

**Nursing home staff mental
health during the COVID-19
pandemic in the Republic of
Ireland**

Doctor of Medicine (MD)

October 2023

Thesis presented by

Dr Conan Brady

Under the supervision of

Professor Declan M McLoughlin

Trinity College Dublin, the University of

Dublin

Declaration

I declare that this thesis has not been submitted as an exercise for a degree at this or any other university and it is entirely my own work.

I agree to deposit this thesis in the University's open access institutional repository or allow the Library to do so on my behalf, subject to Irish Copyright Legislation and Trinity College Library conditions of use and acknowledgement.

I consent to the examiner retaining a copy of the thesis beyond the examining period, should they so wish (EU GDPR May 2018).

Declaration and Statement of Plagiarism

This thesis submitted is my own work. All of the work conducted in this thesis was performed independently by the author with contributions from the following:

- Caoimhe Fenton was a research assistant who was involved in the study. She was involved in the study design and design and creation of the online survey. She analysed qualitative data that was collected with the quantitative data; that qualitative data is not included in this thesis. She also was involved with recruitment of nursing homes.
- Orlaith Loughran and Ellie Shackleton were research assistants who were involved in this study. They assisted by recruiting nursing home staff for the study.

Acknowledgements

I am sincerely grateful to my supervisor Prof Declan McLoughlin, Department of Psychiatry, Trinity College Dublin and St Patrick's University Hospital, Dublin, for providing me with guidance and support both for this body of research and in my clinical training. I feel privileged to have had the chance to work under his supervision. His advice and expertise will stay with me for the rest of my career.

I would also like to thank Caoimhe Fenton, Orlaith Loughran and Ellie Shackleton, Department of Psychiatry, St Patrick's University Hospital, whom I worked very closely with over the course of this research. I would also like to thank Prof Blánaid Hayes of Beaumont Hospital and Prof Agnes Higgins for their guidance and advice. I am truly grateful for their hard work, dedication, and motivation throughout this study.

In addition, I would like to acknowledge both the nursing home staff who participated in this study, and, more broadly, nursing home staff across Ireland. They perform an important role in our society with little recognition and reward; they deserve more of both. I am also grateful to Nursing Homes Ireland for supporting this project and providing helpful advice.

Finally, I would like to thank my partner, Aoife, who has supported me throughout this research. I am truly grateful for her support and encouragement throughout my career.

Summary

This thesis comprises three main studies. The aim of this project was to characterise nursing home staff mental health during the COVID-19 pandemic in the Republic of Ireland.

Study 1: Cross-sectional survey of nursing home staff working in the Republic of Ireland during the third wave of the COVID-19 pandemic (November 2020-January 2021)

The objective was to conduct a national, cross-sectional survey of nursing home staff in the Republic of Ireland during the third wave of the COVID-19 pandemic. I hypothesised that there may be significant differences in these outcomes between jobs or professions. 390 responses were collected. Moderate-severe post-traumatic stress disorder (PTSD) symptoms were found in 45.1% (95% CI 40.2-50.1%) of all staff. A World Health Organisation-5 (WHO-5) wellbeing index score ≤ 32 , indicating low mood, was reported by 38.7% (33.9-43.5%) of staff; significantly more nurses reported low mood. Suicidal ideation and suicide planning were reported respectively by 13.8% (10.4-17.3%) and 9.2% (6.4-12.1%) of participants with no differences between groups. HCAs reported significantly higher moral injury than nonclinical staff. Nurses were more likely to use approach coping styles than nonclinical staff.

Study 2: Cross-sectional, anonymous online survey one year after the original study of nursing home staff mental health in the Republic of Ireland (November 2021-January 2022)

The objective was to conduct a follow-up, anonymous online survey one year after the original study to further characterise nursing home staff mental health and to assess if there have been changes in these outcomes over time. I hypothesised the rollout of vaccination, and the easing of pandemic-related restrictions would improve mental health outcomes. 229 responses were collected. More staff reported moderate-severe post-traumatic stress symptoms (Survey 1 (S1) 45%; S2 65%; $p<0.01$), depression (S1: 39%; S2 57%; $p<0.01$), suicidal ideation (S1: 14%; S2 18%; $p<0.01$) and suicidal planning (S1: 9%; S2 15%; $p=0.04$) later in the pandemic. There was a higher degree of moral injury in Survey 2 (S2) (S1: 20.8 standard deviation (SD) 9.1; S2: 25.7 SD (11.3), $p<0.01$) and use of avoidant (maladaptive) coping styles at S2 (S1: 20.8 (6.3); S2 23.0 (6.3); $p<0.01$) with no significant differences found in the use of approach (adaptive) coping styles. Staff reported significantly more concerns at S2 regarding contracting Covid-19 ($p<0.01$), social stigma ($p=0.01$), job stress ($p<0.01$), doubts about personal protective equipment ($p<0.01$) and systems and processes ($p<0.01$). This study shows that mental health outcomes have significantly worsened over time in this cohort. My hypothesis has not been supported.

Study 3: Multiple linear regression analyses of correlates of depression, post-traumatic stress, and moral injury in nursing home staff in the Republic of Ireland during the COVID-19 pandemic.

The objective was to perform analyses of the data collected in both surveys to ascertain if demographic and employment characteristics, COVID-19 exposure, perceptions regarding the pandemic, and coping

styles correlate with depressive symptoms, post-traumatic stress symptoms and moral injury. Based upon previous related research, I hypothesised that significant correlates of these measures would exist. Maladaptive coping was found to moderately correlate with worse outcomes in every measure in both Survey 1 and Survey 2. This may provide a target for mitigating poor outcomes in this cohort in future.

Presentations

Oral Conference Presentations

Brady, C., Fenton, C., Loughran, O., Hayes, B., Hennessy, M., Higgins, A., Leroi, I., Shanagher, D., & McLoughlin, D. M. Nursing home staff mental health during the COVID-19 pandemic in the Republic of Ireland.

International workshop on COVID-19 and Long-term Care systems: What have we learnt and what policies do we need to strengthen LTC systems.

December 7th, 2021. Online. Available at:

<https://www.youtube.com/watch?v=o47Ww8jnvNU> [accessed 16 Sept 2022]

Brady, C., Shackleton, E., Fenton, C., Loughran, O., Hayes, B., Hennessy, M., Higgins, A., Leroi, I., Shanagher, D., & McLoughlin, D. M. (2022). Initial findings of a second survey of nursing home staff during the COVID-19 pandemic in Ireland. *St James's Hospital Dementia, Delirium and Cognition Research and Audit Showcase*. April 21st, 2022, Mercer's Institute for Successful Ageing, St James's Hospital, Dublin.

Upcoming Poster Presentation

Brady, C., Shackleton, E., Fenton, C., Loughran, O., Hayes, B., Hennessy, M., Higgins, A., Leroi, I., Shanagher, D., & McLoughlin, D. M. (2022).

Worsening of mental health outcomes in nursing home staff during the COVID-19 pandemic in Ireland. [Accepted for 5th November 2022]. *College of Psychiatrists in Ireland Winter Conference* Malahide Castle, Dublin.

Publications

Published papers

Brady, C., Fenton, C., Loughran, O., Hayes, B., Hennessy, M., Higgins, A., Leroi, I., Shanagher, D., & McLoughlin, D. M. (2021). Nursing home staff mental health during the COVID-19 pandemic in the Republic of Ireland. *International Journal of Geriatric Psychiatry*, 37(1).
<https://doi.org/10.1002/gps.5648>

Submitted papers

Brady, C., Shackleton, E., Fenton, C., Loughran, O., Hayes, B., Hennessy, M., Higgins, A., Leroi, I., Shanagher, D., & McLoughlin, D. M. (2022). Worsening of mental health outcomes in nursing home staff during the COVID-19 pandemic in Ireland. *PLOS One* [submitted, under peer review]

Related papers

Fenton, C., Higgins, A., **Brady, C.**, Loughran, O., Hayes, B., Hennessy, M., Leroi, I., Shanagher, D., & McLoughlin, D. M. (2022). “Exhausted and hollowed out”: Experience of Nursing Home Staff in Ireland during the COVID-19 pandemic, a qualitative study. *PLOS One* [submitted, under peer review]

Brady, C., Fenton, C., Loughran, O., Hayes, B., Hennessy, M., Higgins, A., Leroi, I., & McLoughlin, D. M. (2021). Dublin hospital workers' mental health during the peak of Ireland's COVID-19 pandemic. *Irish Journal of Medical Science*. 22:1-10 [https://doi: 10.1007/s11845-022-03056-0](https://doi.org/10.1007/s11845-022-03056-0).

CHAPTER 2 CONTENTS

Declaration	2
Declaration and Statement of Plagiarism	3
Acknowledgements	4
Summary	5
Presentations.....	8
Oral Conference Presentations	8
Upcoming Poster Presentation	8
Publications	10
Published papers.....	10
Submitted papers.....	10
Related papers	10
List of figures	19
List of tables.....	20
List of abbreviations	24
Chapter 1 - Introduction.....	26
1.1 SARS-CoV2 and the COVID-19 pandemic.....	26
1.2 The Irish nursing home sector	28
1.3 Nursing homes during the COVID-19 pandemic.....	30
1.4 Healthcare worker and nursing home staff mental health	34
1.4.1 Introduction	34

1.4.2 Healthcare worker mental health during infectious disease outbreaks	35
1.4.3 Correlates of HCW mental health during infectious disease outbreaks.	36
1.4.4 Nursing home staff mental health	38
1.6 Aims, objective and hypotheses.....	43
1.6.1 Aims	43
1.6.2 Study 1	43
1.6.3 Study 2	44
1.6.4 Study 3	44
Chapter 2 - Materials and Methods	46
2.1 Introduction	46
2.2 Methods	47
2.2.1 Introduction	47
2.2.2 Demographic information.....	47
2.2.3 Staff exposure to COVID-19	49
2.2.4 Measures	49
2.2.5 Recruitment	63
2.2.6 Statistical Analyses.....	65
2.2.7 Ethical approval & Data Protection.....	69
2.2.8 Methodological Limitations	69
Chapter 3 – Survey one (S1).....	71

3.1 Introduction.....	71
3.2 Methods	73
3.2.1 Study design, setting and recruitment.....	73
3.2.2 Measures.....	74
3.2.3 Statistical analyses	74
3.3 Results	75
3.3.1 Survey completion	75
3.3.2 S1 demographic characteristics	75
3.3.3 S1 exposure to COVID-19	78
3.3.4 S1 mental health measures.....	80
3.3.5 S1 coping styles, perceptions, and altruism	85
3.4 Discussion	86
3.4.1 Limitations.....	89
3.4.2 Conclusions	90
Chapter 4 - Survey two (S2) and comparison with S1	92
4.1 Introduction.....	92
4.2 Methods	94
4.2.1 Study design and setting	94
4.2.2 Recruitment and data collection.....	94
4.2.1 Materials	95
4.2.2 Statistical analyses	95
4.3 Results	95

4.3.1 Survey completion & linked data	95
4.3.2 S2 descriptive characteristics.....	96
4.3.3 S1 and S2 comparative analyses	107
4.4 Discussion	112
4.4.1 Introduction	112
4.4.2 WHO-5	113
4.4.3 IES-R	114
4.4.4. Suicidal thinking.....	115
4.4.5 Moral injury	116
4.4.6 Work ability.....	116
4.4.7 Perceptions of the COVID-19 pandemic	118
4.4.8 Coping styles	118
4.4.9 Differences between roles	119
4.4.10 Limitations	120
4.4.11 Conclusions	121
Chapter 5 – Correlates of depression, post-traumatic stress and moral injury	124
5.1 Introduction	124
5.2 Methods	127
5.3 Results	128
5.3.1 Assumptions Testing	128
5.3.2 Subjects per variable (SPV)	136

5.3.3 S1 WHO-5 model summary	136
5.3.4 S1 IES-R model summary.....	137
5.3.5 S1 MIES model summary.....	138
5.3.6 S2 WHO-5 model summary	138
5.3.7 S2 IES-R model summary.....	139
5.3.8 S2 MIES model summary.....	140
5.3.9 Composite table of correlates with mental health outcomes..	141
5.3.10 Correlates of the WHO-5 at S1 and S2 following regression analysis.....	143
5.3.11 Correlates of the IES-R at S1 and S2 following regression analysis.....	145
5.3.12 Correlates of the MIES at S1 and S2 following regression analysis.....	146
5.3.13 Regression analysis of entire model without the IES-R avoidance subdomain	147
5.4 Discussion	149
5.4.1 Introduction	149
5.4.2 Correlates of depression	149
5.4.3 Correlates of post-traumatic stress.....	156
5.4.4 Correlates of moral injury	161
5.4.5 Limitations.....	166
Chapter 6 : Conclusions and future directions	167
6.1 Conclusions.....	167

6.2 Future directions	170
References	172
Appendices.....	194
Appendix I: Patient Information Sheet.....	194
Appendix II: Patient Consent.....	197
Appendix III: Nursing home staff survey	199
a. Demographic details	199
b. Mental Health and Medical Conditions	201
c. Experience of working with COVID-19	202
d. WHO Well-being Index	205
e. Work Ability	207
f. IES-R.....	207
g. Moral Injury Events Scale	213
h. Perceptions of the COVID-19 pandemic	216
i. Coping with the COVID-19 outbreak.....	220
j. The Longer-Term Effects of the COVID-19 Outbreak on your Wellbeing.....	226
Appendix IV: Signposting to psychological supports.....	228
Appendix V: Appearance of survey on desktop and mobile	229
a. Desktop appearance	229
b. Mobile appearance	230

Appendix VI: St Patrick’s Mental Health Services Research Ethics	
Committee approval letter	231
Appendix VII: Poster advertisements	234
a. Survey 1	234
b. Survey 2	235
Appendix VIII: Publication: Nursing home staff mental health during the COVID-19 pandemic in the Republic of Ireland	236
Appendix IX: Related publication: Dublin hospital workers’ mental health during the peak of Ireland’s COVID-19 pandemic	246

List of figures

FIGURE 1-1: WUHAN, HUBEI PROVINCE, CHINA	30
FIGURE 1-2: BERGAMO, ITALY.....	31
FIGURE 1-3: NEW YORK CITY, USA	31
FIGURE 2-1: COVID-19 CASES, DEATHS, AND PERCENTAGE OF THOSE FULLY VACCINATED IN THE REPUBLIC OF IRELAND AND THE TIMING OF SURVEYS AT SURVEY 1 (S1) AND SURVEY 2 (S2).....	63
FIGURE 5-1: SCATTERPLOTS OF RESIDUALS VS PREDICTED VALUES AT S1 IN (A) WHO-5; (B) IES-R; (C) MIES	132
FIGURE 5-2: SCATTERPLOTS OF RESIDUALS VS PREDICTED VALUES AT S2 IN (D) WHO-5; (E) IES-R; (F) MIES	133
FIGURE 5-3: PREDICTED VALUES PLOTTED AGAINST RESIDUALS (P-P PLOTS).	134
FIGURE 5-4: WHO-5 DATA AT S1; PLOT OF DEPENDENT VARIABLE AGAINST INDEPENDENT VARIABLES.....	135

List of tables

TABLE 1-1: PREPANDEMIC PAPERS EXAMINING DEPRESSION AND/OR DEPRESSIVE SYMPTOMS IN NURSING HOME STAFF	40
TABLE 1-2: POSTPANDEMIC PAPERS EXAMINING DEPRESSION AND/OR DEPRESSIVE SYMPTOMS IN NURSING HOME STAFF	41
TABLE 1-3: POSTPANDEMIC PAPERS EXAMINING PTSD AND/OR PTSD SYMPTOMS IN NURSING HOME STAFF	42
TABLE 2-1: THE IMPACT OF EVENTS SCALE REVISED (IES-R)	51
TABLE 2-2: THE WHO-5 QUESTIONNAIRE.....	53
TABLE 2-3: MORAL INJURY EVENTS SCALE (QUESTIONS ADAPTED FOR HCWS DURING THE COVID-19 PANDEMIC)	55
TABLE 2-4: THE BRIEF COPING ORIENTATION TO PROBLEMS EXPERIENCED SCALE (BRIEF-COPE).....	58
TABLE 2-5: PERCEPTIONS REGARDING THE COVID-19 PANDEMIC.....	60
TABLE 2-6: INDEPENDENT VARIABLES SELECTED FOR LINEAR REGRESSION ANALYSES	68
TABLE 3-1: NUMBER OF STAFF IN PARTICIPATING NURSING HOMES, SURVEY PARTICIPANTS AND LOCATION OF PARTICIPANTS' NURSING HOMES IN THE REPUBLIC OF IRELAND, BY ROLE.....	76
TABLE 3-2: S1 DEMOGRAPHIC CHARACTERISTICS OF NURSING HOME STAFF, BY ROLE.....	77
TABLE 3-3: S1 POST HOC ANALYSES OF DEMOGRAPHIC DIFFERENCES BETWEEN GROUP, BY ROLE.....	78
TABLE 3-4: S1 NURSING HOME STAFF EXPOSURE TO COVID-19, BY ROLE.	79
TABLE 3-5: S1 POST HOC ANALYSES OF COVID-19 EXPOSURE DIFFERENCES, BY ROLE	80

