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BRIEF REPORT

Posttraumatic Stress Symptoms and Associated Comorbidity During the COVID-19 Pandemic in Ireland: A Population-Based Study

Thanos Karatzias,[1,2] Mark Shevlin,[3] Jamie Murphy,[3] Orla McBride,[3] Menachem Ben-Ezra,[4] Richard P. Bentall,[5] Frédérique Vallières,[6] and Philip Hyland[7]

[1]School of Health & Social Care, Edinburgh Napier University, Scotland
[2]Rivers Centre for Traumatic Stress, NHS Lothian, Scotland
[3]School of Psychology, Ulster University, Northern Ireland
[4]School of Social Work, Ariel University, Israel
[5]University of Sheffield, England
[6]Trinity Centre for Global Health, Trinity College Dublin, Ireland
[7]Department of Psychology, Maynooth University, Ireland

The prevalence of posttraumatic stress disorder (PTSD) as it relates to individuals' experiences of the COVID-19 pandemic has yet to be determined. This study was conducted to determine rates of COVID-19–related PTSD in the Irish general population, the level of comorbidity with depression and anxiety, and the sociodemographic risk factors associated with COVID-19–related PTSD. A nationally representative sample of adults from the general population of the Republic of Ireland ($N = 1{,}041$) completed self-report measures of all study variables. The rate of COVID-19–related PTSD was 17.7% ($n = 184$), 95% CI [15.35%, 19.99%], and there was a high level of comorbidity with generalized anxiety (49.5%) and depression (53.8%). Meeting the diagnostic requirement for COVID-19–related PTSD was associated with younger age, male sex, living in a city, living with children, moderate and high perceived risk of COVID-19 infection, and screening positive for anxiety or depression. Posttraumatic stress symptoms related to the COVID-19 pandemic are common in the general population. Our results show that health professionals responsible for responding to the COVID-19 pandemic should expect to routinely encounter symptoms and concerns related to posttraumatic stress.

Traumatic stress disorders are relatively common in the general population (Brewin et al., 2017). The findings from a recent study showed that in 2019, approximately 13% of the general adult population of the Republic of Ireland was suffering from a traumatic stress disorder (Hyland et al., in press). In the 11th revision of the *International Classification of Diseases* (*ICD-11*; WHO, 2018), posttraumatic stress disorder (PTSD) is described in terms of six core symptoms distributed across three clusters, including reexperiencing in the here and now, avoidance of reminders, and hyperarousal. As PTSD is a chronic disorder, research has suggested that approximately 40% of affected individuals continue to exhibit significant symptoms 10 years after its onset (Kessler et al., 1995). Individuals with PTSD are between 2 and 6 times more likely to present with psychiatric comorbidities, including depression, anxiety, and suicidality (Bresleau et al., 1991; Karatzias et al., 2019). In addition, PTSD has been shown to be associated with significant economic costs due to work impairment, hospitalization, and health care–related visits (Ferry et al., 2015). Thus, early intervention and appropriate management of PTSD is important.

Data derived from previous outbreaks of respiratory infections, such as severe acute respiratory syndrome (SARS), demonstrate that being infected or the threat of being infected can be a potentially traumatic event and increase risk of developing PTSD (Cheng et al., 2006; Mak et al., 2009; Wu et al., 2009). The COVID-19 pandemic represents a threatening and potentially traumatic event, as it can lead to hospitalization and even death. Many governments, including the Republic of Ireland, imposed extensive restrictions, such as limits on freedom of movement, the closure of nonessential businesses, and the requirement to stay at home and restrict social contact to slow the spread of the contagion. We are unaware of any

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Correspondence concerning this article should be addressed to Thanos Karatzias, Edinburgh Napier University, Sighthill Campus, Sighthill Court, Edinburgh EH11 4BN, Scotland, United Kingdom. E-mail: t.karatzias@napier.ac.uk

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studies that have published findings on rates of PTSD in the general population in the context of the COVID-19 pandemic. Our research group conducted parallel surveys of the general adult populations of the United Kingdom and the Republic of Ireland, and we have reported elsewhere that 16.79%, 95% CI [15.16%, 18.42%], of adults in the United Kingdom screened positive for PTSD specifically related to their experiences with COVID-19 (Shevlin et al., 2020). We also found that younger age, male sex, urban residence, having a higher number of children living in the home, lower income level, and moderate and high perceived risk of becoming infected with COVID-19 were significantly associated with screening positive for COVID-19–related PTSD.

