent, with anxiety and depressive symptoms. Similar results have been reported by Wang et al,[7] which showed that the prevalence of COVID-19-related post-traumatic stress symptoms was higher than the prevalence of depression and anxiety. According to recent population studies,[17,19] COVID-19 can be considered a life-threatening disease which might cause PTSD symptoms. In this context, the outbreak of the pandemic in Greece and the accompanying lockdown measures probably acted as an acute psychological shock, which unexpectedly disrupted normal living, closely resembling the effect of acute psychological trauma. Earlier research focussing on epidemics showed that quarantine measures were associated with a high incidence of PTSD, similar to the incidence of PTSD symptoms following natural disasters or terrorist attacks.[20,21] Likewise, the COVID-19 threat and imposed lockdown measures have been associated with an increased psychological impact on the general population.[22]

Another important finding of the present study was that the Greek general population reported increased rates of high perceived COVID-19 severity, infection risk and efficacy of protective measures, similar to those reported by a recent Chinese study.[23] In line with that, another large-scale study across three European countries (Germany, Italy and the Netherlands) revealed particularly high levels of perceived effectiveness of protective measures.[24] In contrast, according to an online survey, Australians perceived the COVID-19 pandemic as less severe, themselves as less vulnerable to get infected and protective measures as less effective.[25] In addition,