TABLE 3-6: S1 NURSING HOME STAFF MENTAL HEALTH OUTCOMES, BY ROLE	82
TABLE 3-7: S1 POST HOC ANALYSIS OF WHO-5 SCORES, BY ROLE	84
TABLE 3-8: S1 POST HOC ANALYSES OF MORAL INJURY EVENTS SCALE SCORES, BY ROLE.....	84
TABLE 3-9: S1 POST HOC ANALYSES OF BRIEF-COPE SCORES, BY ROLE	85
TABLE 4-1: S2 NUMBER OF STAFF IN PARTICIPATING NURSING HOMES, SURVEY PARTICIPANTS AND LOCATION OF PARTICIPANTS' NURSING HOMES IN THE REPUBLIC OF IRELAND, BY ROLE	96
TABLE 4-2: S2 DEMOGRAPHIC CHARACTERISTICS OF NURSING HOME STAFF, BY ROLE	98
TABLE 4-3: S2 POST-HOC ANALYSIS OF SIGNIFICANT DIFFERENCES IN ACCOMMODATION BETWEEN ROLES	99
TABLE 4-4: S2 POST-HOC ANALYSIS OF SIGNIFICANT DIFFERENCES IN YEARS OF EXPERIENCE BETWEEN ROLES	99
TABLE 4-5: S2 POST-HOC ANALYSIS OF THE PRESENCE OF MENTAL ILLNESS BETWEEN ROLES	99
TABLE 4-6: S2 NURSING HOME STAFF EXPOSURE TO COVID-19, BY ROLE	101
TABLE 4-7: S2 POST-HOC ANALYSIS OF EXPOSURE TO COVID-19 POSITIVE RESIDENTS BETWEEN ROLES.....	102
TABLE 4-8: S2 POST-HOC ANALYSIS OF QUARANTINE HISTORY BETWEEN ROLES	102
TABLE 4-9: S2 NURSING HOME STAFF MENTAL HEALTH OUTCOMES, BY ROLE	104

TABLE 4-10: S2 PAIRWISE COMPARISONS OF THE MORAL INJURY EVENTS	
SCALE “TRANSGRESSION BY OTHERS” SUBSCALE, BY ROLE	105
TABLE 4-11: S2 PAIRWISE COMPARISONS OF THE BRIEF-COPE APPROACH	
SUBSCALE, BY ROLE	106
TABLE 4-12: DEMOGRAPHIC AND COVID-19 EXPOSURE CHARACTERISTICS	
COMPARED BETWEEN SURVEYS 1 AND 2	108
TABLE 4-13: POST HOC ANALYSIS OF AGE COMPARED BETWEEN SURVEYS	
1 AND 2.....	108
TABLE 4-14: POST HOC ANALYSIS OF PHYSICAL HEALTH CONDITIONS	
COMPARED BETWEEN SURVEYS 1 AND 2	109
TABLE 4-15: MENTAL HEALTH OUTCOMES, COPING, PERCEPTIONS, AND	
ALTRUISM COMPARED BETWEEN SURVEYS ONE AND TWO.....	111
TABLE 5-1: VARIANCE INFLATION FACTOR (VIF) VALUES FOR THE WHO-5,	
IES-R AND MIES AT SURVEY ONE AND SURVEY TWO.	130
TABLE 5-2: BREUSCH-PAGAN TEST APPLIED TO EACH MODEL.....	131
TABLE 5-3: WHO-5 AT S1 MODEL SUMMARY	136
TABLE 5-4: WHO-5 AT S1 ANOVA.....	136
TABLE 5-5: IES-R AT S1 MODEL SUMMARY	137
TABLE 5-6: IES-R AT S1 ANOVA.....	137
TABLE 5-7: MIES AT S1 MODEL SUMMARY	138
TABLE 5-8: MIES AT S1 ANOVA.....	138
TABLE 5-9: WHO-5 AT S2 MODEL SUMMARY	139
TABLE 5-10: WHO-5 AT S2 ANOVA	139
TABLE 5-11: IES-R AT S2 MODEL SUMMARY	139
TABLE 5-12: IES-R AT S2 ANOVA.....	140
TABLE 5-13: MIES AT S2 MODEL SUMMARY	140

TABLE 5-14: MIES AT S2 ANOVA	140
TABLE 5-15: CORRELATES OF WHO-5, IES-R (INCLUDING AVOIDANCE) AND MIES AT S1 AND S2.	142
TABLE 5-16 : SUMMARY OF SIGNIFICANT CORRELATES OF WHO-5 AT S1 AND S2.	143
TABLE 5-17: SUMMARY OF SIGNIFICANT CORRELATES OF IES-R AT S1 AND S2.....	145
TABLE 5-18: SUMMARY OF SIGNIFICANT CORRELATES OF MIES AT S1 AND S2.....	146
TABLE 5-19: CORRELATES OF WHO-5, IES-R (EXCLUDING AVOIDANCE) AND MIES AT S1 AND S2.	148

List of abbreviations

95% CI	95% confidence interval
CFR	Case fatality rate
COPD	Chronic obstructive pulmonary disease
COPE Inventory	Coping Orientation to Problems Experienced
COVID-19	Coronavirus disease 2019
DSM-IV	Diagnostic & Statistical Manual of Mental Disorders, fourth edition
DSM-V	Diagnostic & Statistical Manual of Mental Disorders, fifth edition
DV	Dependent variable
GP	General practitioner
HAM-D	Hamilton Depression Rating Scale
HCA	Healthcare assistant
HCW	Healthcare worker
HIQA	Health Information and Quality Authority
HSE	Health Service Executive
ICD-10 Revision	International Classification of Diseases, 10 th
ICU	Intensive care unit
IV	Independent variable
IES-R	Impact of Events Scale Revised
LTC	Long-term care
MD	Mean difference
MERS	Middle East Respiratory Syndrome
MIES	Moral Injury Events Scale
NH	Nursing home
NHI	Nursing Homes Ireland
NHS	National Health Service (UK)

OR	Odds ratio
PCR	Polymerase chain reaction
PPE	Personal protective equipment
PTSD	Post-traumatic stress disorder
RCT	Randomised controlled trial
RNA	Ribonucleic acid
ROI	Republic of Ireland
S1	Survey one (November 2020 – January 2021)
S2	Survey two (November 2021 – February 2022)
SARS	Severe acute respiratory syndrome
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
SPV	Subjects per variable
SD	Standard deviation
SE	Standard error
UK	United Kingdom
USA	United States of America
VIF	Variance Inflation Factor
VOC	Variant of Concern
WAI	Work Ability Index
WAS	Work Ability Score
WHO	World Health Organisation
WHO-5	World Health Organisation-Five Well-being Index

CHAPTER 1 - INTRODUCTION

1.1 SARS-CoV2 and the COVID-19 pandemic

The SARS-CoV-2 is a single, positive-strand RNA virus that emerged in December 2019 in Wuhan, China (Yesudhas et al., 2021). The disease consequent to infection with this virus, Coronavirus disease 2019 (COVID-19), is the causative illness of an ongoing global pandemic. As with the two previous coronavirus outbreaks of the 21st century, this virus can cause a severe respiratory syndrome in humans (Yesudhas et al., 2021). Unlike the previous two outbreaks, this virus proved to be much more highly transmissible: it spread rapidly across the world, leading to widespread morbidity and mortality (Yesudhas et al., 2021). Less than three years following its emergence, the virus has caused one of the deadliest infectious disease outbreaks in history (Sampath et al., 2021). At the time of writing, more than six million deaths caused by COVID-19 have been confirmed. Actual mortality is suspected to be multiples larger than this figure; one estimate using excess mortality gives a total of more than 18 million deaths to date (Barber, 2022).

While the majority of COVID-19 cases are mild, approximately 5% of patients develop a severe syndrome (defined by dyspnoea, hypoxia, respiratory failure, shock and multiorgan dysfunction) necessitating intensive care (Wiersinga et al., 2020).

While this severe syndrome can occur in any patient, the case-fatality rate (CFR) varies substantially by age, with older adults at a much higher risk of death from the condition. For example, in those aged 5-17 the estimate is a CFR of 0.3 deaths per 1000; among those aged 85 or older the CFR is 305 deaths per 1000 – roughly a 1000-fold increase (Wiersinga et al., 2020). In one analysis from the United Kingdom, the risk of death in those aged greater than 80 was twenty times that seen in those aged between 50 and 59 (Williamson et al., 2020).

The virus was already highly transmissible when it emerged in Wuhan; it became significantly more so as its evolution optimised it for improved human-to-human transmission (Sharif et al., 2022). It is now considered to be one of the most transmissible human viruses, with a recent variant, Omicron, having an estimated basic reproduction number of 8.2, a figure comparable to that of measles (Liu & Rocklöv, 2022). It spreads primarily via droplet and aerosol routes and appears to have an increased attack rate in poorly ventilated environments (Somsen et al., 2020; Yesudhas et al., 2021). Its transmissibility is enhanced by the fact that apparently asymptomatic people have the ability to spread the virus to others, making contact tracing and isolation of cases complex (Rothe et al., 2020).

This unfortunate combination of a highly transmissible virus which had the potential to cause substantial mortality in an immunologically naïve population had seismic consequences for both healthcare systems and wider society globally (Blavatnik School of Government, 2020; Panneer et al., 2022; Zangani et al., 2022). Hospitals in areas experiencing acute outbreaks of the virus early in the pandemic were completely overwhelmed, quickly running out of intensive care unit (ICU) beds, ventilators, and trained staff (Tyrrell et al., 2021). High levels of healthcare worker infection rates with the disease further contributed to the difficulties in supplying care to the afflicted (Panneer et al., 2022; Pirdal et al., 2022). Images of patients dying due to the rationing of care and the creation of mass graves for those who had died spread around the world (Arnold, 2020; Hennigan, 2020; Mee, 2020; Nasiri, 2020). In response to this, governments reacted by implementing restrictions designed to impede the spread of the virus (Blavatnik School of Government, 2020). These varied considerably both longitudinally and by jurisdiction, but included contact tracing procedures, restricted travel, isolation requirements, mask-wearing, school closures, working from home, prohibitions on public gatherings and, in some

cases, complete lockdown of citizens to their homes (Blavatnik School of Government, 2020).

The pandemic was abated to some degree due to the rapid development of several vaccines; rollout of these vaccines began approximately one year after the virus was first identified in Wuhan (Berry et al., 2022). While vaccination has not prevented transmission as much as may have been hoped, it has substantially reduced COVID-19 mortality (Baradaran et al., 2022). While restrictions in wider society have largely been removed at the time of writing, some advisory measures have continued in Ireland including mask-wearing in healthcare settings and the ongoing requirement to self-isolate if one is infected with COVID-19 (Citizens Information, 2022). The virus continues to spread and evolve freely; its future trajectory and impact is unclear.

1.2 The Irish nursing home sector

The Irish nursing home sector is composed of a mix of public and private nursing homes (NHs). In May 2020, there were approximately 31,000 beds across 576 NHs giving an average of 55 beds per nursing home (range of 9 to 184 beds) (Department of Health, 2020). The majority of residents – approximately 25,000 - are cared for by private and voluntary nursing homes (Department of Health, 2020). Nursing Homes Ireland (NHI; <https://www.nhi.ie>), the representative body for private and voluntary nursing homes in the state, represent approximately 90% of such nursing homes. The private sector is a mix of individual NHs, independent groups of NHs, and religious organisations (Department of Health, 2020). Public nursing homes provide care for approximately 5,000 residents and are owned and operated by the state-funded public healthcare provider, the Health Service Executive (HSE) (Department of

Health, 2020). Nationally, approximately 30,000 staff work across the sector (Department of Health, 2020).

All nursing homes, whether private or public, are regulated by the Health Information and Quality Authority (HIQA). HIQA is a statutory, government-funded, independent agency, operating since 2007, which monitors the safety and quality of healthcare and social care systems in the state. It was founded in the wake of the O'Neill Report, which found that care in Irish nursing homes was deficient and consistent with findings of institutional abuse (O'Neill, 2006). HIQA has powers to register, inspect, and apply to court for the closure of nursing homes and residential facilities delivering substandard care (Health Information and Quality Authority, 2020b).

The sector was challenged even before the pandemic. In the Republic of Ireland (ROI), the proportion of those aged 80 or older (the cohort most likely to require nursing home care) has increased by 21% between 2005 and 2015 (Department of Health, 2020). The proportion of long-term healthcare workers has increased by only 13% in the same time period (Department of Health, 2020). Additionally, many of these staff have little training in the care of older persons; the majority of healthcare workers recruited are classified as healthcare assistants or “multi-task attendants” (Department of Health, 2020). As seen elsewhere, it is thought that there is a lack of nurses with specialist training working with older people in Ireland (Department of Health, 2020). Additionally, the sector has difficulty attracting workers due to low wages, limited career opportunities, limited training, heavy workload, and significant job stress; the outlook is expected to be challenging for nursing home staff recruitment in the post-pandemic world (OECD, 2020). A January 2022 survey of 118 nursing homes by NHI revealed that an average of 9.4 HCAs and 2.86 nurses left each nursing home in Ireland in the previous year; 80.6% of

nursing homes reported it was “extremely difficult” or “impossible” to recruit HCAs; and 61.9% reported the same difficulty with nursing recruitment; the organisation characterise this as a “staffing emergency” (Nursing Homes Ireland, 2022).

1.3 Nursing homes during the COVID-19 pandemic

Much of the focus in the initial months of the pandemic was on hospital preparedness (Rocard et al., 2021). Startling images from Wuhan, Bergamo and New York City sparked a dramatic rush of equipment procurement and staff redeployment in healthcare systems internationally (see Figure 1-1, Figure 1-2 & Figure 1-3). The fear at this time was that the virus would overwhelm healthcare systems and care would need to be rationed, leading to enormous premature death in even the young and healthy. This race to pandemic preparedness was focused on hospital networks, specifically in hospital emergency departments and intensive care units (ICUs) (Rocard et al., 2021).



Figure 1-1: Wuhan, Hubei Province, China

Construction efforts begin to build the Huoshenshan Hospital in January 2020, a 1,000-bed temporary field hospital in Wuhan, Hubei province, China. Medical services were rapidly overwhelmed early in the pandemic, leading to a strict lockdown to prevent community transmission and the rapid construction of eighteen temporary hospitals and isolation units in the area. “China News Service. Creative Commons (CC BY 3.0)]]



Figure 1-2: Bergamo, Italy.

A bio-containment team prepare a patient for transport from Bergamo, Italy to other hospitals for treatment in March 2020. Hospitals in the area were completely overwhelmed by the rapid spread of the virus early in the pandemic. ["Trasporto di pazienti in bio-contenimento." Aeronautica Militare. Creative Commons (CC BY 4.0)]



Figure 1-3: New York City, USA

Military members set-up emergency intensive care beds in the Jacob K. Jarvis Convention Center in New York City, April 3, 2020. [Virginia National Guard response to the COVID-19 pandemic, U.S. Air National Guard, Creative Commons (CC 2.0)]

In the midst of this, the nursing home sector was largely an afterthought in terms of health system procurement and planning (Rocard et al., 2021). Nursing homes initially struggled to source personal and protective equipment (PPE) and staff were diverted to other, prioritised sectors, e.g., polymerase chain reaction (PCR) testing and frontline services (Chan et al., 2021). It was clear from early in the pandemic that SARS-CoV-2 was destined to be at its most destructive in those older persons living largely indoors in communal residences (Iritani et al., 2020). Unsurprisingly, many nursing homes suffered disproportionate early pandemic mortality rates globally; by mid-2020, nursing home residents accounted for 56% of COVID-19 deaths in Ireland, 40% in the USA, 47% in the UK and 40% in Italy (Burton et al., 2020; M. K. Chen et al., 2021; Department of Health, 2020; Ioannidis et al., 2021; Istituto Superiore di Sanità, 2020). There were some initial hopes that restrictive infection control policies could create a barrier to stop the virus entering the nursing home environment, even when there was widespread community transmission of the virus. Unfortunately, this was not the experience on the ground and there is growing evidence that the rates of nursing home resident COVID-19 mortality correlate highly with community transmission of the virus (McMaster National Collaborating Centre for Methods and Tools, 2020). The only jurisdictions that managed to keep COVID-19 out of residential facilities are those that successfully adopted a successful community “suppression” or “zero COVID” policy; even these failed at a local level when outbreaks occurred (Comas-Herrera A, 2022; Fan, 2022; Jefferies et al., 2020; Manning, 2021). Therefore, it seems unlikely that the virus could have been kept out entirely, even with improved central policies and planning. Regardless, adequate staffing and proper infection control interventions have been shown to mitigate nursing home outbreaks of COVID-19 and it seems unlikely that the early-pandemic disregard for nursing homes did not have a significant impact on resident mortality. (Simoni-Wastila et al., 2021; Thomas, 2021)

Even in the absence of central planning, nursing homes did implement stringent regimens, including restricting visitors and group activities for residents (Comas-Herrera A, 2022). These restrictions are in themselves are punitive for both residents and staff in nursing homes. Early evidence points to negative impacts on resident cognition, functioning and wellbeing (Giebel et al., 2022). Quarantine rules for staff often worsen already understaffed working environments. Fortunately, vaccination rollout provided some reprieve for staff and residents and substantially reduced mortality rates (Cabezas et al., 2021). However, the emergence of the Omicron variant in late 2021 added to the ongoing challenges experienced by nursing homes (Comas-Herrera A, 2022).