The current study had three objectives. First, we sought to determine the proportion of the general adult population of Ireland likely to screen positive for PTSD specifically related to their experiences with the COVID-19 pandemic. Second, we sought to determine the levels of comorbidity for COVID-19–related PTSD with major depression and generalized anxiety. Third, we sought to identify the key sociodemographic risk factors associated with screening positive for COVID-19–related PTSD, both with and without controlling for anxiety and depression.

Method

Participants and Procedure

Participants ($N = 1{,}041$) were recruited by the survey company Qualtrics, using stratified quota sampling to ensure that the sample characteristics of sex, age, and region of Ireland matched known population parameters from the 2016 Irish census. Data collection started on March 31, 2020, which was 31 days after the first confirmed case of COVID-19 in the Republic of Ireland was reported, 19 days after the first physical distancing measures were enacted (i.e., closure of all childcare and educational facilities), and 2 days after the Taoiseach (i.e., the Republic of Ireland's Prime Minister) announced that people were not to leave their homes. The survey was completed on April 5, 2020. Participants had to be aged 18 years or older at the time of the survey and be able to complete the survey in English. Participants were contacted by the survey company via email and requested to participate. If they consented, individuals completed the survey online (median completion time = 37.52 min) and were reimbursed by the survey company for their time. Ethical approval for the study was granted by the ethical review boards of the University of Sheffield and Ulster University. The sample characteristics are presented in Table 1.

Table 1
Sociodemographic Characteristics of the Republic of Ireland Sample

Variable	%
Sex	
Female	51.5
Male	48.2
Age (years)	
18 to −24	11.1
25 to −34	19.2
35 to −44	20.6
45 to −54	15.9
55 to −64	21.0
≥65	12.2
Birthplace	
Ireland	70.7
Region of Ireland	
Leinster	55.3
Munster	27.3
Connaught	12.0
Ulster	5.4
Ethnicity	
Irish	74.8
Irish Traveller	0.3
Other White background	17.3
African	1.9
Other Black background	0.3
Chinese	0.4
Other Asian	3.2
Mixed Background	1.8
Residence location	
City	24.5
Suburb	18.1
Town	26.8
Rural	28.8
Educational attainment	
No qualification	1.2
Finished mandatory schooling	6.4
Finished secondary school	22.4
Undergraduate degree	22.5
Postgraduate degree	19.8
Other technical qualification	27.9
2019 income	
0–€19,999	24.6
€20,000–€29,999	21.3
€30,000–€39,999	19.5
€40,000–€49,999	12.7
≥€50,000	21.9
Employment status	
Employed full-time[a]	43.3
Employed part-time[a]	15.7
Retired	15.0

(*Continued*)

Measures

Traumatic Stress Symptoms

The International Trauma Questionnaire (Cloitre et al., 2018) is a self-report measure of *ICD-11* PTSD. Participants were asked to answer the six PTSD symptom–related items with regard to their experience of the COVID-19 pandemic and

Table 1
Continued

Variable	%
Unemployed	8.4
Student	6.3
Unemployed (disability or illness)	5.6
Unemployed due to COVID-19	5.7
Religion	
Christian	69.8
Muslim	1.6
Jewish	0.2
Hindu	1.1
Buddhist	0.6
Sikh	0.1
Other religion	3.8
Atheist	15.3
Agnostic	7.5
Lone adult in household	
Yes	18.4
Children in the household	
Yes	39.7

[a]Self-employed or as an employee.

indicate how much they had been bothered by each problem in the past month. The PTSD-related items are accompanied by three items that measure functional impairment caused by these symptoms. All items are answered on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*Extremely*), and a response of 2 or higher (i.e., *moderately* or more) is considered to indicate symptom endorsement. A probable PTSD diagnosis requires the endorsement of at least one symptom from each symptom cluster as well as the endorsement of at least one indicator of functional impairment. The psychometric properties of the ITQ have been demonstrated in multiple general population samples (Ben-Ezra et al., 2017; Cloitre et al., 2019) as well as clinical and high-risk samples (Hyland et al., 2017; Karatzias et al., 2016). In the current sample, the reliability of the PTSD-related items was high, Cronbach's $\alpha = .93$.