**Table 2** Associations between HADS scores, background characteristics and COVID-19-related beliefs

| | HADS anxiety | | HADS depression | | IES-R total | |
|---|---|---|---|---|---|---|
| | Median (IQR) | *P*-value | Median (IQR) | *P*-value | Median (IQR) | *P*-value |
| Gender | | <0.001* | | 0.009* | | <0.001* |
| Male | 5.0 (2.0–8.0) | | 5.0 (3.0–8.0) | | 24 (12.0–36.0) | |
| Female | 7.0 (4.0–10.0) | | 6.0 (3.0–9.0) | | 33 (21–46) | |
| Age group, years | | 0.907 | | 0.667 | | 0.728 |
| 18–30 | 6.0 (4.0–10.0) | | 5.0 (3.0–8.0) | | 31 (19.0–44.0) | |
| 31–40 | 6.0 (3.0–10.0) | | 6.0 (3.0–8.0) | | 30 (19.0–44.0) | |
| 41–50 | 6.0 (3.0–9.0) | | 6.0 (3.0–9.0) | | 30 (19.0–43.0) | |
| 51–60 | 6.0 (3.0–10.0) | | 6.0 (3.0–9.0) | | 29 (17.0–42.0) | |
| 61–70 | 6.0 (3.0–10.0) | | 6.0 (3.3–8.8) | | 28 (18.8–46.0) | |
| ≥70 | 7.0 (1.0–10.5) | | 6.5 (2.8–8.0) | | 25.5 (12.0–45.3) | |
| Educational level | | 0.024* | | 0.049* | | 0.011* |
| Secondary education | 6.0 (3.0–10.0) | | 6.0 (3.0–9.0) | | 30 (19.0–44.0) | |
| University degree | 6.0 (4.0–10.0) | | 6.0 (3.0–8.0) | | 32 (20.0–44.8) | |
| Postgraduate degree | 6.0 (3.0–9.0) | | 6.0 (3.0–8.0) | | 29.5 (18.0–42.0) | |
| PhD | 4.0 (2.0–8.0) | | 5.0 (2.0–8.0) | | 23 (12.5–37.0) | |
| Residence (NUTS) | | 0.692 | | 0.243 | | 0.478 |
| Attica | 6.0 (4.0–9.0) | | 5.0 (3.0–8.0) | | 29 (19.0–42.0) | |
| Aegean/Crete | 6.0 (2.5–9.0) | | 5.0 (3.0–9.0) | | 33 (22.5–46.3) | |
| Northern Greece | 6.0 (3.0–10.0) | | 6.0 (3.0–9.0) | | 29 (17.0–42.0) | |
| Central Greece | 6.0 (3.0–10.0) | | 6.0 (3.0–9.0) | | 30 (19.0–44.0) | |
| Family status | | 0.367 | | 0.005* | | 0.939 |
| Single | 6.0 (3.0–9.0) | | 5.0 (3.0–8.0) | | 30 (18.0–44.0) | |
| Married | 6.0 (4.0–10.0) | | 6.0 (3.0–9.0) | | 30 (18.3–43.8) | |
| Widowed | 6.0 (2.3–9.3) | | 6.0 (5.3–7.8) | | 33.5 (21.5–46.5) | |
| Divorced | 6.0 (3.0–10.0) | | 6.0 (3.0–10.0) | | 27.5 (20.0–44.3) | |
| Chronic physical disease | | 0.350 | | 0.013* | | 0.233 |
| Yes | 6.0 (3.0–10.0) | | 6.0 (3.0–9.0) | | 31 (18.0–45.8) | |
| No | 6.0 (3.0–9.0) | | 5.0 (3.0–8.0) | | 30 (19.0–43.0) | |
| Current psychiatric disease | | 0.064 | | 0.331 | | 0.094 |
| Yes | 7.0 (3.8–11.0) | | 5.5 (3.0–9.0) | | 33 (18.0–49.0) | |
| No | 6.0 (3.0–10.0) | | 6.0 (3.0–8.0) | | 30 (19.0–43.0) | |
| History of psychiatric disease | | 0.019* | | 0.093 | | 0.001* |
| Yes | 7.0 (3.0–11.0) | | 6.0 (3.0–9.0) | | 35 (21.0–48.0) | |
| No | 6.0 (3.0–9.0) | | 6.0 (3.0–8.0) | | 29 (18.0–43.0) | |
| Perceived severity of COVID-19 | | 0.022* | | 0.279 | | <0.001* |
| Level 1 | 3.0 (0.0–10.8) | | 4.5 (2.0–9.0) | | 11.5 (0.25–23.0) | |
| Level 2 | 5.0 (2.0–8.0) | | 5.0 (3.0–8.0) | | 24 (13.0–36.5) | |
| Level 3 | 6.0 (4.0–9.0) | | 5.0 (3.0–8.0) | | 30 (19.0–44.0) | |
| Level 4 | 6.0 (3.0–9.0) | | 6.0 (3.0–8.8) | | 30 (20.0–43.0) | |
| Level 5 | 7.0 (3.0–10.0) | | 6.0 (3.0–9.0) | | 32 (20.0–46.0) | |
| Perceived personal situation in case of COVID-19 | | <0.001* | | <0.001* | | <0.001* |
| Level 1 | 4.0 (2.0–8.5) | | 5.0 (3.0–9.0) | | 20 (5.0–35.0) | |
| Level 2 | 6.0 (2.0–9.0) | | 4.0 (3.0–8.0) | | 27 (15.0–39.0) | |
| Level 3 | 5.0 (3.0–8.0) | | 5.0 (3.0–8.0) | | 28 (17.0–40.0) | |
| Level 4 | 6.0 (3.3–10.0) | | 6.0 (3.0–8.0) | | 31 (20.0–44.0) | |
| Level 5 | 7.0 (4.0–11.0) | | 7.0 (4.0–10.0) | | 35 (23.0–48.0) | |
| Perceived possibility of infection without protective measures | | 0.329 | | 0.334 | | 0.006* |
| Definitely no | 4.0 (0.3–10.8) | | 2.5 (1.0–8.8) | | 18 (0.0–38.0) | |
| Probably no | 4.0 (3.0–9.0) | | 5.0 (3.0–9.0) | | 24 (14.3–41.0) | |
| Maybe no-maybe yes | 6.0 (3.0–9.0) | | 6.0 (3.0–8.0) | | 29 (17.0–40.0) | |
| Probably yes | 6.0 (3.0–10.0) | | 6.0 (3.0–8.0) | | 31 (20.0–44.0) | |
| Definitely | 6.0 (3.0–11.0) | | 6.0 (3.0–9.0) | | 31 (19.0–48.0) | |
| Perceived possibility of COVID-19 infection | | <0.001* | | 0.002* | | <0.001* |
| Very low | 4.0 (2.0–8.0) | | 4.0 (1.0–7.0) | | 24 (12.5–29.0) | |
| Low | 5.0 (2.0–9.0) | | 5.0 (3.0–8.0) | | 27 (14.0–38.0) | |
| Neither low nor high | 6.0 (3.0–9.0) | | 5.5 (3.0–8.0) | | 30 (18.0–42.0) | |
| High | 7.0 (4.0–10.0) | | 6.0 (3.0–9.0) | | 33 (20.5–47.0) | |
| Very high | 7.5 (4.0–12.0) | | 7.0 (4.0–9.0) | | 34.5 (23.8–50.3) | |
| Perceived worry about COVID-19 | | <0.001* | | <0.001* | | <0.001* |
| Not all | 3.0 (1.0–6.0) | | 4.0 (1.8–7.3) | | 18 (8.0–29.0) | |
| No worry | 4.0 (2.0–6.8) | | 4.0 (2.0–7.0) | | 22 (13.0–34.0) | |
| Slightly | 5.0 (2.8–8.0) | | 5.0 (3.0–8.0) | | 27 (17.0–38.0) | |
| Enough | 7.0 (4.0–10.0) | | 6.0 (3.0–8.0) | | 32 (21.0–45.0) | |
| Great | 11.0 (8.0–14.8) | | 9.0 (6.0–11.8) | | 47 (37.0–56.3) | |
| Perceived efficacy of protective measures | | 0.083 | | 0.068 | | 0.016* |
| Definitely not | 3.0 (0.5–7.5) | | 4.0 (1.5–7.5) | | 14 (4.0–25.5) | |
| Probably not | 8.0 (4.5–13.5) | | 5.0 (3.0–9.5) | | 36 (24.0–57.0) | |
| Maybe no maybe yes | 6.0 (3.0–10.5) | | 6.0 (3.0–10.0) | | 32 (20.0–47.5) | |
| Probably yes | 6.0 (3.0–9.0) | | 6.0 (3.0–9.0) | | 29 (18.0–44.0) | |
| Definitely | 6.0 (3.0–10.0) | | 5.0 (3.0–8.0) | | 30 (19.0–43.3) | |