The impact on specific nursing homes has varied hugely by establishment; some NHs evaded outbreaks until vaccinations had been administered to their residents (and consequently avoided high mortality rates); others suffered substantial resident mortality during the first and second waves (Comas-Herrera A, 2022). Catastrophic results were seen in some cases. For example, in Ireland, one nursing home was described as a “centre in chaos” with no apparent management in place, residents “wandering unsupervised” and COVID-19 positive residents intermixing freely with others; it was subsequently closed by HIQA (Health Information and Quality Authority, 2020a; Raidió Teilifís Éireann, 2020).

1.4 Healthcare worker and nursing home staff mental health

1.4.1 Introduction

There are limited data on nursing home staff mental health. A small number of studies have described the challenges of conducting research in nursing homes and LTC facilities (Lam et al., 2018). Many nursing homes have never participated in research before (Hickman et al., 2008). Some nursing home facility owners do not allow research to take place in their facilities, occasionally because they fear more regulatory scrutiny (Davies et al., 2014; Zapka et al., 2014). Larger chains of nursing homes (which are to be found in Ireland) may have policies which restrict research participation and smaller nursing homes may not have the resources to enable them to participate (Van Ness et al., 2012). Nursing homes are often understaffed; consequentially, there are significant time constraints for staff to participate in studies (Davies et al., 2014; Shah, 1998). Nursing homes are considered “highly unstable environments” for research, partially due to high staff turnover (Buckwalter et al., 2009). The attritional nature of these settings makes it difficult to carry out longitudinal studies without substantial dropout rates (Mentes & Tripp-Reimer, 2002).

These factors may help explain the lack of research into nursing home staff mental health. In comparison to hospital settings, there is a lack of research in the Irish nursing home sector generally. A search of prepandemic MEDLINE literature using MeSH terms “nursing homes”/“homes for the aged”/“long-term care” and “Ireland” finds only 89 articles that mention the Irish nursing home sector. Few of these were focused on staff specifically; none were focused on their mental health. Unlike Irish hospitals, who have fostered increasingly closer ties to the university

sector over the years and are partially staffed by part- or full-time academics, many Irish nursing homes apparently operate in a largely research-free space.

Given the lack of research in the nursing home staff cohort, a summary is provided below of firstly, prevalences and correlates of all HCW mental health (the bulk of which is focused on hospital staff), and secondly, a summary of the literature examining nursing home staff mental health specifically. It is hoped that providing this data for the HCW cohort in general may help contextualise the nursing home cohort findings, despite this sector being markedly different from the hospital one in many ways.

1.4.2 Healthcare worker mental health during infectious disease outbreaks

The requirements to provide frontline care during infectious disease outbreaks is a recognised risk factor for the development poor short and long-term psychological outcomes in HCWs (Maunder et al., 2006). At the outset, staff are forced to work in environments where the consequences of infection by a novel pathogen may be unknown and where policies and procurement have yet to catch up with the realities of the outbreak. It seems likely that this stressful situation could negatively affect staff wellbeing and, conversely, increase rates of depressive symptoms and suicidal thinking. Additionally, staff may be exposed to traumatic scenarios or fear for their lives, increasing their risk of developing symptoms of post-traumatic stress disorder (PTSD).

Of increasing interest is moral injury in HCWs, i.e., the distress experienced when an individual witnesses or engages in acts that contradict their moral and ethical beliefs (Nash et al., 2013a). This has traditionally been studied in military

populations exposed to combat but severe difficulties in providing optimal care during a pandemic could provoke similar reactions in HCWs (Wisco et al., 2017) (Hines et al., 2020). Surveys of USA hospital workers have demonstrated high levels of moral injury over the course of the COVID-19 pandemic (Hines et al., 2021; Hines et al., 2020).

One systematic review of prepandemic literature examined prevalences of mental health disorders in HCWs during previous infectious disease outbreaks (Serrano-Ripoll et al., 2020). This study found estimated pooled prevalences for acute stress disorder (40%, 95% confidence interval (CI) 39- 41%), anxiety (30%, 95%CI 30-31%), burnout (28%, 95% CI 26-31%), depression (24%, 95% CI 24-25%), and post-traumatic stress disorder (13%, 95% CI 13-14%).

1.4.3 Correlates of HCW mental health during infectious disease outbreaks.

Several studies have demonstrated factors that are correlated with (and may represent predictors of) psychological outcomes for healthcare staff during infectious disease outbreaks (Brooks et al., 2017; Serrano-Ripoll et al., 2020). These can be grouped into broad categories of demographic variables, occupational factors including those relating to virus exposure, and coping styles.

Firstly, demographic variables (including younger age, female gender and belonging to an ethnic minority) have been shown to be associated with a higher risk of poor mental health outcomes. Younger age has been shown to be a risk factor for depression and PTSD in a study of Indian ophthalmologists (Khanna et al., 2020); it has also been shown to be associated with increased stress in a study of UK healthcare workers (n=2,773) (Gilleen et al., 2021). Female HCWs have consistently

been shown to be at higher risk of depression and a subgroup analysis showed a higher prevalence of PTSD (30%, 95%CI 28-31%) than their male colleagues (16%, 95%CI 13-14%) (Elbay et al., 2020; Gilleen et al., 2021; Kurt et al., 2020; Lai et al., 2020; Santamaría et al., 2021; Serrano-Ripoll et al., 2020). In a study of UK healthcare workers during the COVID-19 pandemic (n=2,773), being from an ethnic minority has been shown to be significantly associated with high PTSD symptoms (OR=1.52); no association was found between ethnicity and depression in this study (Gilleen et al., 2021).

Secondly, viral outbreak-related factors and factors relating to exposure to the virus in the healthcare setting have been identified in several studies as being associated with psychological distress. For example, nurses have been found to be at higher risk of developing PTSD during infectious outbreaks in numerous studies (Barello et al., 2020; Song et al., 2020; Tang et al., 2017); it has been suggested that this may be due to the fact that they work closely with patients or that they have less knowledge of viral outbreaks than doctors (Tang et al., 2017). With respect to outbreak-related factors, one study of Singaporean HCWs (n=15,025) during the SARS outbreak found that perceived stigmatization due to their role was associated with stress (Koh et al., 2005). A fear of infection has been shown to be associated with various mental health problems including depression and PTSD (Liu et al., 2012) (Mauder et al., 2004). Job stress, social isolation and a lack of social support have similarly been found to contribute to worse outcomes including post-traumatic stress (Mauder et al., 2004; Park et al., 2018; Xiao et al., 2020). Being quarantined or self-isolated during the COVID-19 pandemic was shown to be associated with depression in one study (n=320) of Californian nurses (OR=2.68 [1.55–4.63], $p<0.01$). In the same study, caring for COVID-19 patients was shown to be associated with moderate/severe stress (OR=2.25; $p=0.012$) and anxiety (OR=3.04; $p<0.001$).

Coping styles have been shown to be associated with differing mental health outcomes in numerous studies (Hannemann et al., 2022). The terminology for coping styles differs in various studies but broadly coping styles can be considered to be positive (otherwise known as adaptive/active/approach) or negative (otherwise known as maladaptive/passive/avoidant). The evidence is unclear as to whether positive coping strategies may be protective against depression with different effects reported in two studies (Hannemann et al., 2022). However, negative (also known as maladaptive) coping styles consistently appear to be related with worse outcomes, including depression and PTSD (Hannemann et al., 2022).

1.4.4 Nursing home staff mental health

1.4.4.1 Prepandemic literature

MEDLINE searches were carried out on prepandemic literature (defined as papers published up to and including the year 2019) using (i) the MeSH terms “nursing homes” OR “homes for the aged” OR “long-term care” OR non-MeSh terms “care home*” OR “nursing home*”, (ii) “staff” or the MeSH term “Health personnel” and (iii) the relevant outcome measure using MeSH terms where possible. Results were then screened to determine if the studies examined the relevant outcome of healthcare workers in nursing homes. Nine prepandemic papers were identified that examined depression and depressive symptoms as a primary or secondary outcome in nursing home staff (see Table 1-1). Estimates for depression ranged from 4.3% to 56.8% (Hjarsbech et al., 2013; Muntaner et al., 2015). The studies are heterogenous in their methodology and measures used. A review of the literature showed no

prepandemic literature on post-traumatic stress, moral injury, suicidal thinking, or work ability in nursing home staff.

Author(s), Year	Title	Measure(s)	Prevalence of depression / depressive symptoms
(Firth et al., 1987)	Professional depression, 'burnout' and personality in longstay nursing	BDI	6.7% of female staff moderately-severely depressed; 16% of male staff moderately-severely depressed
(Muntaner et al., 2004)	Work Organization, Area Labor-market Characteristics, and Depression among U.S. Nursing Home Workers: A Cross-classified Multilevel Analysis	RCES-D; cut-off ≥ 16	Depressive disorder: 48.5%
(Muntaner, Li, et al., 2006)	County and organizational predictors of depression symptoms among low-income nursing assistants in the USA	RCES-D; cut-off ≥ 16	No figure reported; "Approximately half report symptoms of MDD"
(Muntaner, Van Dussen, et al., 2006)	Work organization, economic inequality, and depression among nursing assistants: a multilevel modelling approach	RCES-D; cut-off ≥ 16	No figure reported; "Approximately half report symptoms of MDD"
(O'Donnell et al., 2011)	Depressive Symptoms in Extended-Care Employees: Children, Social Support, and Work-Family Conditions	RCES-D	No cut-off/prevalence reported.
(Rodwell & Demir, 2012)	Psychological consequences of bullying for hospital and aged care nurses	RCES-D; no cut-off reported	Prevalence not reported.
(Hjarsbech et al., 2013)	Do psychosocial working conditions modify the effect of depressive symptoms on long-term sickness absence?	MDI; cut-off ≥ 20	4.3% excluded from the study on the basis of having a diagnosis of depression on MDI
(Suzumura et al., 2013)	A Prospective Study of Factors Associated with Risk of Turnover among Care Workers in Group Homes for Elderly Individuals with Dementia	CES-D; cut-off ≥ 16	Depressive disorder: 10.1%
(Muntaner et al., 2015)	Social class and mental health: testing exploitation as a relational determinant of depression	CES-D/RCES-D; cut-off of 16 for both scales	CES-D: 56.8%; RCES-D: 54.2%

Table 1-1: Prepandemic papers examining depression and/or depressive symptoms in nursing home staff

BDI: Beck Depression Inventory. MDI: Major Depression Inventory. (R)CES-D: (Revised) Centre for Epidemiological Studies-Depression Scale. MDD: Major depressive disorder.

1.4.4.2 Postpandemic literature

The same procedure was applied to studies from the beginning of 2020 to August 2022. Two studies examining depressive symptoms in nursing home staff during the

pandemic were discovered following search; estimates for depression ranged from 16.5% to 57.6%. A survey of Australian nursing home staff was excluded as the figure for depression reported (20%) was based off a survey of senior staff in residential aged care facilities where they were asked what percentage of staff they felt were depressed and it did not include a validated measure of depression in individual nursing home staff. (Brydon et al., 2022) Three papers were found to examine PTSD symptoms in nursing home staff; again, the estimates vary substantially, ranging from 10.2% in France to 38% in Italy (Husky et al., 2022; Marianna Riello et al., 2021). One paper (n=40) examined suicidal risk in nursing home staff, finding that 25% of staff indicated a high risk of suicide on the Suicide Behaviours Questionnaire-Revised (SBQ-R) (Veronese et al., 2021). A recent systematic review of the literature on moral injury in healthcare workers found only one quantitative paper (published by the author of this thesis and colleagues; the findings are reported later in this thesis) and seven qualitative studies; the authors concluded that moral injury was likely present in nursing home staff before the pandemic but may have been exacerbated by it (Brady et al., 2021; Laher et al., 2022). No studies were found to examine work ability in nursing home staff during the pandemic.

Author(s), Year	Title	Measure(s)	Prevalence of depression / depressive symptoms
(Takahashi et al., 2022)	Mental Health of Caregivers Working in Nursing Homes during the COVID-19 Pandemic	HADS; cut-off ≥ 8	54.7% of males; 57.6% females
(Husky et al., 2022)	Nursing Home Workers' Mental Health During the COVID-19 Pandemic in France	PHQ-9; cut-off ≥ 10	Major depression: 16.5%

Table 1-2: Postpandemic papers examining depression and/or depressive symptoms in nursing home staff

HADS: Hospital Anxiety and Depression Scale. PHQ-9: Public Health Questionnaire-9 item

Author(s), Year	Title	Measure(s)	Prevalence of PTSD / PTSD symptoms
(Husky et al., 2022)	Nursing Home Workers' Mental Health During the COVID-19 Pandemic in France	PCL-5; cut-off of 33	PTSD: 10.2%
(Riello et al., 2020)	Prevalence of post-traumatic symptomatology and anxiety among residential nursing and care home workers following the first COVID-19 outbreak in Northern Italy	IES-R; cut-off of ≥ 26	Moderate to severe symptoms of PTSD: 38%
(Marianna Riello et al., 2021)	Effectiveness of self-help plus (SH+) in reducing anxiety and post-traumatic symptomatology among care home workers during the COVID-19 pandemic: a randomized controlled trial	IES-R; cut-off of ≥ 26	69.4% of participants who had received the intervention reported at least mild symptoms; 72.9% of those who had not reported at least mild symptoms.

Table 1-3: Postpandemic papers examining PTSD and/or PTSD symptoms in nursing home staff

PCL-5: PTSD Checklist for DSM-5. IES-R: Impact of events scale revised.

1.4.4.3 Correlates of nursing home staff mental health

Overall, there are limited prepandemic data on correlates of nursing home staff mental health but a number of qualitative and mixed-methods studies have examined psychological distress in nursing home staff in the COVID-19 pandemic. Several factors have been identified which appear to relate to this distress (Laher et al., 2022). The lack of availability of PPE has been identified as a major issue, with staff reporting fear of becoming infected or infecting others with COVID-19 (Blanco-Donoso et al., 2022). Staff have also reported job stress because of conflicting principles, inadequate staffing levels, rapidly changing roles and demands (S. Zhao et al., 2021, Kaelen et al., 2021, Krzyzaniak et al., 2021; Mo & Shi, 2020). Several studies have highlighted how staff felt that they were too inexperienced or had not received adequate training for coping with the challenge of the pandemic (Nyashanu et al., 2022; Sarabia-Cobo et al., 2021; S. Zhao et al., 2021). Many nursing home staff felt abandoned, betrayed, and undervalued for the work that they do (Nyashanu et al., 2022, Sarabia-Cobo et al., 2021, Blanco-Donoso et al., 2022; Krzyzaniak et al., 2021). This was in addition to the challenges that they already faced; one study reported a

participant as saying: “COVID-19 has been the trigger that has exposed the deficiencies of the system” (Blanco-Donoso et al., 2022).

1.6 Aims, objective and hypotheses

1.6.1 Aims

The aims of this study are to assess the mental health of nursing home staff in the Republic of Ireland over the course of the COVID-19 pandemic and to explore if there are factors that may be related to mental health outcomes in this cohort.

1.6.2 Study 1

1.6.2.1 Objective

To conduct an anonymous, online survey to characterise nursing home staff mental health in the Republic of Ireland during the third wave of the COVID-19 pandemic.

1.6.2.2 Hypothesis

I hypothesised that there will be significant differences between nurses, healthcare assistants and nonclinical staff working in nursing homes in the Republic of Ireland in terms of their mental health outcomes during the COVID-19 pandemic. More specifically, that HCAs would report significantly worse mental health outcomes (i.e., lower WHO-5, higher IES-R, higher MIES, more suicidal thinking, lower WAI scores) than nurses and that nurses would report significantly worse outcomes compared to nonclinical staff.

1.6.3 Study 2

1.6.3.1 Objective

To conduct a follow-up, anonymous online survey one year after the original study to further characterise nursing home staff mental health and to assess if there have been changes in these outcomes over time.

1.6.3.2 Hypothesis

I hypothesised that the rollout of vaccination and the easing of pandemic-related restrictions will have improved staff wellbeing, post-traumatic stress, moral injury, suicidal thinking and pandemic-related occupational perceptions.

1.6.4 Study 3

1.6.4.1 Objective

To perform analyses of the data collected in both surveys to ascertain if demographic and employment characteristics, COVID-19 exposure, perceptions regarding the pandemic, and coping styles correlate with depressive symptoms, post-traumatic stress symptoms and moral injury.

