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A longitudinal assessment of depression and anxiety in the Republic of Ireland before and during the COVID-19 pandemic

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ABSTRACT

Few studies have examined changes in mental health before and after the outbreak of COVID-19. We examined changes in the prevalence of major depression and generalized anxiety disorder (GAD) between February 2019 and March-April 2020; if there were changes in major depression and GAD during six weeks of nationwide lockdown; and we identified factors that predicted major depression and GAD across the six-week lockdown period. Nationally representative samples of Irish adults were gathered using identical methods in February 2019 ($N = 1020$) and March-April 2020 ($N = 1041$). The latter was reassessed six weeks later. Significantly more people screened positive for depression in February 2019 (29.8% 95% CI = 27.0, 32.6) than in March-April 2020 (22.8% 95% CI = 20.2, 25.3), and there was no change in GAD. There were no significant changes in depression and GAD during the lockdown. Major depression was predicted by younger age, non-city dwelling, lower resilience, higher loneliness, and higher somatic problems. GAD was predicted by a broader set of variables including several COVID-19 specific variables. These findings indicate that the prevalence of major depression and GAD did not increase as a result of, or during the early phase of the COVID-19 pandemic in Ireland.

1. Introduction

Following the global outbreak of COVID-19, numerous commentaries warned of dire mental health consequences (Carvalho, Moreira, de Oliveira, Landim, & Neto, 2020; Reger, Stanley, & Joiner, 2020; Xiang et al., 2020). It has been claimed that the pandemic is 'having wide-ranging effects on population mental health' (Campion, Javed, Sartorius, & Marmot, 2020, p. 1), and the President of the Royal College of Psychiatrists in the United Kingdom (UK) warned that 'the prevalence of mental health issues is also expected to grow enormously due to the repercussions of the virus and the lockdown on mental health' (Torjesen, 2020). While the societal impact of this crisis cannot be understated - as of March 22nd 2021, there have been 123.2 million cases of COVID-19 and 2.7 million deaths worldwide (Roser, Ritchie, Ortiz-Ospina, & Hasell, 2021), along with 255 million full-time job losses resulting in

\$3.7 trillion in lost labour income (International Labour Organization, 2021) - the empirical evidence available to date indicates that there has been little effect on the mental health of the general population. A systematic review and meta-analysis from January 2021 of 65 longitudinal studies comparing mental health before and after the outbreak of COVID-19 found that there was a small increase in mental health problems in the immediate aftermath of the outbreak (i.e., March-April 2020), however these increases returned to pre-pandemic levels within several weeks (i.e., by May-June 2020) (Robinson et al., 2021). This study did note, however, that increases in depression were greater than those for anxiety, and the reductions over time for depression were less pronounced.

Using nationally representative data from the general adult population of the Republic of Ireland that was gathered prior to the outbreak of the COVID-19 pandemic (i.e., February 2019), and then again at two

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intervals during the early phase of the COVID-19 pandemic (i.e., March-April 2020 and April-May 2020), we sought to add important information regarding population mental health changes pre- and post the outbreak of COVID-19 by addressing three objectives. First, we examined if there were changes in the proportion of Irish adults who screened positive for major depression and generalized anxiety disorder (GAD) between February 2019 and March-April 2020. Second, we examined if there were changes in the proportion of Irish adults who screened positive for major depression and GAD across six weeks of lockdown. Third, we identified risk factors that predicted screening positive for major depression and GAD across the six-week lockdown period.

2. Methods

2.1. Participants and procedures

In February 2019, a nationally representative quota sample of adults from the Republic of Ireland ($N = 1,020$) was collected as part of a project to ascertain the frequency of trauma exposure and trauma-related psychopathology in the general population (see Hyland et al., 2020). Following the outbreak of COVID-19, a new longitudinal project was initiated as part of the COVID-19 Psychological Research Consortium study (McBride et al., 2020). For this project, we gathered a new and independent nationally representative quota sample of Irish adults. These samples were recruited in an identical manner. An Irish-based survey company, Qualtrics, was employed to collect both samples, and Qualtrics recruit participants from existing online, nationally representative panels of survey participants. A target sample of 1,000 adults was set for both samples, and quotas were based on sex, age, and geographical distribution. The sample statistics for these variables match known population parameters derived from the most recent census (Central Statistics Office of Ireland, 2020). This information is available from the first author upon request.