(*Continued*)

**Table 2** (*Continued*)

| | HADS anxiety | | HADS depression | | IES-R total | |
|---|---|---|---|---|---|---|
| | Median (IQR) | *P*-value | Median (IQR) | *P*-value | Median (IQR) | *P*-value |
| Adherence to protective measures | | 0.026* | | 0.019* | | 0.001* |
| Yes | 6.0 (3.0–10.0) | | 6.0 (3.0–8.0) | | 30 (19.0–44.0) | |
| No | 4.0 (1.0–7.0) | | 3.0 (1.0–7.5) | | 20 (7.5–31.5) | |

HADS, Hospital Anxiety and Depression Scale; IES-R, Impact of Event Scale–Revised; IQR, interquartile range; NUTS, nomenclature of territorial units for statistics; PhD, Doctor of philosophy; COVID-19, Coronavirus disease 2019.
* Significance level was set at $P < 0.05$.

Lee and You[26] reported low levels of perceived susceptibility to the SARS-CoV-2 infection in a large Korean sample. The aforementioned discrepancies in COVID-19-related perceptions might be attributed to cultural, societal and even political factors. During the study period, there was a wide-scale media coverage of the pandemic and an ongoing public awareness campaign regarding its effects, which may have contributed to people's increased awareness about the infection's consequences and the almost universal adherence to the protective measures. In addition, the detrimental effects of the pandemic in countries where a large number of Greeks live and work (Italy, England, USA), probably strongly shaped COVID-19-related public opinion, and convinced a large proportion of the population to conform to health authorities' instructions and the recommended restrictive measures.

Our study also revealed that certain COVID-19-related perceptions were significantly associated with the emergence of psychological dysfunction. More specifically, the degree of COVID-19-related worry and the perceived severity of the infection were correlated with greater psychological distress, suggesting that during the first pandemic wave, increased disease-related awareness was linked to a heightened emotional reaction and a more severe post-traumatic stress response. The cross-sectional design of the current investigation did not allow us to draw safe conclusions regarding the direction of the observed associations, and further prospective research is needed to clarify whether people who perceived COVID-19 as a serious threat were more likely to experience psychiatric symptoms or whether people with a psychiatric vulnerability were more prone to feel worried and threatened by the pandemic. Nonetheless, adequate information around the pandemic and its severity, although disturbing and psychologically challenging, may contribute to a greater adherence to the recommended measures and eventually lead to more alert and responsible public health attitudes.[7,27]

As expected, female gender and lower educational level were strongly associated with increased psychological dysfunction. Women appear more vulnerable to the emergence of anxiety, depression and PTSD, and research on COVID-19 has repeatedly shown that the current pandemic is having a greater impact on women's mental health.[3,7,28] School closure was one of the initial measures undertaken by the government during the first pandemic wave, and in most households, mothers probably experienced