1.6.4.2 Hypothesis

I hypothesised that demographic and employment characteristics, COVID-19 exposure, perceptions regarding the pandemic, and coping styles will correlate with depression, post-traumatic stress and moral injury in nursing home staff working in the Republic of Ireland during the COVID-19 pandemic. More specifically, I hypothesised that female gender, younger age, non-white ethnicity, employment as a HCA, less experience, the presence of physical or mental health conditions,

exposure to COVID-19 residents, history of self-quarantine, COVID-19 infection history, negative perceptions of issues relating to the COVID-19 pandemic, lower altruism, less adaptive coping strategies, and more maladaptive coping strategies would significantly correlate with worse mental health outcomes.

CHAPTER 2 - MATERIALS AND METHODS

2.1 Introduction

This study comprised two national, cross-sectional, online, anonymous surveys of nursing home staff in the Republic of Ireland. The target sample was all staff working in nursing homes, defined as residential facilities that provides 24-hour support and care for persons who require assistance with activities of daily living (Sanford et al., 2015). Staff were invited to participate irrespective of whether they were clinical or non-clinical staff and whether they were working on a full- or part-time basis. The nursing homes selected for participation were those affiliated with Nursing Homes Ireland (NHI, www.nhi.ie), the national representative body for the private and voluntary nursing home sector. NHI represents 90% of such nursing homes in the state.

Given the nature of the study, signposts to psychological supports were provided on exiting the survey (see Appendix IV: Signposting to psychological supports). Participants were advised that they could consider liaising with mental health supports via their GP, their occupational health department, and online support services.

2.2 Methods

2.2.1 Introduction

Identical information was collected for both survey one and survey two (see Appendix III: Nursing home staff survey). The general principles guiding the selection of measures were that (i) validated measure should be used where possible, and (ii) given that I was collecting data on a wide variety of outcomes and that participants could drop out before survey completion if it were overly long, the measures should be as brief as possible. 2.2.2 Demographic information

Basic demographic data were collected, including age, gender (female, male, other, prefer not to say), living arrangements (alone, with family, with roommates, other), ethnicity ((i) Asian/Asian-Irish, (ii) Black/Black-Irish, (iii) southeast Asian/southeast Asian-Irish, (iv) white Irish/British/other, (v) mixed race, (vi) other), years of experience in their role (less than five years, five to ten years, greater than ten years) and county of work location. To ensure that I was including categories of profession that capture the entirety of staff working in Irish nursing homes, I had obtained information from NHI prior to recruitment. They advised that there were six categories of staff working in Irish nursing homes: nurses, healthcare assistants, activity coordinators, household staff, catering staff and administrative staff. As I wished to capture the experience of those based entirely in nursing homes, I did not recruit those who visit nursing homes on an intermittent basis e.g., general practitioners (GPs) responsible for nursing home medical care.

Participants were asked if they had a history of pre-existing physical illness. These were subsequently grouped into broad categories of conditions, namely (i) cancers, (ii) cardiovascular diseases (e.g., hypertension, angina), (iii) immunosuppressive conditions (whether drug induced or otherwise), (iv) metabolic diseases (e.g., diabetes, obesity), (v) respiratory diseases (e.g., asthma, chronic obstructive pulmonary disease (COPD)), (vi) other diseases or (vii) none. Some of these conditions have been shown to increase risk for the development of severe COVID-19 e.g., diabetes and obesity (Gao et al., 2021). Some other conditions may have been perceived by the public to be a risk factor for the development of severe COVID-19 irrespective of their actual level of risk. For example, the evidence for asthma being a risk factor for severe COVID-19 is controversial but those with asthma appear to have significant worries regarding contracting the disease (Gao et al., 2021; Philip et al., 2020).

Participants were also asked if they had a history of pre-existing mental illness; these were subsequently grouped into (i) anxiety disorders, (ii) mood disorders, (iii) other or (iv) none. Those with pre-existing mental illness are at higher risk of developing subsequent episodes of mental illness and therefore, may have been likely to report worse mental health outcomes during the pandemic (Gilleen et al., 2021).

Given that I was collecting highly sensitive personal information from participants in a relatively small field, the protection of participant anonymity was a high priority. Therefore, where possible, demographic response variables were broadened to protect participants' identity. For example, instead of collecting age by year as a numerical variable, three categories were denoted for respondents to select (less than 30 years old, 31-50 years old, greater than or equal to 51 years old).

2.2.3 Staff exposure to COVID-19

Previous research has shown that the degree of pathogen exposure during infectious disease outbreaks is correlated with psychological distress (Mauder et al., 2004).

Participants were asked to answer several categorial items relating to their exposure to the novel coronavirus in both their nursing home and outside of work. One item asked regarding the number of COVID-19 residents the staff member had attended to. Staff were asked if they had previously self-quarantined; this has been demonstrated to have an association with elevated levels of psychological distress (Brooks et al., 2020). Staff were asked regarding their personal history of COVID-19 infection, including the severity and duration of their illness and their current recovery status. Staff were asked regarding their exposure to COVID-19 positive acquaintances in work and at home. They were also asked if they had contact with acquaintances who had been hospitalised or died from COVID-19.

2.2.4 Measures

2.2.4.1 The Impact of Events Scale-Revised (IES-R 22)

The Impact of Event Scale-Revised (IES-R) was used for assessing post-traumatic stress symptoms during the previous seven days (Creamer et al., 2003). At a cut-off score of 33, this measure has a positive predictive factor of 0.90 for a diagnosis of PTSD and a negative predictive factor of 0.84 (Creamer et al., 2003). It is highly correlated (0.84, $p < 0.001$) with the PTSD Checklist, another measure of PTSD symptomatology that has shown good psychometric properties (Creamer et al., 2003; Weathers et al., 1993). Much of the development of this tool arose in military research but it has been studied in various other populations, for example in firefighters, community disasters, workplace bullying, and in victims of bank robbery

(Malinauskienė & Bernotaitė, 2016; Mitani, 2008; Mucci et al., 2015; Yoo et al., 2017). However, outside of military research, the tool has found its widest application in the study of psychological responses to stressful situations affecting healthcare workers.

This is a 22-item Likert-rated measure with three subscales corresponding to the main symptom domains of PTSD (hyperarousal, intrusion, and avoidance) as defined in the DSM-IV (Motlagh, 2010). Scores can be summed to give a total IES-R score with a higher score indicating a greater degree of severity of post-traumatic symptoms. While there has been some suggestion that higher scores may be strongly indicative of a diagnosis of PTSD, this tool is not diagnostic (Murphy et al., 2017).

“We'd like to ask some questions about how the COVID-19 outbreak itself has affected your mental health. Choose the options that best describe you. Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to the COVID-19 outbreak. How much were you distressed or bothered by these difficulties?”

Item	Subdomain
1. Any reminder brought back feelings about it.	Intrusion
2. I had trouble staying asleep.	Intrusion
3. Other things kept making me think about it.	Intrusion
4. I felt irritable and angry.	Hyperarousal
5. I avoided letting myself get upset when I thought about it or was reminded of it.	Avoidance
6. I thought about it when I didn't mean to.	Intrusion
7. I felt as if it hadn't happened or wasn't real.	Avoidance
8. I stayed away from reminders of it.	Avoidance
9. Pictures about it popped into my mind.	Intrusion
10. I was jumpy and easily startled.	Hyperarousal
11. I tried not to think about it.	Avoidance
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.	Avoidance
13. My feelings about it were kind of numb.	Avoidance
14. I found myself acting or feeling like I was back at that time.	Intrusion
15. I had trouble falling asleep.	Hyperarousal
16. I had waves of strong feelings about it.	Intrusion
17. I tried to remove it from my memory.	Avoidance
18. I had trouble concentrating.	Hyperarousal
19. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea or a pounding heart.	Hyperarousal
20. I had dreams about it.	Intrusion
21. I felt watchful and on-guard.	Hyperarousal
22. I tried not to talk about it.	Avoidance

Table 2-1: The Impact of Events Scale Revised (IES-R)

Items were rated “Not at all”, “A little bit”, “Moderately”, “Quite a bit”, or “Extremely”

The hyperarousal scale comprises six items relating to anger, irritability, hypervigilance, increased physiological response to reminders of the traumatic event and poor concentration. The intrusion scale comprises eight items related to nightmares, intrusive thoughts and feelings, and trauma-related imagery. The

avoidance scale comprises items relating to the use of avoidance to cope with trauma-related ideas, scenarios, and feelings. As the score can be divided into separate scores for each of the PTSD subdomains, it provides granular information as to whether these subdomains may have interactions with other variables independently.

The measure includes suggested cut-off scores grouping post-traumatic stress symptoms into severity-based categories. However, there is no validated and universally agreed cut-off score for this measure in healthcare workers (or nursing home staff specifically). As a result, the cut-offs used for analyses in published literature, even during the pandemic, are highly variable, ranging from 20 to 34 (Marvaldi et al., 2021). At the time that ethical approval was being sought for this study, there were two papers that were most relevant to the study of PTSD symptoms in healthcare workers during the pandemic. Firstly, a paper from Wuhan at the beginning of the pandemic and, secondly, in nursing and care home staff in northern Italy early in the pandemic (Lai et al., 2020; Riello et al., 2020). Both studies used a cut-off score of 26 to indicate moderate-severe symptoms; I similarly chose a cut-off of ≥ 26 to indicate the presence of moderate-severe symptoms in Irish nursing home staff.

2.2.4.2 The World Healthcare Organisation-Five Wellbeing Index (WHO-5)

Wellbeing (and, conversely, depression) was assessed with the World Health Organisation's Well-Being Index (WHO-5). This is a self-rated five-item measure that asks about wellbeing during the previous two weeks. The WHO-5 was developed following the observation that there was no previous psychometric definition of subjective wellbeing (Topp et al., 2015). This led to the development of the WHO-10, which was itself derived from a 28-item rating scale used in a multicentre, international European study (Bech et al., 1996). This 28-item scale was based on

several other validated measures, i.e., the Zung scales for depression, distress and anxiety, the General Health Questionnaire, and the Psychological General Well-being scale (Bech, 1993). The 10 most valid items of this scale were identified using non-parametric item response theory and these items were further reduced to including only positively phrased items (Topp et al., 2015).

As the WHO-5 only contains positively phrased items, it captures a range of the subjective, positive wellbeing experienced by a respondent not captured by other common depression rating scales which tend to be focused on the negative symptomatology considered diagnostic for the disorder. The five items cover the positively phrased core features of depression in both the ICD-10 (low mood, lethargy, and anhedonia) and the DSM-V (low mood and anhedonia) in addition to one other diagnostic symptom (disrupted sleep) and another commonly comorbid feature (anxiety/agitation). The WHO-5 also asks respondents if these have been features for the past two weeks, the minimum duration required for a diagnosis of depression in both the International Classification of Disease-Revision 10 (ICD-10) and the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V). Scores are then multiplied by four to give a scale ranging from 0-100, with higher scores indicating a greater degree of wellbeing.

Please indicate for each of the five statements which is closest to how you have been feeling over the past two weeks. Over the past two weeks:

1. have felt cheerful and in good spirits
 2. I have felt calm and relaxed
 3. I have felt active and vigorous
 4. I woke up feeling fresh and rested
 5. My daily life has been filled with things that interest me.
-

Table 2-2: The WHO-5 Questionnaire

Items were rated “At no time”, “Some of the time”, “Less than half the time”, “More than half the time”, “Most of the time”, “All of the time”

The WHO-5 has been found to have validity in screening for depression and in measuring outcomes in clinical trials; with a cut-off of 50 the sensitivity of the WHO-5 was 0.86, and the specificity was 0.81; with a more restrictive cut-off of ≤ 28 it has a sensitivity of 0.93 and a specificity of 0.83 in the detection of depression (Topp et al., 2015). While the scale was not devised to measure depressive symptoms specifically, further research has identified that it shows a very high negative correlation with both subjective and objective ratings of these symptoms (Krieger et al., 2014). Furthermore, its scores have been shown to correspond well to the Hamilton Depression Rating Scale (HAM-D), considered to be the “gold standard” for assessing depression severity (Fenton & McLoughlin, 2021; Hamilton, 1960; Topp et al., 2015). Utilising the corresponding validated cut-off scores in the HAM-D, a WHO-5 score of 21-32 indicates the presence of low mood; a WHO-5 score of ≤ 20 suggests a likely diagnosis of major depression (Topp et al., 2015). It is these cut-offs that I have used in this study as cut-offs for, respectively, low mood and moderately/severely depressed participants.

2.2.4.3 The Work Ability Score (WAS)

The Work Ability Score (WAS) is derived from the Work Ability Index (WAI), an occupational health instrument developed in Finland in a longitudinal study of municipal employees (Oakman et al., 2018). The WAI is a 7-item measure developed to appraise staff perceptions of work ability and to identify those in need of support. It has been shown to have good predictive power to predict the level of emotional exhaustion, general health perception, and disability score in the nursing profession (Radkiewicz & Widerszal-Bazyl, 2005). It also has high cross-national stability (Radkiewicz & Widerszal-Bazyl, 2005). However, the WAS includes one item which

appears to be a poor determinant of work ability (Radkiewicz & Widerszal-Bazyl, 2005).

The Work Ability Score is simply the first item from the WAI questionnaire. It has been shown to have convergent validity with the WAI as a whole (El Fassi et al., 2013). Participants are asked to rate their present ability to cope with work demands compared to their lifetime best on a scale of 1-10, with 10 being their lifetime best. A score of ≤ 5 suggests insufficient perceived work ability (Ruitenburg et al., 2012).

2.2.4.4 The Moral Injury Events Scale (MIES) [adapted]

The Moral Injury Events Scale (MIES) is a 9-item scale originally developed to appraise moral injury in military personnel (Nash et al., 2013). It was developed with a cohort of participants from the Marine Resiliency Study, a prospective and longitudinal study examining risk factors for combat-related PTSD in United States marines (Nash et al. 2013). In this study, the MIES demonstrated internal consistency and temporal stability. Additionally, the authors reported finding preliminary support for its construct validity. Cut-off scores have not been developed for this measure to date.

"Please indicate how much you agree/disagree with each of the following statements regarding your experience at any time during the COVID-19 outbreak."		Domain
1.	I saw things that were morally wrong.	Transgression by others
2.	I am troubled by having witnessed others' immoral acts.	Transgression by others
3.	I acted in ways that violated my own moral codes or values.	Transgression by self
4.	I am troubled by having acted in ways that violated my morals or values.	Transgression by self
5.	I violated my own morals by failing to do something I felt I should have done.	Transgression by self
6.	I am troubled because I violated my morals by failing to do something I felt I should have done.	Transgression by self
7.	I feel betrayed by leaders at work who I once trusted.	Betrayal
8.	I feel betrayed by fellow healthcare workers who I once trusted.	Betrayal
9.	I feel betrayed by others outside the hospital who I once trusted.	Betrayal

Table 2-3: Moral injury events scale (questions adapted for HCWs during the COVID-19 pandemic)

Items were rated “Strongly disagree”, “Disagree”, “Not sure but probably disagree”, “Not sure but probably agree”, “Agree”, “Strongly agree”

I adapted this scale for healthcare staff during the COVID-19 pandemic (see Table 2-3). Staff were asked if they agreed with statements about moral injury during the COVID-19 pandemic. The scale has three domains: “Perceived transgressions by others” (two items relating to acts of omission where staff believed they witnessed others act in ways that violated their moral code), “Perceived transgressions by self” (four items relating to acts that staff have committed that violate their own moral code), and “Betrayal” (three items relating to perceived betrayal by previously trusted leaders). For the total score and in each of the subdomains, a higher score indicates a higher degree of moral injury.

2.2.4.5 Items adopted from the Columbia Suicide Severity Rating Scale (C-SSRS)

Two Likert scale items, adopted from the Columbia Suicide Severity Rating Scale (C-SSRS), were used to appraise suicidal ideation and planning during the previous week (Posner et al., 2011). The C-SSRS is a tool designed to measure four constructs in relation to suicidal ideation and behaviour. The two items in my survey were adapted from C-SSRS items designed to measure severity of suicidal ideation and planning. Participants were asked “I had some thoughts about wanting to end my life” and “I thought about developing a plan to end my life.” The response options were “Not at all”, “A little bit”, “Moderately”, “Quite a bit”, and “Extremely.” Responses were then dichotomised depending on presence/absence of suicidal ideation or planning.

2.2.4.6 Coping Orientation to Problems Experienced Inventory (Brief-COPE)

The Brief Coping Orientation to Problems Experienced (Brief-COPE) Scale was used to appraise staff coping styles. The Brief-COPE was developed from the COPE inventory,

a measure with 15 scales measuring various coping styles (Carver, 1997). It was developed from the observation that there was significant redundancy in the COPE inventory itself. The Brief-COPE reduced this to 14 scales with two Likert-rated items per scale; the majority of these can be categorised into either (i) approach (i.e., adaptive or positive) coping styles, or (ii) avoidant (maladaptive or negative) coping styles.

Examples of approach coping styles include “positive reframing” (e.g., “I’ve been trying to see things in a different light, to make it seem more positive”) or “emotional support” (“I’ve been getting comfort and understanding from someone.”) Examples of avoidant coping styles include “denial” (e.g. “I’ve been saying to myself ‘this isn’t real’”) or “substance misuse” (e.g., “I’ve been using alcohol or other drugs to help me get through it.”) There are two further constructs that are not considered to be part of either the adaptive or maladaptive styles: religion and humour. In total, there are 28 items in the scale.