Qualtrics contacted panel members by email, text, or in-app notification, and requested their participation in a survey of approximately 20 minutes in length. At the initial contact, participants were given no information about the topic of the survey so as to minimize selection bias. If potential participants followed the provided link to complete the survey, they were provided with detailed information about the nature of the survey prior to providing their informed consent. The inclusion criteria for both samples were that participants were resident of the Republic of Ireland, could read and write in English, and were aged 18 years or older. Ethical approval for the 2019 survey was granted by Maynooth University, and ethical approval for the 2020 surveys was granted by the University of Sheffield and Ulster University.

The sample recruited in February 2019 included 1,020 participants and the sociodemographic characteristics are presented in Supplementary Table 1. The sample recruited in March-April 2020, which marked Wave 1 of the COVID-19 Psychological Research Consortium study, included 1,041 participants and the sociodemographic characteristics are presented in Supplementary Table 2. Wave 1 was conducted between March 31st and April 5th; the first week of Ireland's initial lockdown. All those who participated at Wave 1 were recontacted and asked to take part in a second wave of data collection which occurred approximately six weeks later between April 30th and May 14th; this coincided with the end of Ireland's initial lockdown period. In total, 506 participants agreed to participate at Wave 2 (participation rate = 48.6%). Compared to non-responders, responders at Wave 2 were significantly older, more likely to have been born in Ireland, to be of Irish ethnicity, to be living in a town, suburb, or rural location, to be retired, to have a pre-existing health condition, were less likely to have a confirmed or suspected COVID-19 infection, and to have screened positive for major depression and GAD (see Table 1 for full details). Statistical methods to adjust for responder bias are described in the data analysis section.

Table 1

Differences Between Non-Responders ($n = 535$) and Responders ($n = 506$) at Wave 2.

| | Non-responders | Responders | |
|---------------------------------------|----------------|------------|------------------|
| | % | % | χ^2 , df, p |
| Sex | | | 0.17, 1, .683 |
| Female | 52.3 | 51.0 | |
| Male | 47.7 | 49.0 | |
| Age | | | 95.33, 5, <.001 |
| 18-24 | 17.9 | 4.0 | |
| 25-34 | 22.4 | 15.8 | |
| 35-44 | 23.0 | 18.0 | |
| 45-54 | 13.8 | 18.0 | |
| 55-64 | 15.5 | 26.9 | |
| 65+ | 7.3 | 17.4 | |
| Birthplace | | | 5.23, 1, .019 |
| Ireland | 67.5 | 74.1 | |
| Region of Ireland | | | 2.47, 5, .480 |
| Leinster | 57.6 | 53.0 | |
| Munster | 26.4 | 28.3 | |
| Connaught | 11.2 | 12.8 | |
| Ulster | 4.9 | 5.9 | |
| Ethnicity | | | 6.88, 1, .009 |
| Irish | 71.4 | 78.5 | |
| Non-Irish | 28.6 | 21.5 | |
| Living location | | | 16.24, 1, <.001 |
| City | 29.7 | 19.0 | |
| Suburb, town, rural | 70.3 | 81.0 | |
| Highest Education | | | 0.59, 1, .441 |
| University/ third-level | 69.2 | 71.3 | |
| Finished mandatory schooling | 30.8 | 28.7 | |
| 2019 income | | | 6.33, 4, .176 |
| 0-€19,999 | 27.1 | 21.9 | |
| €20,000-€29,999 | 22.1 | 20.6 | |
| €30,000-€39,999 | 17.8 | 21.3 | |
| €40,000-€49,999 | 12.9 | 12.5 | |
| €50,000+ | 20.2 | 23.7 | |
| Employment status | | | 32.16, 3, <.001 |
| Full-time (self)/employed | 43.7 | 42.9 | |
| Part-time (self)/employed | 16.7 | 14.8 | |
| Retired | 9.3 | 20.9 | |
| Unemployed / not working | 30.5 | 21.3 | |
| Living alone | | | 0.66, 1, .418 |
| Yes | 13.5 | 15.2 | |
| Pre-existing health condition | | | 4.26, 1, .039 |
| Yes | 14.4 | 19.2 | |
| COVID-19 infection - self | | | 5.18, 1, .023 |
| Yes | 5.6 | 2.8 | |
| COVID-19 infection - loved one | | | 3.03, 1, .082 |
| Yes | 8.0 | 5.3 | |
| Major Depression | | | 11.77, 1, .001 |
| Yes | 27.1 | 18.2 | |
| Generalized Anxiety Disorder | | | 7.04, 1, .008 |
| Yes | 23.2 | 16.6 | |