**Table 3** Predictors of anxiety scores

| | Multivariate linear regression analysis | | |
|---|---|---|---|
| | $\beta$ coefficient | CI for exp($\beta$) | *P*-value |
| Gender (female) | 1.281 | 0.808–1.755 | <0.001* |
| Education | | | |
| University degree | −0.341 | −0.819 to 0.137 | 0.162 |
| Postgraduate degree | −0.928 | −1.501 to −0.354 | 0.002* |
| PhD degree | −1.570 | −2.546 to −0.595 | 0.002* |
| History of psychiatric treatment (no) | −0.816 | −1.387 to −0.244 | 0.005* |
| Perceived severity of COVID-19 infection | | | |
| Level 2 | −0.389 | −2.880 to 2.102 | 0.759 |
| Level 3 | −0.076 | −2.488 to 2.335 | 0.951 |
| Level 4 | −0.493 | −2.931 to 1.944 | 0.691 |
| Level 5 | −0.950 | −3.392 to 1.492 | 0.446 |
| Perceived personal situation in case of COVID-19 | | | |
| Level of severity 2 | −0.938 | −2.374 to 0.499 | 0.201 |
| Level of severity 3 | −1.745 | −3.146 to −0.344 | 0.015* |
| Level of severity 4 | −1.298 | −2.730 to 0.133 | 0.075 |
| Level of severity 5 | −1.339 | −2.810 to 0.133 | 0.075 |
| Possibility of COVID-19 infection | | | |
| Low | 0.417 | −0.911 to 1.744 | 0.538 |
| Neither low nor high | 0.048 | −1.193 to 1.288 | 0.940 |
| High | 0.189 | −1.084 to 1.462 | 0.771 |
| Very high | −0.270 | −1.828 to 1.289 | 0.734 |
| Worry about COVID-19 infection | | | |
| No worry | 1.082 | −0.184 to 2.349 | 0.094 |
| Slight worry | 1.919 | 0.671–3.166 | 0.003* |
| Enough worry | 3.565 | 2.308–4.823 | <0.001* |
| Great worry | 7.633 | 6.206–9.060 | <0.001* |
| Adherence to protective measures | −0.872 | −2.547 to −0.803 | 0.307 |
| Regression statistics | $F = 16.311$, d.f. = 22, $P < 0.001$ $R^2 = 0.202$ | | |

* Significance level was set at $P < 0.05$.

**Table 4** Predictors of depression scores

| | Multivariate linear regression analysis | | |
|---|---|---|---|
| | $\beta$ coefficient | CI for exp($\beta$) | *P*-value |
| Gender (female) | −0.340 | −0.104 to 0.784 | 0.133 |
| Education | | | |
| University degree | −0.411 | −0.861 to 0.039 | 0.073 |
| Postgraduate degree | −0.915 | −1.455 to −0.376 | 0.001* |
| PhD degree | −1.298 | −2.220 to −0.377 | 0.006 |
| Family status | | | |
| Married | 0.497 | 0.065–0.930 | 0.024* |
| Widowed | 0.382 | −1.482 to 2.246 | 0.688 |
| Divorced | 0.826 | 0.087–1.566 | 0.028* |
| History of chronic physical disease (no) | −0.111 | −0.550 to 0.327 | 0.618 |
| Perceived personal situation in case of COVID-19 infection | | | |
| Level of severity 2 | −1.281 | −2.557 to −0.004 | 0.049* |
| Level of severity 3 | −1.475 | −2.702 to −0.248 | 0.018* |
| Level of severity 4 | −1.331 | −2.579 to −0.082 | 0.037* |
| Level of severity 5 | −1.178 | −2.461 to 0.106 | 0.072 |
| Possibility of COVID-19 infection | | | |
| Low | 0.634 | −0.603 to 1.870 | 0.315 |
| Neither low nor high | 0.694 | −0.465 to 1.853 | 0.240 |
| High | 0.788 | −0.405 to 1.981 | 0.196 |
| Very high | 0.307 | −1.157 to 1.770 | 0.681 |
| Worry about COVID-19 infection | | | |
| No worry | 0.446 | −0.728 to 1.621 | 0.456 |
| Slight worry | 0.629 | −0.528 to 1.785 | 0.286 |
| Worry | 1.398 | 0.229–2.568 | 0.019* |
| Great worry | 4.102 | 2.769–5.436 | <0.001* |
| No adherence to protective measures | −1.442 | −2.956 to −0.072 | 0.062 |
| Regression statistics | $F = 7.80$, d.f. = 21, $P < 0.001$ $R^2 = 0.104$ | | |

* Significance level was set at $P < 0.05$.