Depression

The nine-item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) was used to screen participants for major depression. Respondents indicate how often they have been bothered by each symptom over the last 2 weeks, using a four-point Likert scale that ranges from 0 (*not at all*) to 3 (*nearly every day*). To identify participants likely to meet the criteria for probable major depression, a cutoff score of 10 or higher was used (Kroenke et al., 2001); this cutoff has been shown to produce good sensitivity (.85) and specificity (.89). The psychometric properties of the PHQ-9 scores have been widely supported (Manea et al., 2012), and the reliability in the current sample was excellent, Cronbach's $\alpha = .91$.

Generalized Anxiety

Symptoms of generalized anxiety disorder were measured using the seven-item Generalized Anxiety Disorder scale (GAD-7; Spitzer et al., 2006). Participants use a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*nearly every day*) to indicate how often they have been bothered by each symptom over the past 2 weeks. In the present study, a cutoff score of 10 or higher was used to identify participants suffering from generalized anxiety disorder. This score has been shown to have good sensitivity (.89) and specificity (.82; Spitzer et al., 2006). The GAD-7 has been shown to produce reliable and valid scores in community studies (Hinz et al., 2017), and the reliability in the current sample was excellent, Cronbach's $\alpha = .94$.

Data Analysis

The proportion of the sample who met the diagnostic requirements for COVID-19–related probable PTSD was first calculated. Chi-square tests were used to assess the rates of comorbidity for PTSD with depression and generalized anxiety. Two binary logistic regression models were used to identify the risk factors associated with a positive screen for COVID-19–related PTSD. In the first model, the predictor variables were age, sex (0 = male, 1 = female), urban dwelling (1 = city, 0 = town, suburb, or rural), lost income due to COVID-19 ("My household has lost income because of the coronavirus COVID-19 pandemic;" 1 = yes, 0 = no), having children living at home (1 = yes, 0 = no), being the lone adult in the household (1 = no other adult living in the household, 0 = other adult[s] living in the household), having a preexisting health problem ("Were you diagnosed with a health condition [e.g., heart or lung disease; diabetes; cancer] before December 31, 2019 [i.e., before the start of the coronavirus COVID-19 outbreak]?": 1 = yes, 0 = no), and perceived risk of infection ("What do you think is your personal percentage risk of being infected with the COVID-19 virus over the next month?" rated on a scale of 0 to 100 and coded as low [0–33], moderate [34–67], or high [68–100]). In the second model, a variable representing participants who met the criteria for either anxiety or depression was added as a predictor.

Results

The mean COVID-19–related PTSD symptom score was 5.07 ($Mdn = 3.00$, $SD = 5.64$, range: 0–24). In total, 17.7%, 95% CI [15.35%, 19.99%], of the sample met the diagnostic requirements for COVID-19–related PTSD. Of the individuals who screened positive for PTSD, 53.8% met the criteria for depression, $\chi^2(1, N = 1{,}041) = 122.45$, $p < .001$; 49.5% met the criteria for generalized anxiety disorder, $\chi^2(1, N = 1{,}041) = 121.45$, $p < .001$; and 60.3% met the criteria for either anxiety or depression, $\chi^2(1, N = 1{,}041) = 119.13$, $p < .001$.