In this survey, staff were asked to identify which coping responses they had used during the entire pandemic to date. A summative score was created for the adaptive coping styles (range 12-48) and maladaptive coping styles (range 12-48). Religion and humour scores were summed and scored separately with correspondingly smaller ranges (2-8). In all cases, higher scores indicate a higher degree of utilisation of this type of coping style.

"The following items deal with ways in which you have been coping with stress in your life during the COVID-19 outbreak. Using the 4-point scale, indicate the extent to which you have been doing what the item says. Please do not answer on the basis of whether it seems to be working or not - just whether you are doing it."

Item	Avoidant/Approach
1. I've been turning to work or other activities to take my mind off things	Avoidant
2. I've been concentrating my efforts on doing something about the situation I'm in	Approach
3. I've been saying to myself "this isn't real."	Avoidant
4. I've been using alcohol or other drugs to make myself feel better.	Avoidant
5. I've been getting emotional support from others.	Approach
6. I've been giving up trying to deal with it.	Avoidant
7. I've been taking action to try to make the situation better.	Approach
8. I've been refusing to believe that it has happened.	Avoidant
9. I've been saying things to let my unpleasant feelings escape.	Avoidant
10. I've been getting help and advice from other people.	Approach
11. I've been using alcohol or other drugs to help me get through it.	Avoidant
12. I've been trying to see it in a different light, to make it seem more positive.	Approach
13. I've been criticising myself.	Avoidant
14. I've been trying to come up with a strategy about what to do.	Approach
15. I've been getting comfort and understanding from someone.	Approach
16. I've been giving up the attempt to cope.	Avoidant
17. I've been looking for something good in what is happening.	Approach
18. I've been making jokes about it.	Humour
19. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	Avoidant
20. I've been accepting the reality of the fact that it has happened.	Approach
21. I've been expressing my negative feelings.	Avoidant
22. I've been trying to find comfort in my religion or spiritual beliefs.	Religion
23. I've been trying to get advice or help from other people.	Approach
24. I've been learning to live with it	Approach
25. I've been thinking hard about what steps to take.	Approach
26. I've been blaming myself for things that happened.	Avoidant
27. I've been praying or meditating.	Religion
28. I've been making fun of the situation.	Humour

Table 2-4: The Brief Coping Orientation to Problems Experienced scale (Brief-COPE)

Items were rated "I haven't been doing this at all", "I've been doing this a little bit", "I've been doing this a medium amount", "I've been doing this a lot",

2.2.4.7 Perceptions of the COVID-19 pandemic

I included a 15-item questionnaire adapted from a study assessing perceptions of HCWs during the severe acute respiratory syndrome (SARS) outbreak (Maunder et al, 2004). This study of 1557 healthcare workers in Toronto derived scales representing attitudes to the outbreak using factor analysis of 76 items. Scales with inadequate internal reliability were eliminated. The 15 remaining items in that study comprise three Likert scale items for each of five areas: health fear, social isolation, doubts about protective equipment, dissatisfaction with infection control-related systems and processes, and job stress. Items were scored from one to six; higher scores indicating greater levels of dissatisfaction with this construct. Two constructs were reverse coded (“doubts about protection” and “dissatisfaction with system and procedures”). Scores were expressed as group means and standard deviations. There are no cut-off scores for this measure.

“Below is a list of thoughts you may have had about your COVID-19 outbreak experience. Please read each item, and then indicate how much you agree/disagree with it.”

	Construct
1. I have been afraid of falling ill with COVID-19	Health fear
2. Emotional support is available at work for those who need help.	Dissatisfaction with system and procedures
3. I have been most concerned about passing COVID-19 onto my family members.	Health fear
4. People close to me have been worried about my health.	Health fear
5. I think that there is more conflict amongst colleagues at work.	Job stress
6. I believe that face masks are useful in protecting myself against COVID-19 at work.	Doubts about protection
7. I believe that there was adequate training provided to me at work in the use of personal protective equipment (PPE)	Dissatisfaction with system and procedures
8. I have personally coped with the COVID-19 situation by avoiding colleagues who may be exposed	Social isolation and avoidance
9. I believe that regular hand washing is useful in protecting myself against COVID-19.	Doubts about protection
10. I think that people have avoided me because of my job.	Social isolation and avoidance
11. I have had to do work that I don't usually do.	Job stress
12. I feel that personal protective measures at work are generally effective.	Dissatisfaction with system and procedures
13. I have avoided telling other people about the nature of my job.	Social isolation and avoidance
14. I believe that disposable eye shields or goggles are useful in protecting myself from COVID-19	Doubts about protection
15. I think that I have had an increase in my workload.	Job stress

Table 2-5: Perceptions regarding the COVID-19 pandemic.

Item were rated “Strongly disagree”, “Disagree”, “Not sure but probably disagree”, “Not sure but probably agree”, “Agree”, “Strongly agree”.

2.2.4.8 Altruism

There is previous evidence that altruism may mediate the psychological impact of disease outbreaks on HCWs (Wu et al., 2009). To assess this in my study, I included an additional Likert scale item assessing altruistic acceptance of risk: “Because I wanted to help COVID-19 patients, I was willing to accept the risks involved.” This

was rated “Strongly disagree”, “Disagree”, “Not sure but probably disagree”, “Not sure but probably agree”, “Agree”, or “Strongly agree”.

2.2.4.9 Linkage of survey responses using pseudonymous identifiers

At the end of the survey, staff were provided with an opportunity to create a unique, anonymous identifier that could be used to link their responses across surveys. This anonymous identifier was created by participants inputting two-digit responses to several questions creating a string that could be linked anonymously across Surveys one and two. This was optional; a survey was considered to be complete irrespective of whether these data had been entered or not.

2.2.4.10 Free text response

A free text response box was incorporated, asking participants to write about their experience of the pandemic. This information was used in a separate qualitative study and is not commented upon further in this thesis.

2.2.4.11 Persons-in-charge survey

There is no national register of nursing home staff and as a result it is not possible to say how many staff are working in the sector nationally; we therefore are unable to state with certainty a denominator which would provide an overall response rate. As there is also limited information available on the professional breakdown of staff in nursing homes in Ireland, a separate, anonymous survey was sent to the persons-in-charge of nursing homes promoting the survey to their staff members. This form asked persons-in-charge to select the number of staff working in their nursing home in each role (nurses, HCAs, administrative staff, catering staff, household staff and activity coordinators). This also provided me with a denominator for the calculation of response rates (S1: n=3,816 and S2: n=2,421) and additionally provided some data on the representativeness of our sample (see Table 3-1 and Table 4-1). Broadly, the

breakdown of staff by profession seemed to correspond with the responses collected in both surveys. Unfortunately, given the heterogeneous nature of the nursing home sector, there are no data available on other relevant demographic variables of staff working in the sector in Ireland e.g., ethnicity; we are unable to comment further on the representativeness of our sample as a result. These data were collected anonymously via Google Forms (Google, USA); no identifying information was requested from the persons-in-charge completing this form.

2.2.5 Recruitment

Nursing homes were recruited from the Republic of Ireland during two time periods. The target sample was all staff working in a full- or part-time basis in nursing homes affiliated with NHI, irrespective of their profession.

Survey one (S1) recruited staff from 20th November 2020 to 4th January 2021 during Ireland's third COVID-19 wave (Lima, 2021). This corresponded with the escalation of cases and hospitalisations and the implementation of severe restrictions due to rapid transmission of the Alpha variant of concern (VOC) B.1.1.7 (Ritchie et al., 2022) (Figure 2-1). This initial survey immediately preceded the rollout of COVID-19 vaccinations in the state (Ritchie et al., 2022). All 394 nursing homes on the NHI mailing list were contacted. Convenience sampling was used with staff self-selecting for participation.

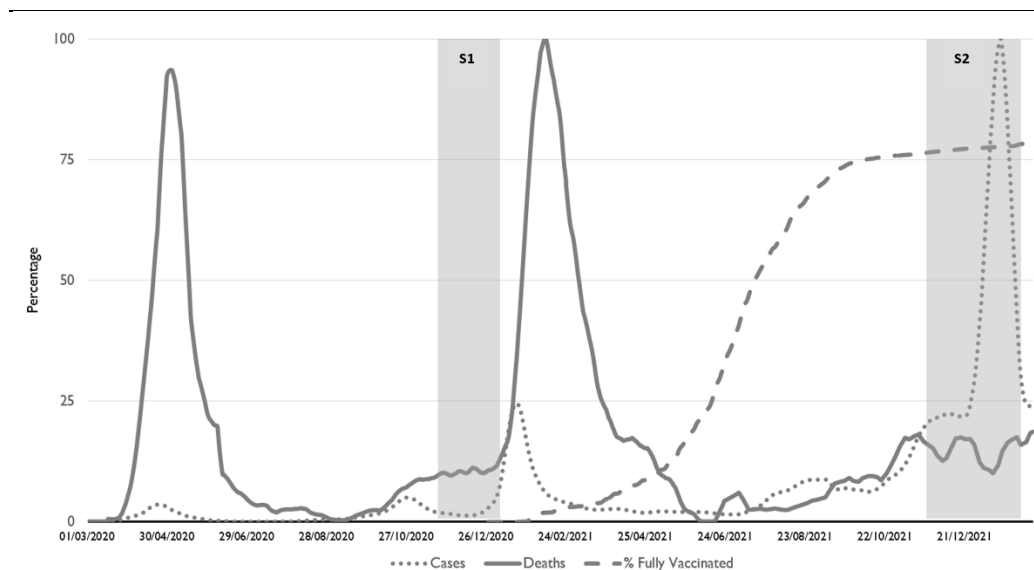


Figure 2-1: COVID-19 cases, deaths, and percentage of those fully vaccinated in the Republic of Ireland and the timing of surveys at Survey 1 (S1) and Survey 2 (S2).

Cases and deaths are 14-day averages and are depicted as a percentage of their respective maxima. Vaccinations are expressed as the percentage of the total Irish population considered to be fully vaccinated.

Survey 2 (S2) recruited staff from November 22nd, 2021 to February 1st, 2022.

This occurred in the context of a high national uptake of vaccination, rapid transmission of the Omicron VOC B.1.1.529 sublineage BA.1, declining hospitalisation rates, and a concurrent period of relative easing of lockdown restrictions (Ritchie et al., 2022). Compared to S1, this recruitment period was extended to ten weeks due to a slow response uptake.

The same recruitment procedure was utilised for S1 and S2. I contacted persons-in-charge (PICs) of all 394 NHI-affiliated nursing homes via telephone, email and post and asked them to inform their staff about the survey. The survey was also advertised via social media: NHI advertised the study on their Twitter and Facebook pages and advertisements were taken out on Facebook targeting nursing home staff of any discipline working in the Republic of Ireland.

Anonymous data were collected online using Qualtrics Core XM, an online survey platform (Qualtrics, USA). This platform has been vetted by Trinity College Dublin Information Technology department and has been deemed suitable for this use in terms of its data protection capabilities. Qualtrics provided an estimate of less than 20 minutes for the survey to be completed; staff were notified of the expected duration prior to survey commencement. Participant information was provided, and consent obtained, at survey beginning (see Appendix 1: Patient Information Sheet & Appendix 2: Patient Consent). Participation was explicitly voluntary. Surveys were considered completed when they had completed all items, excluding an optional free-text response box at the end of the survey. The responses in this free-text box are not included in the analyses for this thesis.

2.2.6 Statistical Analyses

2.3.6.1 Descriptive analyses

Data were analysed in SPSS 26 (IBM, USA) and Excel (Microsoft, USA). Using a 95% confidence interval with a 5% margin of error, I estimated a minimum sample size of 360 based on a previous study that reported 39% of nursing home staff during the COVID-19 pandemic scored ≥ 26 on the IES-R (Riello et al., 2020).

My primary descriptive analysis of each survey examined differences between staff based on their classification into one of three groups: nurses, healthcare assistants (HCAs) and nonclinical staff. The groups were further categorised depending on WHO-5, IES-R and WAS cut-off scores and the presence/absence of suicidal ideation/planning.

Chi square tests were used to analyse categorical variables; one-way ANOVAs were used to analyse means. Data are reported as means (standard deviation) and proportions (percentages with 95% confidence intervals) as appropriate. Significance level was set at 0.05. As is common in such exploratory cross-sectional surveys including multiple measures, I did not adjust for multiple testing so as not to rule out positive findings which may point to future research directions (Lai et al., 2020; Lamb et al., 2021). However, this does increase the false discovery rate, and this should be remembered when interpreting findings.

Post-hoc analyses were performed for significant between-profession differences with a Bonferroni correction applied (adjusted $\alpha=0.0167$). The degree of significance of these outcomes was expressed as z-scores, where a between-group difference is defined as significant (i.e., that a probability of a random significant finding is <0.05) when lying outside the range of $z = \pm 1.96$ (McLeod, 2019). Furthermore, when greater than two groups were included on a post-hoc analysis,

they were labelled with letters to identify which groups were significantly different from each other, e.g., when two of three groups were labelled with the letter “a” they were considered to be not significantly different but if the third group was labelled with “b” that group was considered to be significantly different from the other two groups. Differences between groups on post-hoc analyses are reported as mean differences (MDs) and standard errors (SEs).

2.3.6.2 Comparative analyses

All S1 and S2 outcomes were compared using Chi-square tests and one-way ANOVAs as appropriate to assess for changes in nursing home staff mental health outcomes across the pandemic.

2.3.6.3 Regression analyses of IES-R, WHO-5, and MIES scores: assumptions testing

To assess whether certain independent variables (IVs) correlated with post-traumatic stress, depression, and moral injury, I utilised regression analysis models to test for significant interactions. For the purposes of these analyses, the outcome variables were treated as linear variables. Prior to analysis, both S1 and S2 datasets were checked to ensure they met the assumptions for linear regression analysis (Lund & Lund, 2022). Assumption (i) that the dependent variables (DVs) were continuous was already accounted for due to the selection of the measures. Assumption (ii) - that the independent variables were interval or ratio variables – was met by dichotomising variables and using dummy coding as appropriate. The remaining assumptions required testing in SPSS: (iii) that there were no significant outliers; (iv) that there was absence of multicollinearity i.e., independence of

observations; (v) that the data demonstrated homoscedasticity i.e., the variances along the line of best fit remained similar along the line; (vi) that the data demonstrated normality, i.e. the residuals of the regression line were approximately normally distributed, and (vii) that the data demonstrated linearity, i.e., that a linear relationship existed between the dependent and independent variables. Should the datasets not meet these assumptions, measures were taken as necessary to perform the analyses.

2.3.6.4 Regression analyses of IES-R, WHO-5, and MIES scores: independent variable (IV) selection and subjects per variable (SPVs)

From the available data in this study, eighteen independent variables were prioritised for these analyses. (see Table 2-6: Independent variables selected for linear regression analyses)

In order to meet assumption (ii), categorical independent variables were dichotomised with the exception of role, where dummy coding was used to facilitate analysis; therefore, the total number of independent variables inputted in the model was nineteen. While the rule of thumb is that you should have no more than ten subjects per variable (SPV) for such an analysis, the best available study of this topic, which used a series of simulations to examine the impact of SPV on relative bias, standard errors, and confidence intervals in results, has demonstrated that only approximately two SPV are required for linear regression analysis (Austin & Steyerberg, 2015; Harrell, 2001). Separate regression analyses were performed for each of the three outcomes at both timepoints; that is, six regression analysis models in total.

Independent variables selected for multiple linear regression analyses	
1. Age (40 or less)	2. Female gender
3. White ethnicity	4. Role: Nurse (dummy coded)
5. Role: Healthcare assistant	6. Role: Nonclinical
7. Years of Experience (<10 years)	8. Absence of physical health condition(s)
9. Absence of mental health condition(s)	10. Exposure to COVID-19 positive resident(s)
11. History of self-quarantine	12. COVID-19 infection history
13. Perceptions: Health fear	14. Perceptions: Job stress
15. Perceptions: Social isolation and avoidance	16. Perceptions: Doubts about protection
17. Perceptions: Dissatisfaction with system/ processes	18. Altruism
19. Avoidant (maladaptive) coping style	20. Approach (adaptive) coping style

Table 2-6: Independent variables selected for linear regression analyses

2.3.6.5 Regression analyses of IES-R, WHO-5, and MIES scores: multiple comparisons testing

Given the high number of p-value outputs, the Benjamini-Hochberg method was used to adjust for multiple comparisons testing (Hochberg & Benjamini, 1990). All the p-value outputs from each of the six linear regression analyses were ranked and tested for significance using a false discovery rate of 0.1.

2.3.6.6 Regression analysis: potential confounding between the IES-R avoidance subdomain and the Brief-COPE avoidant coping styles

Due to the possibility that the results of the analysis on the IES-R could be confounded by the fact that both the IES-R and the Brief-COPE incorporate questions regarding avoidance, the analysis was repeated twice for this measure with the IES-R avoidance subdomain excluded. The Benjamini-Hochberg test was then performed

on all p-value outputs from this analysis along with the standard WHO-5 and MIES outputs.