Note: χ^2 = chi-square test; df = degrees of freedom; p = statistical significance.

3. Measures

The same measures were used in all surveys.

3.1. Depression and anxiety

Major depression was measured using the nine-item *Patient Health Questionnaire-9* (PHQ-9) (Kroenke, Spitzer, & Williams, 2001). Participants indicate how often they have been bothered by each symptom over the last two weeks on a four-point Likert scale that ranges from 0 (*Not at all*) to 3 (*Nearly every day*). Screening positive for major depression was indicated by using the well-established cut-off score of ≥ 10 , and this produces adequate sensitivity (.85) and specificity (.89)

(Kroenke et al., 2001). The psychometric properties of the PHQ-9 scores have been widely supported (Manea, Gilbody, & McMillan, 2012), and the internal reliability of the scale scores in the February 2019 ($\alpha = .93$), March-April 2020 ($\alpha = .91$), and April-May 2020 ($\alpha = .91$) samples were excellent.

GAD was measured using the *Generalized Anxiety Disorder 7-item Scale* (GAD-7) (Spitzer, Kroenke, Williams, & Lowe, 2006). Participants indicate how often they have been bothered by each symptom over the last two weeks on a four-point Likert scale that ranges from 0 (*Not at all*) to 3 (*Nearly every day*). Screening positive for GAD was indicated by a score of ≥ 10 , and this cut-off score has adequate sensitivity (.89) and a specificity (.82) (Spitzer et al., 2006). The GAD-7 scale scores have been shown to produce reliable and valid scores in community studies (Hinz et al., 2017), and the internal reliability of the scale scores in the February 2019 ($\alpha = .94$), March-April 2020 ($\alpha = .94$), and April-May ($\alpha = .94$) samples were excellent.

3.2. Sociodemographic variables

Ten sociodemographic variables were measured in the March-April 2020 sample including sex (0 = Male, 1 = Female), age, nationality (0 = Irish, 1 = Non-Irish), ethnicity (recoded as 0 = Irish, 1 = Non-Irish), area of residence (recoded 0 = suburb, town, or rural location, 1 = city), highest educational achievement (recoded as 0 = did not attend university/third-level education, 1 = attended university/third-level education), 2019 annual income (recoded as 0 = Less than €20,000, 1 = €20,000-€29,999, 2 = €30,000-€39,999, 3 = €40,000-€49,999, 4 = €50,000 or more), working in an occupation that involves face-to-face contact with the public (0 = No, 1 = Yes), living alone (0 = No, 1 = Yes), and having a pre-existing health condition such as heart or lung disease, diabetes, or cancer (0 = No, 1 = Yes).

3.3. COVID-19 pandemic variables

Six COVID-19 pandemic related variables were measured including having lost income due to COVID-19 (0 = No, 1 = Yes), suspected or confirmed COVID-19 infection status for oneself (0 = No, 1 = Yes), suspected or confirmed COVID-19 infection status for a friend or loved one (0 = No, 1 = Yes), perceived risk of being infected by COVID-19 over the next month (measured using a slider scale ranging from 0 [*No risk*] to 100 [*Great risk*]), anxiety about the COVID-19 pandemic (measured using a slider scale ranging from 0 [*Not at all anxious*] to 100 [*Extremely anxious*]), and worries about one's finances due to the COVID-19 pandemic (measured using a response scale ranging from 1 [*Not worried at all*] to 10 [*Extremely worried*]).