The binary logistic regression model of COVID-19–related PTSD was statistically significant, $\chi^2(13, N = 1{,}038) = 178.73$, $p < .001$, as was the model with the anxiety/depression

Table 2
Binary Logistic Regression Results Predicting COVID-19–Related Posttraumatic Stress Disorder (PTSD) Status

Variable	N	PTSD		Unadjusted					
		n	%	*OR*	95% CI	a*OR*[a]	95% CI	a*OR*[b]	95% CI
Age (years)									
18–24	116	31	26.7	–		–		–	
25–34	200	64	32.0	1.290	[0.777, 2.143]	1.013	[0.581, 1.767]	1.268	[0.710, 2.264]
35–44	214	48	22.4	0.793	[0.471, 1.336]	0.641	[0.363, 0.132]	0.942	[0.517, 1.715]
45–54	165	25	15.2	0.490	[0.271, 0.885]*	0.414	[0.217, 0.789]**	0.668	[0.342, 1.305]
55–64	219	14	6.4	0.187	[0.095, 0.370]***	0.182	[0.087, 0.381]***	0.323	[0.150, 0.695]**
≥65	127	2	1.6	0.044	[0.010, 0.188]***	0.045	[0.010, 0.200]*	0.088	[0.019, 0.402]***
Sex									
Male	502	97	19.3	–		–		–	
Female	536	87	16.2	0.809	[0.588, 1.113]	0.699	[0.488, 1.003]	0.608	[0.417, 0.888]*
Residence location									
Suburb, town, or rural	786	111	14.1	–		–		–	
City	255	73	28.6	2.439	[1.740, 3.419]***	1.776	[1.211, 2.604]**	1.831	[1.228, 2.730]**
Lost income									
No	596	84	14.1	–		–		–	
Yes	445	100	22.5	1.767	[1.282, 2.434]**	1.241	[0.870, 1.772]	1.054	[0.725, 1.530]
Children at home									
No	628	81	12.9	–		–		–	
Yes	413	103	24.9	2.244	[1.625, 3.098]***	1.460	[1.011, 2.110]*	1.490	[1.015, 2.187]*
Lone adult									
No	849	155	18.3	–		–		–	
Yes	192	29	15.1	0.797	[0.517, 1.227]	1.180	[0.723, 1.925]	1.065	[0.639, 1.773]
Preexisting health condition									
No	867	149	17.2	–		–		–	
Yes	174	35	20.1	1.213	[0.805, 1.829]	1.665	[1.034, 2.679]*	1.601	[0.982, 2.610]
Perceived risk of COVID-19 infection									
Low	374	30	8.0	–		–		–	
Moderate	448	75	16.7	2.306	[1.473, 3.609]***	2.645	[1.654, 4.229]***	2.322	[1.432, 3.768]**
High	219	79	36.1	6.470	[4.068, 10.291]***	5.664	[3.477, 9.226]***	4.747	[2.871 −7.851]***
Anxiety/depression									
No	753	73	9.7	–				–	
Yes	288	111	38.5	5.842	[4.164, 8.195]***			4.032	[2.740, 5.933]***

Note. $N = 1{,}041$. *OR* = odds ratio; a*OR* = adjusted odds ratio.
[a]Multivariate model. [b]Multivariate model with anxiety/depression variable included.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

variable added as a predictor, $\chi^2(14, N = 1{,}038) = 229.94$, $p < .001$. The unadjusted and adjusted odds ratios (*OR*s and a*OR*s, respectively) are presented in Table 2. Without controlling for anxiety and depression, participants in the three oldest age categories were less likely to screen positive for COVID-19–related PTSD compared to those in the youngest age category (i.e., 18–24 years). Additionally, living in a city, adjusted a$OR = 1.78$; having children living at home a$OR = 1.46$; having a preexisting health condition, a$OR = 1.67$; and a moderate or high perceived risk of COVID-19 infection in the next month, a*OR*s = 2.65 and 5.66, respectively, were also associated with a positive screen for COVID-19–related PTSD. When the anxiety/depression variable was added to the model, the estimates remained similar; the coefficient for the 45–54 year age group became nonsignificant, the coefficient for sex became significant, indicating a lower risk for women, and the adjusted odds ratio for the anxiety/depression variable was high, a$OR = 4.03$.