2.3.6.7 Reporting of correlates

Correlates are reported with the standardised coefficient (β) and p-values. β is a measure of effect size; <0.1 indicates a small effect size, $0.1-0.5$ indicates a moderate effect size and >0.5 indicates a large effect size. P-values are significant at an α of 0.05.

2.2.7 Ethical approval & Data Protection

These studies received ethical approval from the St Patrick's Mental Health Services Research Ethics Committee on November 18th, 2020 (Protocol 16/20, see Appendix VI: St Patrick's Mental Health Services Research Ethics Committee approval letter).

This study collects anonymous data and the data relating to this project is held securely on TCD and TCD-vetted systems and will be destroyed ten years following initiation of the project.

2.2.8 Methodological Limitations

The survey was piloted informally, both within the research group and with staff members outside of the research group. The survey completion time was noted to be approximately 20 minutes; this corresponded with the software's estimate for survey completion time. Unfortunately, the survey instrument was not piloted formally. It should be noted that this represents a methodological limitation as there may have been unidentified issues in the survey rollout; for example, survey responders may

not have spoken English as their first language and may have misunderstood some questions. However, many of the individual instruments used have been used in varied research populations (i.e., the WHO-5, the IES-R, the Brief-COPE) and it is hoped that they should have been acceptable to most participants. Additionally, there may have been issues with survey fatigue. It should be noted that the sections in the survey were not randomised in order and were completed in the order as presented above and that this may have had an impact on instruments towards the end of the survey. Additionally, some of the instruments covered similar constructs e.g., the Brief-COPE and the IES-R both ask questions regarding avoidance; this may also have contributed to survey fatigue.

CHAPTER 3 – SURVEY ONE (S1)

3.1 Introduction

In terms of mortality, the greatest impact of the COVID-19 pandemic was felt in nursing homes, particularly during the pandemic's first wave (Comas-Herrera A, 2020; Salcher-Konrad et al., 2020). The vulnerability of older persons to COVID-19 combined with the communal nature of the nursing home setting combined to create a potent recipe for disaster. By the end of the first wave, nursing home residents accounted for a substantial proportion of all COVID-19 deaths in western nations. For example, they represented 40% of COVID-19 deaths in the United States, 47% of deaths in the United Kingdom, and 56% of deaths in Ireland (Chen et al., 2021; Department of Health, 2020; Ioannidis et al., 2021). As a result, nursing homes had to drastically adapt their practices to try and mitigate transmission of the virus. Group activities were banned, visiting restrictions were implemented, and the use of personal protective equipment was mandated (Comas-Herrera A, 2022). Naturally, these difficulties were mirrored in the Irish nursing home sector, which experienced widespread outbreaks and high numbers of resident fatalities (Kennelly et al., 2021).

It would be expected that the combined stresses of this rapidly changing work environment and exposure to high rates of resident mortality, while coping with living in a heavily restricted society, could degrade nursing home staff mental health. Before this study, several qualitative studies revealed concerning levels of distress (Miller et al., 2021; Sarabia-Cobo et al., 2021; White et al., 2021). However, prior to this study, there had only been one quantitative study of nursing home staff, which was conducted in Italy following the pandemic's first wave (n=1069) (Riello et al., 2020). That study focused on post-traumatic stress disorder (PTSD) symptoms and generalised anxiety disorder; it found a prevalence of moderate-to-severe symptoms of either disorder at 43% (95% CI 37%–49%) (Riello et al., 2020). Much of

the other research to date on the impact of the COVID-19 pandemic on HCW mental health had focused on hospital workers. A meta-analysis reviewing the mental health of hospital-based HCWs during the COVID-19 pandemic reported an estimated pooled prevalence of PTSD symptoms of 21.5% (95% CI 11.2%–31.8%) (Marvaldi et al., 2021). This may indicate that nursing home staff could be even more distressed than hospital staff (Marvaldi et al., 2021; Riello et al., 2020).

There is a significant body of research examining factors that may be correlated with worse mental health outcomes in HCWs (Serrano-Ripoll et al., 2020). One finding during the SARS outbreak was that nursing staff and other healthcare workers who had significant exposure to infected patients in hospitals appeared to be significantly more affected than other HCWs (Maunder et al., 2004). There is no quantitative evidence that demonstrates similar findings in the nursing home environment. However, it would be expected that, in nursing homes, different groups of staff may have different levels of exposure to COVID-19 and consequently may suffer different levels of distress. For example, HCAs and nurses will typically have no choice but to work closely with residents regardless of their infection status whereas it may be possible for administrative staff to be protected from exposure to some degree. It has not been determined as to whether the differences in professional qualification and training between HCAs and nurses may be protective of poor mental health outcomes in the nursing home environment, where these professions have similar levels of exposure. Previous literature has demonstrated that an increased amount of training may be protective in such situations (Maunder et al., 2006).

Considering these findings, I aimed to estimate the levels of post-traumatic stress and depressive symptoms in nursing home staff in the Republic of Ireland during the COVID-19 pandemic. I also appraised self-rated suicidal ideation and

planning, moral injury, coping styles, perceptions about the pandemic and work ability. I hypothesised that there may be significant differences in these problems between nurses, healthcare assistants and nonclinical staff.

3.2 Methods

3.2.1 Study design, setting and recruitment

This was a cross-sectional, national, anonymous survey of nursing home staff working in the Republic of Ireland. The method is as described in section “

.” Recruitment occurred following this procedure from November 20th, 2020, to the 4th of January, 2021. Convenience sampling was used with staff self-selecting for participation.

3.2.2 Measures

The survey incorporated all measures as described in section “2.2 .”

3.2.3 Statistical analyses

Statistical analyses were performed as outlined in section “2.3.6.1 Descriptive analyses.” Using a 95% CI with a 5% margin of error, the minimum sample size was determined to be 360 based on previous literature demonstrating that 39% of nursing home staff scored ≥ 26 on the IES-R during the COVID-19 pandemic (M. Riello et al., 2021). I examined demographic characteristics of the sample divided into three groups: nurses, healthcare assistants and non-clinical staff. I further categorised these groups using cut-off scores for the WHO-5, IES-R and WAS and the presence of suicidal ideation and suicidal planning. Chi-square tests were used to analyse categorical variables; one-way ANOVAs were used to compare means. Post-hoc analyses were performed for significant between-group differences. I used a generalised linear model to adjust for significant differences in demographic features in the sample (i.e., age, years of experience, ethnicity), personal COVID-19 infection history and exposure to COVID-19-infected acquaintances. Data are reported as means (with standard deviation) and proportions (as percentages with 95% confidence intervals).

3.3 Results

3.3.1 Survey completion

695 participants initiated the survey. Of these, 390 completed all items (56.1%); these completed surveys were used for analysis. As a significant proportion (46.2%) of non-completers did not complete the demographic section of the survey, a meaningful comparison of completers versus non-completers is not possible.

3.3.2 S1 demographic characteristics

Persons in charge (PICs) from 64 (16.5%) of 394 relevant nursing homes provided information on staff (n=3816) breakdown (Table 1). The total number of survey participants was 390 (10.2%), comprising 120 nurses, 172 HCAs and 98 non-clinical staff, representing 16.2%, 8.9% and 8.5% of each occupational group respectively. The geographical distribution of survey participants corresponding to regional populations is shown in Table 3-1.

	Total	Nurses	HCAs	Nonclinical
Total number of staff in the 64 participating nursing homes, <i>n</i> (%)	3,816 (100%)	741 (19.4%)	1,931 (50.6%)	1,144 (30.0%)
Mean number of staff in each nursing home, Mean (SD)	59.6 (33.9)	11.6 (6.7)	30.2 (17.9)	17.9 (11.0)
Survey participants, <i>n</i> (% of total number of participants)	390 (100%)	120 (30.8%)	172 (44.1%)	98 (25.1%)
Participants' nursing home location by province*, <i>n</i> (%)				
Connacht (11.7%)	70 (17.9%)	23 (19.2%)	29 (16.9%)	18 (18.4%)

Leinster (56.0%)	173 (44.4%)	53 (44.2%)	78 (45.3%)	42 (42.9%)
Munster (27.3%)	131 (33.6%)	38 (31.7%)	57 (33.1%)	36 (36.7%)
Ulster (5.0%)	16 (4.1%)	6 (5.0%)	8 (4.7%)	2 (2.0%)

Table 3-1: Number of staff in participating nursing homes, survey participants and location of participants' nursing homes in the Republic of Ireland, by role

Demographic characteristics of Survey 1 participants are summarised in Table 3-2. Most nursing home staff were female (86.4%), lived with their family (80%) and were of white Irish/British origin (83.3%). The majority of staff had no pre-existing physical illness (67.4%) or mental illness (77.9%). There were significant differences between nurses, HCAs, and nonclinical staff in age ($p<0.001$), ethnicity ($p<0.001$) and years' experience ($p<0.001$). HCAs were proportionally the youngest group.

	Total n (%)	Nurses n (%)	HCA's n (%)	Nonclinical n (%)	Chi Square χ^2 p
Total	390 (100%)	120 (30.8%)	172 (44.1%)	98 (25.1%)	
Age (years)					
≤ 30	85 (21.8%)	13 (10.8%)	56 (32.6%)	16 (16.3%)	
31-50	187 (47.9%)	59 (49.2%)	84 (48.8%)	44 (44.9%)	
≥ 51	118 (30.3%)	48 (40%)	32 (18.6%)	38 (38.8%)	31.19 < 0.01
Gender					
Female	337 (86.4%)	106 (88.3%)	148 (86.0%)	83 (84.7%)	
Male	50 (12.8%)	14 (11.7%)	22 (12.8%)	14 (14.3%)	
Prefer not to say	3 (0.8%)	0 (0.0%)	2 (1.2%)	1 (1.0%)	1.76* 0.84
Living Arrangements					
Alone	24 (6.2%)	11 (9.2%)	8 (4.7%)	5 (5.1%)	
With family	312 (80.0%)	89 (74.2%)	144 (83.7%)	79 (80.6%)	
With roommates	21 (3.6%)	7 (5.8%)	12 (7.0%)	2 (2.0%)	
Other	33 (8.5%)	13 (10.8%)	8 (4.7%)	12 (12.2%)	11.69 0.07
Ethnicity					
Asian/Asian Irish	21 (5.4%)	19 (15.8%)	2 (1.2%)	0 (0.0%)	
Black/Black Irish	12 (3.1%)	1 (0.8%)	11 (6.4%)	0 (0.0%)	
Mixed race	2 (0.5%)	1 (0.8%)	1 (0.6%)	0 (0.0%)	
Other	6 (1.5%)	2 (1.7%)	4 (2.3%)	0 (0.0%)	
SE Asian/SE Asian Irish	17 (4.4%)	8 (6.7%)	7 (4.1%)	2 (2.0%)	
White - Irish/British/Other	325 (83.3%)	88 (73.3%)	141 (82.0%)	96 (98.0%)	
Prefer not to say	7 (1.8%)	1 (0.8%)	6 (3.5%)	0 (0.0%)	23.96*** < 0.01
Years of experience					
< 5 years	164 (42.1%)	23 (19.2%)	98 (57.0%)	43 (43.9%)	
5-10 years	76 (19.5%)	27 (22.5%)	26 (15.1%)	23 (23.5%)	
>10 years	150 (38.5%)	70 (58.3%)	48 (27.9%)	32 (32.7%)	45.34 < 0.01
Physical Illness - Pre-existing**					
Cancer	3 (0.8%)	2 (1.7%)	0 (0.0%)	1 (1.0%)	
Cardiovascular Disease	42 (10.8%)	18 (15.0%)	15 (8.7%)	9 (9.2%)	
Immunosuppression	3 (0.8%)	1 (0.8%)	1 (0.6%)	1 (1.0%)	
Metabolic Disease	31 (7.9%)	13 (10.8%)	14 (8.1%)	4 (4.1%)	
Respiratory Disease	38 (9.7%)	14 (11.7%)	18 (10.5%)	6 (6.1%)	
Other	33 (8.5%)	12 (10.0%)	10 (5.8%)	11 (11.2%)	
None	263 (67.4%)	71 (59.2%)	121 (70.3%)	71 (72.4%)	5.52 [†] 0.06
Mental Illness - Pre-existing**					
Anxiety disorder	62 (15.9%)	9 (7.5%)	38 (22.1%)	15 (15.3%)	
Mood disorder	47 (12.1%)	12 (10.0%)	26 (15.1%)	9 (9.2%)	
Other	8 (2.1%)	4 (3.3%)	2 (1.2%)	2 (2.0%)	
None	304 (77.9%)	100 (83.3%)	127 (73.8%)	77 (78.6%)	3.74 [†] 0.15

Table 3-2: S1 demographic characteristics of nursing home staff, by role

HCA's: Healthcare Assistants. SE Asian: Southeast Asian. *Fisher's exact test. **Respondents could pick multiple answers. ***Dichotomised for analysis ("White" and "Non-White"). [†]Dichotomised for analysis (presence or absence of a pre-existing condition).

There were significantly more HCAs aged ≤30 (z = 4.6; Table 3-3) and significantly fewer HCAs aged ≥51 (z=-4.4). Significantly fewer nurses were of white ethnicity (z=-3.5) and nonclinical staff were more likely to be of white ethnicity (z =

4.5). Nurses were less likely to report <5 years' experience ($z = -6.1$) and more likely to report ≥ 10 years' experience ($z=5.4$).

			Nurse	HCA	Nonclinical	Total
Age	≤ 30	n	13 ^a	56 ^b	16 ^a	85
		z	-3.5	4.6	-1.5	
	31-50	n	59 ^a	84 ^a	44 ^a	187
		z	.3	.3	-.7	
	≥ 51	n	48 ^a	32 ^b	38 ^a	118
		z	2.8	-4.4	2.1	
Ethnicity	White	n	88 ^a	141 ^a	96 ^b	325
		z	-3.5	-.6	4.5	
	Non-white	n	32 ^a	31 ^a	2 ^b	65
		z	3.5	.6	-4.5	
Years' Experience	<5	n	23 ^a	98 ^b	43 ^b	164
		z	-6.1	5.3	.4	
	5-10	n	27 ^a	26 ^a	23 ^a	76
		z	1.0	-1.9	1.2	
	>10	n	70 ^a	48 ^b	32 ^b	150
		z	5.4	-3.8	-1.4	
	Total		120	172	98	390

Table 3-3: S1 Post hoc analyses of demographic differences between group, by role

Each superscript letter denotes a group who do not differ significantly from each other in that demographic category, e.g., nurses and nonclinical staff under the age of 30 do not differ from significantly each other (both "a") but HCAs under the age of 30 significantly differ from both ("b").

3.3.3 S1 exposure to COVID-19

Nursing home staff experience of exposure to COVID-19 in S1 is presented in Table 3-4. Almost one third of staff reported having quarantined (31.3%). A majority reported no history of COVID-19 infection (80.3%). Of those who had contracted COVID-19, only 4.8% reported having symptoms for ≥ 9 weeks but 33.8% reported not having fully recovered. Most nursing home staff reported no history of caring for residents with COVID-19 (63.9%), although 67% reported contact with COVID-19 infected acquaintances. There were significant differences between groups in their history of COVID-19 infection ($p=0.001$) and contact with COVID-19 positive acquaintances ($p=0.001$). Nursing staff were more likely ($z=3.9$; Table 3-5) and HCAs

were less likely ($z=-2.4$) to have had exposure to COVID-19 positive acquaintances.

Significantly fewer nonclinical staff had contracted COVID-19 ($z = -3.6$).