3.4. Psychological variables

3.4.1. Personality traits

The Big-Five Inventory (BFI) (Rammstedt & John, 2007) measures the five personality traits of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Each trait is measured by two items on a five-point Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Higher scores reflect higher levels of each personality trait, and the BFI has been shown to produce scale scores with good psychometric properties (Rammstedt & John, 2007). Internal reliability estimates are not reported due to the fact that each trait is measured using two items, and coefficient alpha is inappropriate for demonstrating internal consistency in such cases (Eisinga et al., 2013).

3.4.2. Resilience

The Brief Resilience Scale (BRS) (Smith et al., 2008) is a six-item measure where all items are answered on a five-point Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Higher scores reflect higher levels of resilience, and the BRS has been shown to produce scores with excellent psychometric properties in the general

population (Soer et al., 2019). The internal reliability of the scale scores in this sample was good ($\alpha = .86$).

3.4.3. Locus of control

The Locus of Control Scale (LoCS) (Sapp & Harrod, 1993) measures three forms of locus of control; 'Internal', 'Chance', and 'Powerful Others'. Each subscale includes three questions, and all questions are answered on a seven-point Likert scale that ranges from 1 (*Strongly disagree*) to 7 (*Strongly agree*). Higher scores reflect higher levels of each form of locus of control. The internal reliability of the 'Internal' ($\alpha = .67$) and 'Chance' ($\alpha = .63$) subscale scores were acceptable, and the reliability of the 'Powerful others' subscale scores was good ($\alpha = .78$).

3.4.4. Identification with others

The Identification with all Humanity Scale (IWAHS) (McFarland, Brown, & Webb, 2013) is a nine-item scale. Participants respond to three statements with reference to three groups: people in my community, people from Ireland, and all humans everywhere. The response scale ranges from 1 (*Not at all*) to 5 (*Very much*) and higher scores reflect greater identification with others. The internal reliability of the IWAHS scale scores in this sample was excellent ($\alpha = .91$).

3.4.5. Death anxiety

The Death Anxiety Inventory (DAI) (Tomás-Sábado, Gómez-Benito, & Limonero, 2005) is a 17-item scale where respondents indicate their agreement with each statement on a five-point Likert scale that ranges from 1 (*Totally disagree*) to 5 (*Totally agree*). Higher scores reflect higher levels of death anxiety, and the DAI scores have been shown to have good psychometric properties (Tomás-Sábado et al., 2005). The internal reliability of the DAI scores in this sample was excellent ($\alpha = .92$).

3.4.6. Intolerance of uncertainty

The Intolerance of Uncertainty scale (IUS) (Buhr & Dugas, 2002) includes 12 items that are answered on a five-point Likert scale that ranges from 1 (*Not at all characteristics of me*) to 5 (*Entirely characteristic of me*). Higher scores reflect higher levels of intolerance of uncertainty, and the IUS has been shown to produce scores with excellent psychometric properties (Buhr & Dugas, 2002). The internal reliability of the IUS scores in this sample was good ($\alpha = .87$).

3.4.7. Loneliness

The three-item Loneliness Scale (Hughes, Waite, Hawkey, & Cacioppo, 2004) was designed for use in large-scale population surveys. Respondents indicate how often they feel that they lack companionship, feel left out, and feel isolated from others. Responses are based on three-point scale of 'Hardly ever' (1), 'Sometimes' (2), and 'Often' (3). Higher scores reflect higher levels of loneliness. The internal reliability of the scale scores in this sample was good ($\alpha = .86$).