**Table 5** Predictors of post-traumatic stress symptoms

| | Multivariate linear regression analysis | | |
|---|---|---|---|
| | $\beta$ coefficient | CI for exp($\beta$) | *P*-value |
| Gender (female) | 6.451 | 4.602–8.299 | <0.001* |
| Education | | | |
| University degree | –0.379 | –2.245 to 1.488 | 0.691 |
| Postgraduate degree | –3.401 | –5.635 to –1.167 | 0.003* |
| PhD degree | –5.737 | –9.479 to –1.996 | 0.003* |
| History of psychiatric treatment (no) | –4.028 | –6.274 to –1.782 | <0.001* |
| Perceived severity of COVID-19 infection | | | |
| Level 2 | 7.695 | –2.955 to 18.344 | 0.157 |
| Level 3 | 9.708 | –0.685 to 20.102 | 0.067 |
| Level 4 | 8.296 | –2.197 to 18.788 | 0.121 |
| Level 5 | 5.622 | –4.930 to 16.174 | 0.296 |
| Perceived personal situation in case of COVID-19 | | | |
| Level of severity 2 | –0.164 | –6.127 to 5.799 | 0.957 |
| Level of severity 3 | –2.290 | –8.169 to 3.589 | 0.445 |
| Level of severity 4 | –0.527 | –6.534 to 5.480 | 0.863 |
| Level of severity 5 | 1.008 | –5.165 to 7.182 | 0.749 |
| Possibility of infection without protective measures | | | |
| Probably no | –4.088 | –14.569 to 6.393 | 0.444 |
| Maybe no maybe yes | –4.880 | 14.404–4.645 | 0.315 |
| Probably yes | –5.512 | –15.026 to 4.003 | 0.256 |
| Definitely | –6.692 | –16.400 to 3.016 | 0.177 |
| Possibility of COVID-19 infection | | | |
| Low | 1.754 | –3.621 to 7.129 | 0.522 |
| Neither low nor high | 0.966 | –4.107 to 6.039 | 0.709 |
| High | 2.634 | –2.598 to 7.865 | 0.324 |
| Very high | 0.917 | –5.439 to 7.274 | 0.777 |
| Worry about COVID-19 infection | | | |
| No worry | 2.935 | –2.067 to 7.937 | 0.250 |
| Slight worry | 6.837 | 1.858–11.816 | 0.007* |
| Enough worry | 11.649 | 6.617–16.680 | <0.001* |
| Great worry | 23.865 | 18.201–29.530 | <0.001* |
| Perceived efficacy of protective measures | | | |
| Probably not | 12.903 | 2.059–23.747 | 0.020* |
| Maybe no maybe yes | 7.752 | –1.864 to 17.367 | 0.114 |
| Probably yes | 5.045 | –4.377 to 14.427 | 0.292 |
| Definitely | 4.268 | –5.093 to 13.630 | 0.371 |
| No adherence to protective measures | –6.540 | –13.063 to –0.017 | 0.049* |
| Regression statistics | $F = 11.645$, d.f. = 30, $P < 0.001$ $R^2 = 0.206$ | | |

* Significance level was set at $P < 0.05$.

increased child care and family demands on a 24-hour basis and a complete shrinkage of leisure time. In addition, research has shown that women suffered greater job losses during the pandemic and faced greater work pressure and increased difficulties in balancing work and family life, thus becoming vulnerable to stress-related psychopathology.[29] Educational level has also been linked to individuals' psychosocial adjustment, and during the lockdown period, people with a lower educational level might be more susceptible to the negative financial effect of the imposed restrictions. According to a recent meta-analysis, lower educational level has been identified as a significant risk factor for psychological dysfunction in the context of the COVID-19 pandemic across a wide range of relevant studies.[3] Apart from the association of educational level with occupational and socioeconomic status, less-educated individuals may be more prone to health-related prejudices, which might adversely influence their psychological adjustment during a public health hazard.