	Total <i>n</i> (%)	Nurses <i>n</i> (%)	HCA's <i>n</i> (%)	Nonclinical <i>n</i> (%)	Chi-square χ^2 <i>p</i>	
Total	390 (100%)	120 (30.8%)	172 (44.1%)	98 (25.1%)		
Number of COVID-19 positive residents personally attended to						
None	249 (63.8%)	68 (56.7%)	106 (61.6%)	75 (76.5%)		
1-10	67 (17.2%)	27 (22.5%)	28 (16.3%)	12 (12.2%)		
11-20	35 (9.0%)	10 (8.3%)	21 (12.2%)	4 (4.1%)		
21-40	34 (8.7%)	12 (10.0%)	16 (9.3%)	6 (6.1%)		
> 40	5 (1.3%)	3 (2.5%)	1 (0.6%)	1 (1.0%)	14.46 *	0.06
Previously self-quarantined, <i>n</i> (%)	122 (31.3%)	44 (36.7%)	54 (31.4%)	24 (24.5%)	3.72	0.16
Previous COVID-19 infection, <i>n</i> (%)	77 (19.7%)	31 (25.8%)	39 (22.7%)	7 (7.1%)	13.56	<0.01
Symptom severity (<i>n</i> =77)						
No symptoms	14 (18.2%)	5 (16.1%)	8 (20.5%)	1 (14.3%)		
Mild/Moderate	59 (76.6%)	24 (77.4%)	29 (74.4%)	6 (85.7%)		
Severe illness	4 (5.2%)	2 (6.5%)	2 (5.1%)	0 (0.0%)	3.40*	0.78
Symptom duration (weeks; <i>n</i> =63)						
≤ 4	50 (79.4%)	22 (84.6%)	23 (74.2%)	5 (83.3%)		
5 - 8	10 (15.9%)	3 (11.5%)	6 (19.4%)	1 (16.7%)		
≥ 9	3 (4.8%)	1 (3.8%)	2 (6.5%)	0 (0.0%)	1.46*	0.90
Fully recovered, <i>n</i> (%) (<i>n</i> =77)	51 (66.2%)	21 (67.7%)	26 (66.7%)	4 (57.1%)	0.45*	0.88
Exposure to COVID-19 positive acquaintances**						
Colleagues/Acquaintances	203 (52.1%)	71 (59.2%)	82 (47.7%)	50 (51.0%)		
Close friends	76 (19.5%)	33 (27.5%)	31 (18.0%)	12 (12.2%)		
Housemates	3 (0.8%)	1 (0.8%)	0 (0.0%)	2 (2.0%)		
Immediate family	68 (17.4%)	26 (21.7%)	28 (16.3%)	14 (14.3%)		
No contact	127 (32.6%)	23 (19.2%)	67 (39.0%)	37 (37.8%)	15.17*	<0.01***
Acquaintances hospitalised, <i>n</i> (%) (<i>n</i> =261 [†])	88 (33.7%)	33 (34.0%)	41 (39.4%)	14 (23.3%)	4.41	0.11
Acquaintances died, <i>n</i> (%) (<i>n</i> =261 [†])	49 (18.8%)	15 (15.5%)	25 (24.0%)	9 (15.0%)	3.15	0.21

Table 3-4: S1 nursing home staff exposure to COVID-19, by role

*Fisher's exact test. **Participants could select multiple answers. ***Dichotomised to contact and non-contact for analysis. [†]Two participants did not answer.

		Nurse		HCA	Nonclinical	Total
Contact with COVID-19 positive acquaintances	Yes	n	97 ^a	104 ^b	60 ^b	261
		z	3.9	-2.4	-1.4	
	No	n	23 ^a	68 ^b	38 ^b	129
		z	-3.9	2.4	1.4	
History of COVID-19 infection	No	n	89 ^a	133 ^a	91 ^b	313
		z	-2.0	-1.3	3.6	
	Yes	n	31 ^a	39 ^a	7 ^b	77
		z	2.0	1.3	-3.6	
Total			120	172	98	390

Table 3-5: S1 post hoc analyses of COVID-19 exposure differences, by role

Each superscript letter denotes a group who do not differ significantly from each other in that category.

3.3.4 S1 mental health measures

S1 Mental health outcomes are summarised in Table 3-6. The prevalence of all staff meeting the threshold for moderate-severe PTSD symptoms was 45% (95% CI 40-50) with no significant differences between groups for total or subdomain IES-R scores.

The number of staff reporting a WHO-5 score ≤ 32 , indicating poor wellbeing, was 38.7% (95% CI 33.9-43.6%). Significant differences between groups were noted ($p=0.015$), with more nurses reporting poor wellbeing ($z = 2.6$; Table 3-7) and more HCAs reporting normal wellbeing ($z = 3.1$). Scores consistent with likely major depression (WHO-5 ≤ 20) were reported by 20% (95% CI 16-24%) with no differences between groups.

Thoughts of suicide were reported by 13.8% (95% CI 10-17%) of staff over the past seven days and 9% (95% CI 6-12%) reported at least some planning to end their lives, with no differences between groups.

Moral Injury Events Scale (MIES) mean score for the total group was 20.8 (9.1); of the subdomains, the mean "Transgression by others" score was 5.9 (3.0); "Transgression by self" mean was 7.9 (4.8); and the "Betrayal" mean was 7.4 (4.0). There were significant differences between groups on the MIES total score ($p=0.027$, adjusted $p=0.038$) and the MIES "Transgression by others" subscale ($p=0.030$, adjusted $p=0.048$). HCAs reported a significantly higher degree of moral injury than

nonclinical staff (mean difference (MD) = 3.3, standard error (SE) = 1.2; see Table 3-8) and a significantly higher “Transgression by others” score than nonclinical staff (MD=1.0, SE=0.38). A difference between groups was noted on the MIES betrayal subscale; however, this did not survive adjustment.

Work ability, as self-rated by the Work Ability Score, was deemed insufficient by 24.6% (95% CI 20.3-28.9%) of staff, with no differences between groups.

	Total n=390	Nurses n=120	HCA's n=172	Nonclinical n=98	Chi-square		p (adj.)***
IES-R 22, Moderate/ Severe Symptoms, % (95% CI) *	45 (40-50)	48 (39-57)	42 (35-50)	46 (36-56)	1.02	0.60	0.59
WHO-5*							
Low mood, % (95% CI)	39 (34-44)	48 (39-57)	30 (23-37)	42 (32-52)	12.38	0.02	0.01
Likely major depression, % (95% CI)	20 (16-24)	23 (16-31)	15 (9-20)	26 (17-34)	5.90	0.05	0.07
Suicidal ideation, % (95% CI)**	14 (10-17)	13 (7-19)	15 (9-20)	13 (7-20)	0.12	0.94	0.76
Suicidal planning, % (95% CI)**	9 (6-12)	7 (2-11)	11 (6-16)	9 (3-15)	1.60	0.45	0.97
WAS, Insufficient, % (95% CI) *	25 (20-29)	27 (19-35)	26 (19-33)	20 (12-28)	1.29	0.52	0.44
					One-way ANOVA		
IES-R, Mean (SD)					F	P	P (adj.)***
Total	25.9 (17.6)	27.8 (16.5)	25.1 (18.0)	18.3 (1.8)	1.00	0.37	0.52
Avoidance	9.7 (6.8)	9.9 (6.4)	9.5 (6.9)	9.6 (7.2)	0.12	0.89	0.62
Hyperarousal	5.5 (4.7)	5.9 (4.4)	5.3 (4.9)	5.3 (4.5)	0.67	0.367	0.50
Intrusion	9.6 (6.8)	10.8 (6.6)	9.1 (6.8)	9.0 (7.0)	2.46	0.09	0.35
MIES, Mean (SD)							
Total	20.8 (9.1)	22.5 (10.5)	22.5 (10.5)	19.1 (9.3)	3.66	0.02	0.04
Transgression - others	5.9 (3.0)	5.7 (3.0)	6.3 (3.1)	5.4 (3.0)	3.53	0.03	0.05
Transgression - self	7.9 (4.8)	7.5 (4.3)	8.4 (5.0)	7.4 (4.8)	1.93	0.15	0.07
Betrayal	7.4 (4.0)	7.6 (4.1)	7.8 (4.2)	6.4 (3.4)	3.69	0.03	0.08
Brief-COPE, Mean (SD)							
Avoidant	20.8 (6.3)	21.3 (6.1)	20.9 (6.2)	20.2 (6.6)	0.82	0.44	0.46
Approach	28.8 (8.1)	30.7 (8.0)	28.8 (8.0)	26.5 (7.9)	7.50	<0.01	0.05
Religion	3.7 (2.0)	4.0 (2.1)	3.8 (2.1)	3.3 (1.7)	3.04	0.05	0.12
Humour	3.4 (1.8)	3.3 (1.6)	3.4 (1.8)	3.3 (1.8)	0.05	0.945	0.61
COVID-19 perceptions, Mean (SD)							
Health fear	4.5 (1.2)	4.4 (1.3)	4.6 (1.2)	4.5 (1.3)	0.99	0.37	0.63
Social isolation/ avoidance	3.5 (1.2)	3.4 (1.2)	3.5 (1.1)	3.5 (1.2)	0.69	0.50	0.05
Job Stress	4.2 (1.2)	4.2 (1.1)	4.1 (1.2)	4.3 (1.2)	0.53	0.59	0.77
Doubts about protection	1.8 (0.8)	1.7 (0.8)	1.8 (0.8)	1.7 (0.7)	0.49	0.62	0.98
Dissatisfaction with system/processes	2.2 (0.9)	2.2 (1.0)	2.2 (0.9)	2.3 (0.9)	0.32	0.73	0.06
Altruism, Mean (SD)	4.8 (1.3)	4.7 (1.4)	4.9 (1.3)	4.8 (1.4)	0.91	0.41	0.84

Table 3-6: S1 nursing home staff mental health outcomes, by role

HCA's: Healthcare assistants. SD: Standard deviation. 95% CI: 95% Confidence Interval. WHO-5: World Health Organisation-Five Wellbeing Index: maximum of 100; score of 33 or more indicates normal wellbeing over the past two weeks; 20 or less indicates likely major depression over the past two weeks. IES-R: Impact of events scale revised (22 items); cut-off of 26 or more indicates moderate to severe symptoms of post-traumatic stress over the past seven days. Work Ability Score: maximum of 10; cut-off of 6 or more indicates current sufficient perceived work ability. MIES: Moral Injury Events Scale. Higher scores denote higher intensity of moral injury over the course of the COVID-19 outbreak. Brief-COPE: abbreviated version of the COPE (Coping Orientation to Problems Experienced) Inventory. Higher scores

indicate higher reliance on this coping style over the course of the pandemic. Perceptions of health fear, social isolation and avoidance, job stress, dissatisfaction with system/processes, doubts about protection and altruism: Higher scores indicate increased identification with each domain over the course of the COVID-19 outbreak. *Item dichotomised for analysis using cut-off score. **Items are dichotomised for analysis (any suicidal ideation/planning vs none). ***Following regression analysis adjusting for age, ethnicity, years' experience, personal COVID-19 contact history and history of COVID-19 infection.

		WHO-5 (cut-off of 32)		Total
Role		0-32 (abnormal)	33-100 (normal)	
Nurse	n	58 ^a	62 ^a	120
	z	2.6	-2.6	
HCA	n	52 ^b	120 ^b	172
	z	-3.1	3.1	
Nonclinical	n	41 ^{a,b}	57 ^{a,b}	98
	z	0.7	-0.7	
Total	n	151	239	390

Table 3-7: S1 Post hoc analysis of WHO-5 scores, by role

Each superscript letter denotes a group who do not differ significantly from each other in that category e.g., Nurses with a score of 0-32 (“a”) significantly differ from HCAs (“b”) but not nonclinical staff (“a”, “b”).

Measure	Comparison		MD	SE	p	95% CI	
	Role 1	Role 2				Lower	Upper
MIES Total	Nurse	HCA	-1.637	1.152	0.332	-4.35	1.08
		Nonclinical	1.674	1.254	0.378	-1.29	4.63
	HCA	Nurse	1.637	1.152	0.332	-1.08	4.35
		Nonclinical	3.311	1.234	0.021*	0.40	6.22
	Nonclinical	Nurse	-1.674	1.254	0.378	-4.63	1.29
		HCA	-3.311	1.234	0.021*	-6.22	-0.40
Transgression by self	Nurse	HCA	-1.506	0.790	0.139	-3.37	0.35
		Nonclinical	0.488	0.889	0.847	-1.61	2.59
	HCA	Nurse	1.506	0.790	0.139	-0.35	3.37
		Nonclinical	1.994	0.876	0.062	-0.07	4.06
	Nonclinical	Nurse	-0.488	0.889	0.847	-2.59	1.61
		HCA	-1.994	0.876	0.062	-4.06	0.07
Transgression by others	Nurse	HCA	-0.636	0.358	0.179	-1.48	0.21
		Nonclinical	0.320	0.410	0.715	-0.64	1.28
	HCA	Nurse	0.636	0.358	0.179	-0.21	1.48
		Nonclinical	.955*	0.381	0.033	0.06	1.85
	Nonclinical	Nurse	-0.320	0.410	0.715	-1.28	0.64
		HCA	-.955*	0.381	0.033	-1.85	-0.06
Betrayal	Nurse	HCA	-0.131	0.494	0.962	-1.29	1.03
		Nonclinical	1.186	0.509	0.054	-0.02	2.39
	HCA	Nurse	0.131	0.494	0.962	-1.03	1.29
		Nonclinical	1.317	0.474	0.016*	0.20	2.44
	Nonclinical	Nurse	-1.186	0.509	0.054	-2.39	0.02
		HCA	-1.317	0.474	0.016*	-2.44	-0.20

Table 3-8: S1 Post hoc analyses of Moral Injury Events Scale scores, by role

3.3.5 S1 coping styles, perceptions, and altruism

The groups differed in use of approach (adaptive) coping style ($p=0.001$, adjusted $p=0.045$), with nurses using an approach (adaptive) coping style more than nonclinical staff (MD=4.2, SE=1.09; Table 3-9). There was a significant difference for use of religion as a coping mechanism, but this did not survive adjustment ($p=0.049$, adjusted $p=0.12$). There were no differences noted for using avoidant (maladaptive) coping styles or humour.

Measure	Comparison		MD	SE	<i>p</i>	95% CI	
	Role 1	Role 2				Lower	Upper
Approach	Nurse	HCA	1.901	0.953	0.116	-0.35	4.15
		Nonclinical	4.202*	1.082	0.000	1.65	6.76
	HCA	Nurse	-1.901	0.953	0.116	-4.15	0.35
		Nonclinical	2.301	1.001	0.058	-0.06	4.66
	Nonclinical	Nurse	-4.202*	1.082	0.000	-6.76	-1.65
		HCA	-2.301	1.001	0.058	-4.66	0.06
Religion	Nurse	HCA	0.153	0.250	0.813	-0.44	0.74
		Nonclinical	.654*	0.258	0.032	0.04	1.26
	HCA	Nurse	-0.153	0.250	0.813	-0.74	0.44
		Nonclinical	0.501	0.240	0.095	-0.07	1.07
	Nonclinical	Nurse	-.654*	0.258	0.032	-1.26	-0.04
		HCA	-0.501	0.240	0.095	-1.07	0.07

Table 3-9: S1 post hoc analyses of Brief-COPE scores, by role

On average, staff broadly agreed with statements regarding fear of contracting COVID-19 and job-related stress (Table 3-6). To a slightly lesser extent, they also agreed with statements indicating a degree of concern about social stigma and social isolation in relation to work. They expressed less concern about nursing home systems and processes in place in relation to the pandemic and infection protection measures (i.e., facemasks, eye-shields, and handwashing).

They agreed with an altruistic statement about accepting risks involved in caring for residents with COVID-19. There were no significant differences between groups regarding these perceptions.

3.4 Discussion

This is the first systematically conducted study of nursing home staff experience during the COVID-19 pandemic in the Republic of Ireland. Despite the well-documented impact of the pandemic on nursing homes, it is also only the second such report internationally. Similar to other qualitative studies, there was a high level of stress in this neglected cohort exposed to significant workplace hazards (Miller et al., 2021; Sarabia-Cobo et al., 2021; White et al., 2021). (Steel et al., 2014). These concerning findings are seen in a cohort who report lower levels of pre-existing mental illness (22.1%) to that seen in the general population (29.2% 95%CI 25.9–32.6%) (Steel et al., 2014). I found the 1-week prevalence of moderate–severe symptoms of PTSD in nursing home staff in the Republic of Ireland was 45% (95% CI 40%–50%). This was numerically higher than that seen in Italian nursing homes (39%, 95% CI 33%–46%) (Riello et al., 2020). This figure compares unfavourable to the estimated pooled prevalence of symptoms of PTSD in hospital workers internationally (20.7%, 95% CI 10%–33%) (Marvaldi et al., 2021). There may be several reasons for this finding. As experienced globally, many Irish nursing homes have experienced significant resident mortality. Staff in these nursing homes, who often form collegial relationships with residents, may have had to experience the deaths of well-known residents first hand (Gordon et al., 2020). PPE was lacking in nursing homes early in the pandemic compared to the hospital setting (McGarry et al., 2020). There are few data on the available psychological supports available for nursing home staff, but these may be less available than established occupational

health services in hospital settings (Gordon et al., 2020). Notably, I did not observe significant differences in levels of post-traumatic stress symptoms or PTSD subdomain scores between nurses, HCAs, and nonclinical staff, indicating that they were all equally affected.

The WHO-5 may be used for screening for depression during the previous 2 weeks (Topp et al., 2015). I found that 39% of survey respondents reported scores corresponding with depressive symptoms. This figure lies at the higher end of the range for the global prevalence of depressive symptoms in the general population during the COVID-19 pandemic (14.6%–48.3%) (Xiong et al., 2020). 20% of staff met the criterion for potential major depression. Possible causes could be job stress and work-related stigma, two perceptions that my sample reported that may have compounded the general pandemic-related stresses experienced by society during the comparatively stringent restrictions seen in Ireland (Blavatnik School of Government, 2020). Depressive symptoms were reported by a significantly smaller proportion of HCAs (30%, $p=0.02$) in the initial descriptive analysis. This is notable given that HCAs were the significantly youngest profession and younger age has been associated with depression in other HCWs (Khanna et al., 2020). However, this finding did survive regression analysis for significant differences in demographic and COVID-19 exposure variables, including younger age ($p=0.01$).