3.4.8. Somatic problems

The Patient Health Questionnaire-15 (PHQ-15) (Kroenke, Spitzer, & Williams, 2002) is a 15-item measure that asks participants, "Over the last 2 weeks, how often have you been bothered by any of the following problems?" and lists commonly reported physical problems (e.g., back pain, gastrointestinal complaints, chest pains, lacking energy). We excluded the 'menstrual problems' item due to its gender-specific nature that would preclude analysis of the entire sample. The response options are 'Not bothered at all' (0), 'Bothered a little' (1), and 'Bothered a lot' (2). A total scale score of the 14 items was computed where higher scores reflect more somatic problems. The internal reliability of the scale scores in this sample was good ($\alpha = .83$).

3.5. Data analysis

The data analysis plan included three steps. First, a two-tailed z-test was conducted to compare the proportions of people screening positive

for major depression and GAD in the February 2019 and March-April 2020 samples.

Second, changes in the proportion of people screening positive for major depression and GAD from Wave 1 (i.e., in March-April 2020) to Wave 2 (i.e., April-May 2020) were compared using structural equation modelling (SEM). A SEM approach was used so that missing data were handled using full information robust maximum likelihood estimation (Schafer & Graham, 2002), which is recognised as the optimal method for managing missing data (Li & Stuart, 2019; Witkiewitz et al., 2014). This analytical process involves two steps, and analyses were conducted separately for major depression and GAD. A null or ‘constrained’ model is specified first where the proportions (e.g., of major depression) are constrained to be equal over time, and the variances and covariances are freely estimated. An alternative or ‘unconstrained’ model is then specified where the proportions are freely estimated at both waves. The constrained and unconstrained models differ by one degree of freedom so improvement in model fit can be tested using a loglikelihood ratio test (LRT), which follows a chi-square (χ^2) distribution. Additionally, the models can be compared using the Bayesian Information Criteria (BIC) index, and the model with the lowest value is statistically superior. These analyses were performed using Mplus version 8.2 (Muthén & Muthén, 2017).

Third, binary logistic regression analyses were used to identify predictors of screening positive for major depression and GAD at Wave 2 (i.e., April-May 2020). These models were run separately for major depression and GAD. In both models, the predictor variables (all measured at Wave 1) included ten sociodemographic variables, six pandemic related variables, and fourteen psychological variables. Additionally, both models controlled for major depression and GAD status at Wave 1, respectively. To control for responder bias at Wave 2, an inverse probability weighting procedure was applied (Cohrs, Maes, Moschner, & Kielmann, 2007). These analyses were performed using SPSS version 26.

4. Results

4.1. Objective 1: Changes in Major Depression and GAD from 2019 to 2020

In February 2019, 29.8% (95% CI = 27.0%, 32.6%) of the sample screened positive for major depression compared to 22.8% (95% CI = 20.2%, 25.3%) of the sample in March-April 2020. This represented a statistically significant change in major depression ($z = 3.63, p < .001$). There was no statistically significant difference ($z = 1.26, p = .208$) in the proportion of people who screened positive for GAD in February 2019 (22.3%, 95% CI = 19.7%, 24.8%) and March-April 2020 (20.0%, 95% CI = 17.6%, 22.4%).

4.2. Objective 2: Changes in major depression and GAD during six weeks of lockdown

As shown in Table 2, the BIC and LRT results supported the ‘null’ models of major depression and GAD, indicating that there were no statistically significant changes in the proportion of people who screened positive for these disorder during the six weeks of lockdown.

4.3. Objective 3: Predictors of screening positive for major depression and GAD

The results of the binary logistic regression analyses predicting screening positive for major depression and GAD in April-May 2020 are presented in Table 3.