Discussion

In the present study, we set out to determine the level of COVID-19–related traumatic distress in the general population

of the Republic of Ireland and to identify key risk factors associated with experiencing traumatic distress related to the pandemic. We found that just under 1 in 5 people (17.67%) met the diagnostic requirements for PTSD. This figure is somewhat higher than the rate of traumatic stress disorders that was reported in the general adult population of Ireland in 2019 (i.e., 13.2%; Hyland et al., in press), but it is extremely similar to findings from our parallel survey conducted in the United Kingdom (i.e., 16.79%; Shevlin et al., 2020). The current survey and the parallel survey in the United Kingdom were carried out within the first week after the lockdown measures were enacted. Thus, it appears that a significant proportion of the general adult populations of Ireland and the United Kingdom are being affected by COVID-19–related traumatic stress and that rates of traumatic distress may have increased slightly during the initial lockdown period. Given the well-established capacity for humans to adapt to major stressful life events, this minor increase in rates of traumatic stress disorders is likely to be transitory, although further research is required to delineate the long-term effects of the COVID-19 pandemic. Following these participants across the pandemic, which our research group aims to do, will reveal whether rates of traumatic stress decline as time proceeds. Nonetheless, current and past results (Hyland et al., 2020) show that a significant proportion of the adult general population of the Republic of Ireland suffers from trauma-based psychopathology.

Consistent with the wider trauma and PTSD literature (Karatzias et al., 2019), high levels of PTSD comorbidity with depression and generalized anxiety were evidenced for participants who screened positive for COVID-19–related PTSD. Approximately half of the individuals who met the diagnostic requirements for COVID-19–related PTSD also screened positive for depression and/or generalized anxiety. These results indicate that individuals who are experiencing traumatic stress about the COVID-19 pandemic are likely to be suffering from an array of mental health problems, such as anxiety and depression. The results from the binary logistic regression also suggested that co-occurring anxiety or depression may be an additional risk factor for PTSD.

The results of the binary logistic regression analysis indicated that a positive screen for COVID-19–related PTSD was associated with younger age, urban residence, having children at home, having an existing health condition that increases the risk of mortality from COVID-19, and having a moderate or high perceived risk of COVID-19 infection within the next month. These findings were extremely consistent with our findings in the United Kingdom, and, apart from having a preexisting health condition, each of these variables was associated with COVID-19–related PTSD in the United Kingdom (Shevlin et al., 2020). Notably, the dose–response effect observed in the current study for moderate and high levels of perceived COVID-19 infection risk was also evidenced in the United Kingdom sample, and it remained significant after controlling for anxiety and depression. These findings are also consistent with findings related to the SARS epidemic (Cheng et al., 2006; Mak et al., 2009; Wu et al., 2009). These findings may be used by public health officials to more effectively identify individuals in different parts of society who are at risk for developing posttraumatic stress symptoms in response to the current pandemic.

Several limitations of the present study should be noted. First, all mental health problems were assessed using self-report measures; therefore, the extent to which individuals' PTSD symptoms were directly tied to the COVID-19 pandemic could not be ascertained. Second, we only assessed PTSD symptoms in relation to the current pandemic, and we did not additionally assess past exposure to other traumatic events or previous PTSD diagnoses. Third, the current sample was drawn for the general adult population and was not inclusive of members of the population who were institutionalized at the time of the survey. Hospital, prison, and refugee populations, for example, are all known to have increased rates of PTSD, and this poses a threat to the generalizability of the present findings.

Despite these limitations, the current study provides important and novel information about the rates of COVID-19-related posttraumatic stress symptoms in the general population. Taking these findings in conjunction with our highly congruent results from the general population of the United Kingdom, we can confidently conclude that approximately 17% of adults in the general population are experiencing clinically relevant PTSD symptoms. Furthermore, posttraumatic stress symptoms are associated with younger age, living with children, living in a city, having an existing chronic health problem, and higher levels of perceived vulnerability to COVID-19. Clinicians and public health officials who will be responsible for the mental health response to COVID-19 should be aware that many people that they will encounter, and many people in society, will be suffering from PTSD related to the pandemic.

Open Science Practices Statement

Neither of the studies reported in this article was formally preregistered. Neither the data nor the materials have been made available on a permanent third-party archive; requests for the data or materials may be sent via email to the lead author at t.karatzias@napier.ac.uk

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