In the present study, the presence of mental disorder history was independently associated with the severity of post-traumatic stress symptoms. Alonzi et al[30] reported that people with a pre-existing physical or mental health condition were more vulnerable to the negative effects of the pandemic; however, in our sample, only mental and not physical chronic disease was associated with increased rates of post-traumatic stress. It is not clear whether this association may be attributed to social mediators, given that individuals with a psychiatric history may face several adversities (professional underachievement, financial difficulties, social isolation, family dysfunction) that render them more vulnerable to the effects of psychological trauma in general, or to a common biological background that involves altered neuroimmunity as a result of SARS-CoV-2 infection[31] and a genetically dysfunctional hypothalamus-pituitary-adrenal axis.

This study has certain limitations. First, it was an online survey that was distributed mainly through social media, and for this reason, the present sample may not be representative of the general population, given that older or less-educated individuals may be underrepresented. Second, data on psychological functioning and disease-related perceptions were collected in the form of self-reported questionnaires, which do not possess the diagnostic accuracy of direct mental health assessments. In addition, we should note that, although our analysis revealed strong associations between certain parameters and the psychological impact of COVID-19, our prediction models explained a limited percentage of the variance in participants' psychological symptoms, suggesting that there are additional, yet undetected, parameters that could be potential contributors to people's increased psychosocial vulnerability, and this should be sought in future research.

In conclusion, the current study provided useful information on the heightened psychological burden of the Greek population during the first COVID-19 lockdown period, and identified a set of risk factors associated with a greater COVID-19-related psychological impact. In the context of the serious shortcomings of the national healthcare system, the Greek authorities and the COVID-19 expert committee chose to face the first COVID-19 wave with gradual restrictive measures, escalating to a complete lockdown, quite early during the course of the pandemic, keeping the death toll at quite low levels.[32] The Greek strategy was indeed considered successful; however, it seems to have been accompanied by collateral damages, especially regarding the population's psychosocial adjustment. Based on the current findings, Greek policy makers should allocate healthcare and welfare resources to high-risk populations, including women, less-educated citizens and people with a psychiatric history, to alleviate the pandemic's detrimental consequences on people's psychological functioning. Prioritising the needs of these groups is of crucial importance to create a feasible and cost-effective preventive framework to cope with the second wave of the COVID-19 pandemic, which is now rising, especially under the present circumstances of economic restrictions.

**Katerina Karaivazoglou**, Department of Psychiatry, University Hospital of Patras, Greece; **Georgia Konstantopoulou**, Special Office for Health Consulting Services and Faculty of Education and Social Work, School of Humanities and Social Sciences, University of Patras, Greece; **Maria Kalogeropoulou**, Department of Psychiatry, University Hospital of Patras, Greece; **Theodoros Iliou**, Department of Psychiatry, University General Hospital of Alexandroupolis, Greece; and Faculty of Medicine, School of Health Sciences, Democritus University of Thrace, Greece; **Theofanis Vorvolakos**, Department of Psychiatry and Psychotherapy, Klinikum rechts der Isar, Faculty of Medicine, Technical University of Munich, Germany; **Konstantinos Assimakopoulos**, Department of Psychiatry, University Hospital of Patras, Greece; **Philippos Gourzis**, Department of Psychiatry, University Hospital of Patras, Greece; **Panagiotis Alexopoulos**, Department of Psychiatry, University Hospital of Patras, Greece; and Klinikum rechts der Isar, Faculty of Medicine, Department of Psychiatry and Psychotherapy, Technical University of Munich, Germany

**Correspondence:** Katerina Karaivazoglou. Email: karaivaz@hotmail.com

First received 10 Nov 2020, final revision 30 Dec 2020, accepted 27 Jan 2021

## Supplementary material

Supplementary material is available online at https://doi.org/10.1192/bjo.2021.17.

## Data availability

The data that support the findings of this study are available from the corresponding author, K.K., upon reasonable request.

## Author contributions

K.K. designed the study, handled and analysed the data and wrote the manuscript. G.K. conceived the idea, designed and carried out the study and handled the data. M.K. designed and carried out the study. T.I. designed and carried out the study. T.V. provided expert opinion and drafted the final version of the manuscript. P.G. provided expert opinion and drafted the final version of the manuscript. K.A. provided expert opinion and drafted the final version of the manuscript. P.A. provided expert opinion and drafted the final version of the manuscript.

## Funding

This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

## Declaration of interest

None.

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