The logistic regression model of major depression was statistically significant ($\chi^2(33) = 446.62, p < .001$) and correctly classified 85.1% of participants. Adjusting for major depression status at Wave 1, Wave 2 major depression was predicted by younger age, residing in a town,

Table 2

Tests of the Proportion of People Screening Positive for Major Depression and Generalized Anxiety Disorder from Wave 1 to Wave 2.

| | Wave 1 | Wave 2 | Null model | Alternative model | Null vs. alternative model |
|------------------------------|-------------------|-------------------|------------|-------------------|-----------------------------------|
| | % (95% CI) | % (95% CI) | BIC | BIC | LRT |
| Major depression | 22.8 (20.2, 25.3) | 24.2 (20.9, 27.6) | 1526.93 | 1533.07 | $\chi^2 = 0.81, df = 1, p = .368$ |
| Generalized anxiety disorder | 20.0 (17.6, 22.4) | 17.4 (14.5, 20.4) | 1301.15 | 1305.09 | $\chi^2 = 3.01, df = 1, p = .083$ |

Note: 95% CIs = 95% confidence intervals; BIC = Bayesian Information Criteria; LRT = Likelihood ratio test; χ^2 = chi-square; df = degrees of freedom; p = statistical significance.

suburb, or rural location, lower levels of resilience, higher levels of loneliness, and higher levels of somatic problems.

The logistic regression model of GAD was also statistically significant ($\chi^2(34) = 418.86, p < .001$) and correctly classified 88.5% of participants. Adjusting for Wave 1 GAD status, Wave 2 GAD was predicted by being female, working face-to-face with the public, not having been infected by COVID-19, greater financial worries due to the pandemic, higher levels of trait Openness, lower levels of trait Conscientiousness, higher levels of internal locus of control, higher levels of death anxiety, higher levels of loneliness, and higher levels of somatic problems.

5. Discussion

The global outbreak of COVID-19, and the extraordinary public health measures implemented to slow the spread of the virus, have led to profound changes in people’s lives. As was the case in other epidemics (Shultz, Baingana, & Neria, 2015), these changes were met by warnings of potential (Carvalho et al., 2020; Reger et al., 2020; Xiang et al., 2020) and actual (Campion et al., 2020) adverse mental health consequences. However, as time has passed and the evidence has accumulated, we are learning that the COVID-19 pandemic has had little, if any, negative effect on the mental health of the general population (Robinson et al., 2021).

Our findings indicate that significantly more people screened positive for major depression a year prior to the outbreak of COVID-19 than during the first week of Ireland’s nationwide lockdown measures to control the spread of COVID-19. Additionally, we found that there were no significant changes in the proportion of people who screened positive for GAD during this timeframe. Furthermore, tracking our sample over the six weeks of lockdown revealed that there were no significant changes in the prevalence of both major depression and GAD. These are notable findings considering that meta-analytic data suggests that increases in depression and anxiety were most evident during March-April of 2020, and that the subsequent decreases began to emerge by May 2020 (Robinson et al., 2021). Our longitudinal assessments corresponded with these times, however our results indicated that rates of depression and anxiety were not affected by the outbreak of COVID-19, nor by the lockdown measures implemented to contain the spread of the virus.

We also conducted this study to identify risk factors at the start of the pandemic that would predict screening positive for major depression and GAD six weeks later. Some notable differences were evident for the two disorders. Controlling for major depression status in March-April 2020, major depression in April-May 2020 was significantly predicted by five variables. Younger adults were more likely to screen positive for depression, and this is consistent with other pandemic-related data (Daly et al., 2020; McGinty et al., 2019), and findings from the wider mental health literature (Altemus, 2006; Eid, Gobinath, & Galea, 2019;

Table 3
Binary Logistic Regression Analysis Predicting Screening Positive for Major Depression and Generalized Anxiety Disorder at Wave 2.

| | Major Depression | | | Generalized Anxiety Disorder | | |
|--|------------------|--------------|---------------|------------------------------|--------------|---------------|
| | OR | 95% CI | | OR | 95% CI | |
| Females | 1.236 | 0.804 | 1.902 | 1.871 | 1.120 | 3.124 |
| Age | 0.977 | 0.961 | 0.993 | 1.001 | 0.982 | 1.020 |
| Non-Irish nationality | 1.632 | 0.765 | 3.485 | 0.671 | 0.221 | 2.031 |
| Non-Irish ethnicity | 0.456 | 0.206 | 1.013 | 1.503 | 0.491 | 4.599 |
| City dwelling | 0.573 | 0.341 | 0.964 | 1.102 | 0.634 | 1.916 |
| Third level education | 0.769 | 0.493 | 1.199 | 1.260 | 0.745 | 2.131 |
| 2019 income | | | | | | |
| €0-€19,999 | 1.096 | 0.569 | 2.109 | 1.532 | 0.744 | 3.151 |
| €20,000-€29,999 | 1.103 | 0.575 | 2.114 | 0.967 | 0.453 | 2.065 |
| €30,000-€39,999 | 0.876 | 0.466 | 1.645 | 0.751 | 0.366 | 1.542 |
| €40,000-€49,999 | 0.941 | 0.427 | 2.075 | 0.714 | 0.275 | 1.855 |
| Face-to-face job with public | 1.023 | 0.649 | 1.612 | 2.062 | 1.233 | 3.450 |
| Live alone | 1.293 | 0.687 | 2.435 | 0.812 | 0.380 | 1.735 |
| Pre-existing health condition | 0.707 | 0.412 | 1.215 | 0.944 | 0.517 | 1.725 |
| Lost income due to Covid-19 | 1.285 | 0.828 | 1.993 | 0.600 | 0.357 | 1.006 |
| Covid-19 infection – self | 0.698 | 0.162 | 3.008 | 0.028 | 0.004 | 0.219 |
| Covid-19 infection – family | 0.793 | 0.365 | 1.726 | 0.923 | 0.379 | 2.248 |
| Self-reported risk Covid-19 infection | 1.000 | 0.992 | 1.009 | 0.997 | 0.988 | 1.007 |
| Covid-19 related anxiety | 1.005 | 0.994 | 1.016 | 0.992 | 0.979 | 1.005 |
| Financial worries due to Covid-19 | 1.010 | 0.923 | 1.106 | 1.166 | 1.046 | 1.299 |
| Openness | 0.989 | 0.877 | 1.115 | 1.327 | 1.143 | 1.542 |
| Conscientiousness | 0.981 | 0.859 | 1.120 | 0.809 | 0.700 | 0.936 |
| Extraversion | 1.069 | 0.951 | 1.202 | 1.121 | 0.980 | 1.283 |
| Agreeableness | 0.877 | 0.760 | 1.012 | 0.998 | 0.843 | 1.181 |
| Neuroticism | 0.991 | 0.876 | 1.122 | 1.044 | 0.909 | 1.200 |
| Resilience | 0.921 | 0.869 | 0.977 | 0.936 | 0.875 | 1.001 |
| Identification with others | 1.003 | 0.971 | 1.035 | 1.021 | 0.982 | 1.061 |
| Locus of control – chance | 1.005 | 0.931 | 1.084 | 1.055 | 0.967 | 1.152 |
| Locus of control – powerful others | 0.974 | 0.905 | 1.048 | 0.965 | 0.889 | 1.047 |
| Locus of control – internal | 0.969 | 0.904 | 1.039 | 1.099 | 1.017 | 1.188 |
| Death anxiety | 1.006 | 0.990 | 1.023 | 1.025 | 1.006 | 1.044 |
| Intolerance of uncertainty | 0.989 | 0.974 | 1.005 | 0.995 | 0.977 | 1.012 |
| Loneliness | 1.436 | 1.267 | 1.629 | 1.205 | 1.048 | 1.385 |
| Somatic problems | 1.069 | 1.023 | 1.118 | 1.077 | 1.027 | 1.129 |
| Wave 1 major depression status | 8.357 | 5.155 | 13.549 | – | – | – |
| Wave 1 generalized anxiety disorder status | – | – | – | 10.875 | 6.277 | 18.839 |

Note: OR = odds ratio; 95% CIs = 95% confidence intervals; statistically significant effects ($p < .05$) are in bold.

Kessler et al., 2010). Also consistent with the wider literature were the findings that higher levels of loneliness (McHugh et al., 2020), more somatic problems (Kapfhammer, 2006), and lower levels of resilience (Shapero et al., 2019) predicted screening positive for major depression. One curious result was that individuals residing in a city were less likely to screen positive for depression, and this is unusual because most data suggests that city dwelling is associated with an increased risk of depression (Sampson et al., 2020). This may be an effect unique to the Irish context, but more research will be needed to make any firm conclusions. Nonetheless, given that the predictors of depression during the pandemic period were similar to those that are meaningful more broadly, and that none of the pandemic related variables predicted

depression, it seems likely that risk of depression during this public health crises can be understood on the basis of established risk factors.

The picture was slightly different for GAD. A broader set of variables in March-April 2020 predicted GAD status in April-May 2020, controlling for initial GAD status. Some of these variables were those that are well-established risk factors for GAD such as being female (Hyland et al., 2016), lower levels of Conscientiousness and higher levels of Openness (Costache et al., 2020), higher levels of loneliness (Hyland et al., 2019), and more somatic problems (Bekhuis et al., 2016). However, some predictors of GAD were specific to the COVID-19 pandemic. For example, working in a job that involved face-to-face contact with the public and not having been infected with COVID-19 both predicted screening positive for GAD six weeks later. Given people’s increased risk of exposure to the virus, whose lethality was relatively unknown at that time, it is understandable why these variables predicted greater odds of screening positive for GAD. Moreover, increased levels of death anxiety and higher levels of internal locus of control also predicted GAD. In the context of a global pandemic, increased anxiety related to one’s own mortality may be a meaningful factor in driving increases in general anxiety, and the importance of addressing death anxiety during this crisis have been outlined (Menzies & Menzies, 2020). While internal locus of control is generally associated with experiencing fewer mental health problems (Cheng et al., 2013), we found that higher levels of internal locus of control predicted greater odds of screening positive for GAD. One possible explanation for this finding is due to a mismatch between one’s internal worldview (i.e., believing that oneself is capable of determining what occurs in life) and the actual state of the world (i.e., living in an environment where there was a rapidly spreading virus, and where daily activities were severely restricted by government mandates). Overall, these results suggest that the specific context of the COVID-19 pandemic plays some role in understanding risk of GAD, although well-established risk factors continued to be relevant.

5.1. Limitations

This study is not without limitations. First, the prevalence estimates of major depression and GAD were based on exceeding a cut-off scores on self-report measures. It is likely that not all of these people would meet diagnostic criteria if assessed via a diagnostic interview, however, these cut-off scores have been shown to have good sensitivity and specificity and are routinely used in clinical assessments and epidemiological research to identify probable diagnostic cases. Second, while the 2019 and 2020 samples were constructed to represent the Irish general population in terms of sex, age, and geographical distribution, these were not probability based samples, nor were we able to recruit individuals who were institutionalised (e.g., in prison, hospital, people living in homelessness, asylum seeking/refugee centres etc.), many of whom have higher rates of mental illness compared to the general population (Fazel, Wheeler, & Danesh, 2005; Fazel, Geddes, & Kushel, 2014; Fazel, Hayes, Bartellas, Clerici, & Trestman, 2016). These sampling limitations represent threats to the generalisability of our findings to the entire adult population of Ireland. Third, in the longitudinal portion of the study we were only able to recontact about half of the participants who took part at the first assessment, and these responders differed from those who did not respond at wave 2. We applied robust statistical methods to control for the sample attrition, however, these methods cannot entirely control for sampling bias.

5.2. Conclusion

The findings of this study indicate that (1) the outbreak of COVID-19 did not lead to an increase in major depression or GAD in the general adult population of the Republic of Ireland, (2) major depression and GAD did not change in frequency during the early phase of the pandemic, (3) major depression was predicted by a small number of well-established (and non-pandemic related) risk factors, and (4) GAD

was predicted by a larger number of risk factors, some of which were specific to the pandemic context. These findings add to a growing body of evidence that mental health disorders have not increased in frequency in the general population as result of, or during, the COVID-19 pandemic.

Declaration of Competing Interest

None

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.psychres.2021.113905](https://doi.org/10.1016/j.psychres.2021.113905).

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