Substantial proportions of staff report suicidal ideation (13.8%) and planning (9%) in the past week. These figures are higher than those observed in hospital workers during the pandemic; a number of studies in Chinese and US HCWs have reported suicidal ideation and planning as a combined item and reported 14-day estimates ranging from 5.4% to 12% (Cai et al., 2020; Hong et al., 2021; Xiaoming et al., 2020; Young et al., 2020). A Spanish study ($n=5,450$) explored suicidal ideation and planning in hospital workers as separate items during the pandemic and found

that the one-month prevalence of suicidal planning was 2.7% (Mortier et al., 2021). These issues are not solely the domain of HCWs; the 1-week prevalence of suicidal ideation in the UK general population during the pandemic is also notable at 9.8% (95% CI 8.7%–10.9%) (O'Connor et al., 2021). Nonetheless, longitudinal studies are required to clarify the causes of these higher prevalences of suicidal ideation and planning in Irish nursing home staff.

A concerning level of moral injury is seen in Irish nursing home staff. The mean score for nursing home staff in Ireland (20.8 SD 9.1) was significantly higher than that of US hospital staff early in the pandemic (16.15 SD 7.8; $p < 0.0001$) (Hines et al., 2020)). HCAs reported a significantly more moral injury than non-clinical staff in my study. While HCAs were younger, this difference remained significant even after controlling for age and years of experience. It is possible that HCAs may have found implementing restrictions and dealing with increased mortality more difficult due to their close relationships with residents.

Given the above findings, it is perhaps not unexpected that a large proportion of staff reported insufficient work ability. There are no prior comparative data for nursing home staff, but similar levels of insufficient work ability were recorded in Irish doctors prepandemic; this was also found to be associated with burnout (Hayes et al., 2019). Regarding views of the experience of the COVID-19 outbreak, perceptions were similar to those reported by hospital workers during the SARS outbreak (Maunder et al., 2004) with a high degree of altruism. While nursing staff report using adaptive coping styles more than non-clinical staff, this does not seem to have protected them from high levels of post-traumatic stress and depression symptoms.

3.4.1 Limitations

One limitation of this cross-sectional study is that it is not possible to state definitively that the pandemic is the cause of these difficulties. For example, other pre-existing causes such as organisational problems or support deficits may be the culprit for these dismal figures. To address this, study two includes a follow-up survey performed when nursing home conditions have moved closer to pre-pandemic life. The goal was that this would be completed when 90% or more of the adult Irish population is vaccinated, restrictions have eased significantly, and the pandemic has moved past its emergency phase in Ireland.

Secondly, the sample size is relatively small compared to the estimated number of nursing home staff in Ireland and only 16% of nursing homes approached agreed to distribute the survey. While participants are broadly representative of nursing home staff nationally, staff response rates were low and thus may not reflect their true experience. Therefore, the high prevalences of mental health conditions could be explained by selection bias; these results should be interpreted with caution. However, given that the prevalence for post-traumatic stress symptoms is similar to an Italian care home study in which there was a 53% response rate, the substantial levels of distress in this cohort may be widespread (Riello et al., 2020). As a result, it seems reasonable to believe that my sample may be representative.

Given the lack of data on Irish nursing homes, it is also impossible to say with certainty that I have accurately represented the response rate. While I attempted to do so by asking PICs to provide the number of staff working in their workplaces, this is likely only an approximate figure as there were other avenues for staff to access the survey. For example, PICs may also have distributed the survey in their nursing homes without advising us, or staff in unattached nursing homes may have completed the survey, further diluting our actual response rate. Although the uptake

overall is lower than I had wished, the breakdown of staff by role and location appears to broadly represent staff working in nursing homes across Ireland. The anonymous nature of this survey means that we are unable to say if staff working in a small number of nursing homes accounted for a large proportion of responses.

Thirdly, I was unable to determine if survey participants were ethnically representative as there are no such data available for Irish nursing home staff. Figures from Ireland's regulatory body for nurses, the Nursing and Midwifery Board of Ireland, indicate that the proportions of nurses' country of registration corresponds to the ethnicity of survey participants (Nursing and Midwifery Board of Ireland, 2019). Fourthly, there was a substantial proportion of those who began the survey who did not complete that. Unfortunately, as many of these did not complete the demographic section, a meaningful comparison of these is not possible. One possibility is that difficulties with comprehension of the survey by non-Irish participants may have hindered completion.

Another limitation is that working hours per week were not measured and this might have been a mitigating factor for negative wellbeing or stress, for example, if one was working part time. Of course, in any such study there will be unmeasured factors that may contribute to the outcomes; it is unfortunately not possible to measure every such factor within the confines of one study.

3.4.2 Conclusions

In this national survey, the prevalence of moderate–severe PTSD symptoms and the degree of moral injury in nursing home staff was significantly higher than that of international hospital staff during the COVID-19 pandemic. Distress levels were high overall in both clinical and non-clinical staff, but differences exist between

professional groups in the intensity of moral injury and coping styles. These factors need to be accounted for when tailoring pandemic supports for nursing home staff.

CHAPTER 4 - SURVEY TWO (S2) AND COMPARISON WITH S1

4.1 Introduction

Nursing homes have endured successive waves of crises during the COVID-19 pandemic. Initially, as countries worldwide prepared for the spread of the virus, the long-term nursing home sector was an afterthought in terms of health system procurement and planning (Rocard et al., 2021). Nursing homes initially struggled to source personal and protective equipment (PPE) and staff were diverted to other, prioritised sectors, e.g., PCR testing and frontline services (Health Information and Quality Authority, 2020). Subsequently, many nursing homes suffered disproportionate mortality rates globally; by mid-2020, nursing home residents accounted for 56% of COVID-19 deaths in Ireland, 40% in the USA, 47% in the UK and 40% in Italy (Ioannidis et al., 2021; Istituto Superiore di Sanità, 2020) (Burton et al., 2020; Chen et al., 2021; Department of Health, 2020). This led to increased negative media scrutiny of nursing homes that was demoralising for staff (White et al., 2021). Nursing home staff were forced to implement stringent regimens, including restricting visitors and group activities for residents (Comas-Herrera A, 2022). Fortunately, vaccination rollout provided some reprieve for staff and residents and substantially reduced mortality rates (Cabezas et al., 2021). However, the emergence of the Omicron variant in late 2021 added to the ongoing challenges experienced by nursing homes (Comas-Herrera A, 2022).

These stressors seem likely to have adversely affected nursing home staff mental health (Department of Health, 2020). While there are limited data on nursing home staff mental health prepandemic, study one in this thesis indicates that there may be higher prevalences of post-traumatic stress, depression, and suicidal thinking

than those seen in the general population during the pandemic (Brady et al., 2021, Hyland et al., 2021; Riello et al., 2020; Robinson et al., 2022). As previously discussed, my initial survey found that 45% (95%CI 40-50%) of all staff reported moderate-severe post-traumatic stress disorder symptoms; this was similar to that found in a study of Italian nursing homes (43%, 95%CI 37-49%)(Riello et al., 2020). I found that a World Health Organisation-5 (WHO-5) wellbeing index score ≤ 32 , indicating low mood, was reported by 38.7% (95%CI, 33.9-43.5%) of staff. High levels of suicidal ideation (13.8%, 95%CI, 10.4-17.3%) and planning (9.2%, 95%CI, 6.4-12.1%) during the previous week were reported by staff. Additionally, my initial survey indicated that there was a higher degree of moral injury in Irish nursing home staff (20.8, 95%CI 19.9-21.7) than that seen in a similar survey of UK healthcare workers in a mix of acute and mental health settings during the pandemic (15.5, 95% CI 15.1-16.0) (Lamb et al., 2021). Of note, healthcare assistants (HCAs) reported a significantly higher degree of moral injury than nonclinical (i.e., administrative and support) staff.

I aimed to estimate the levels of post-traumatic stress, wellbeing, suicidal thinking, moral injury, coping styles, perceptions about the pandemic, and work ability in nursing home staff in the Republic of Ireland during the COVID-19 pandemic one year after my initial survey. I also explored if there were differences in these outcomes between professions. Finally, as these two surveys bookended Ireland's successful vaccination programme (Government of Ireland, 2021), I hypothesised that this rollout of vaccination and the easing of pandemic-related restrictions will have improved staff wellbeing and, correspondingly, levels of post-traumatic stress, moral injury, suicidal thinking, and occupational perceptions. I therefore compared outcomes between these two surveys.

4.2 Methods

4.2.1 Study design and setting

This was a cross-sectional, national, anonymous survey of nursing home staff working in NHI-affiliated nursing homes located in the Republic of Ireland. The method followed is identical to that used for survey one (S1) and as described in section “2.3 Methods.” Recruitment occurred following this procedure from November 20th, 2021 to the 4th of January, 2021. The survey period was extended in comparison to survey one due to a slower response rate. Convenience sampling was used with staff self-selecting for participation. All 394 nursing homes on the NHI mailing list were contacted. Convenience sampling was used with staff self-selecting for participation. Given the nature of the study, signposts to psychological supports were provided on exiting the survey.

4.2.2 Recruitment and data collection

The process for this study is as outlined in section “2.2.5 Recruitment.” Survey 2 (S2) recruited staff from November 22nd, 2021 to February 1st, 2022. This occurred in the context of a high national uptake of vaccination, rapid transmission of the Omicron VOC B.1.1.529 sublineage BA.1, declining hospitalisation rates, and a concurrent period of relative easing of lockdown restrictions. Compared to S1, this recruitment period was extended to ten weeks due to slow response uptake.

4.2.1 Materials

The survey was identical to that used in S1; it incorporated all measures as described in section “2.2 Materials.” At the end of the survey, staff were provided with an opportunity to create a unique, anonymous identifier that could be used to link their responses across surveys.

4.2.2 Statistical analyses

Statistical analyses were performed as outlined in section “2.3.2.1 Descriptive analyses.” Briefly, I examined demographic characteristics of the sample divided into three groups: nurses, healthcare assistants and non-clinical staff. I further categorised these groups using cut-off scores for the WHO-5, IES-R and WAS and the presence of suicidal ideation and suicidal planning. Chi-square tests were used to analyse categorical variables; one-way ANOVAs were used to compare means. Post-hoc analyses were performed for significant between-group differences.

4.3 Results

4.3.1 Survey completion & linked data

494 participants initiated the survey, of these 229 completed the entire survey (46.4%) and were included for analyses. As a significant proportion (43.4%) of non-completers did not complete the demographic section of the survey, a meaningful comparison of completers versus non-completers is not possible. With respect to the anonymous linkage of survey responses between surveys, only two participants

completed both surveys S1 and S2, indicating that the two samples are almost entirely independent. As there were an insufficient number of cases to perform meaningful analysis, no further analyses were performed on linked data.

4.3.2 S2 descriptive characteristics

4.3.2.1 S2 demographic characteristics

PICs from 42 (10.7%) of 394 nursing homes provided information on staff (n=2,421) breakdown (Table 4-1). The total number of S2 survey participants was 229 (9.5%), comprising 75 nurses, 100 HCAs and 54 non-clinical staff, representing respectively 15.6%, 8.0% and 7.8% of each occupational group. Survey participants' geographical distribution, corresponding to regional populations, is also shown in Table 4-1.

	Total	Nurses	HCAs	Nonclinical
Total number of staff in the 42 participating nursing homes, <i>n</i> (%)	2,421 (100%)	482 (19.9%)	1,251 (51.7%)	688 (28.4%)
Survey participants, <i>n</i> (% of total number of participants)	229 (100%)	75 (32.8%)	100 (43.7%)	54 (23.6%)
Participants' nursing home location by province*, <i>n</i> (%)				
Connacht (11.7%)	28 (12.2%)	13 (17.3%)	7 (7.0%)	8 (14.8%)
Leinster (56.0%)	109 (47.6%)	38 (50.7%)	47 (47.0%)	24 (44.4%)
Munster (27.3%)	77 (33.6%)	20 (26.7%)	38 (38.0%)	19 (35.2%)
Ulster (5.0%)	15 (6.6%)	4 (5.3%)	8 (8.0%)	3 (5.6%)

Table 4-1: S2 number of staff in participating nursing homes, survey participants and location of participants' nursing homes in the Republic of Ireland, by role

*Populations of provinces given as percentage of total population of the Republic of Ireland (4.9 million, 2020 (est.))

Demographic characteristics of participants in S2 are summarised in Table 4-2. Most nursing home staff were female (86.5%), lived with their family (78.6%) and reported white ethnicity (89.1%). Most staff had no pre-existing physical (57.6%)

or mental health conditions (70.7%). There were significant differences between nurses, HCAs, and nonclinical staff in their living arrangements ($p=0.03$), years of experience ($p<0.01$) and history of mental illness ($p=0.02$). Nurses were significantly more likely to live with roommates ($z=2.6$; Table 4-3) and HCAs were significantly more likely to report other accommodation arrangements ($z=2.1$; Table 4-3). Nurses were significantly more likely to have >10 years' experience ($z=6.0$, Table 4-4). HCAs were significantly more likely to have <10 years' experience ($z=4.5$). Nurses were less likely to have a history of mental illness ($z=-2.0$) and nonclinical staff were more likely to report a history of mental illness ($z=2.6$, Table 4-5).

	Total n (%)	Nurses n (%)	HCA's n (%)	Nonclinical n (%)	Chi Square	
					χ^2	p
Total	229 (100%)	75 (32.8%)	100 (43.7%)	54 (23.6%)		
Age (years)						
≤ 30	28 (12.2%)	3 (4.0%)	16 (16.0%)	9 (16.7%)		
31-50	114 (49.8%)	43 (57.3%)	47 (47.0%)	24 (44.4%)		
≥ 51	87 (38.0%)	29 (38.7%)	37 (37.0%)	21 (38.9%)	8.37*	0.07
Gender						
Female	198 (86.5%)	69 (92.0%)	87 (87.0%)	42 (77.8%)		
Male	31 (13.5%)	6 (8.0%)	13 (13.0%)	12 (22.2%)		
Non-binary / Prefer not to say	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5.47	0.07
Living Arrangements						
Alone	25 (10.9%)	9 (12.0%)	12 (12.0%)	4 (7.4%)		
With family	180 (78.6%)	59 (78.7%)	75 (75.0%)	46 (85.2%)		
With roommates	8 (3.5%)	6 (8.0%)	2 (2.0%)	0 (0.0%)		
Other	16 (7.0%)	1 (1.3%)	11 (11.0%)	4 (7.4%)	13.04*	0.03
Ethnicity						
Asian/Asian Irish	7 (3.1%)	4 (5.3%)	1 (1.0%)	2 (3.7%)		
Black/Black Irish	6 (2.6%)	2 (2.7%)	4 (4.0%)	0 (0.0%)		
Mixed race	2 (0.9%)	0 (0.0%)	2 (2.0%)	0 (0.0%)		
Other	1 (0.4%)	0 (0.0%)	1 (1.0%)	0 (0.0%)		
SE Asian/SE Asian Irish	5 (2.2%)	3 (4.0%)	2 (2.0%)	0 (0.0%)		
White -	204 (89.1%)	65 (86.7%)	88 (88.0%)	51 (94.4%)		
Irish/British/Other						
Prefer not to say	4 (1.7%)	1 (1.3%)	2 (2.0%)	1 (1.9%)	2.17*	0.34
Years of experience						
< 5 years	76 (33.2%)	8 (10.7%)	45 (45.0%)	23 (42.6%)		
5-10 years	53 (23.1%)	13 (17.3%)	28 (28.0%)	12 (22.2%)		
>10 years	100 (43.7%)	54 (72.0%)	27 (27.0%)	19 (35.2%)	40.28	< 0.01
Physical Illness - Pre-existing**						
Cancer	2 (0.9%)	2 (2.6%)	0 (0.0%)	0 (0.0%)		
Cardiovascular Disease	47 (20.5%)	16 (21.3%)	22 (22.0%)	9 (16.7%)		
Immunosuppression	4 (1.7%)	1 (1.3%)	2 (2.0%)	1 (1.9%)		
Metabolic Disease	32 (14.0%)	9 (12.0%)	15 (15.0%)	8 (14.8%)		
Respiratory Disease	21 (9.2%)	6 (8.0%)	8 (8.0%)	7 (13.0%)		
Other	12 (5.2%)	5 (6.7%)	4 (4.0%)	3 (4.7%)		
None	132 (57.6%)	43 (57.3%)	56 (56.0%)	33 (61.1%)	0.38†	0.85
Mental Illness - Pre-existing**						
Anxiety disorder	44 (19.2%)	8 (10.7%)	20 (20.0%)	16 (29.6%)		
Mood disorder	40 (17.4%)	11 (14.7%)	13 (13.0%)	16 (29.6%)		
Other	8 (3.4%)	1 (1.3%)	3 (3.0%)	4 (7.4%)		
None	162 (70.7%)	59 (78.7%)	72 (72.0%)	31 (57.4%)	8.05†	0.02

Table 4-2: S2 demographic characteristics of nursing home staff, by role

SE Asian: Southeast Asian. *Fisher's exact test. **Respondents could pick multiple answers.

***Dichotomised for analysis ("White" and "Non-White"). †Dichotomised for analysis (presence or absence of a pre-existing condition).

			Role			Total
			Nurse	HCA	Nonclinical	
Accommodation	Alone	n	9 ^a	12 ^a	4 ^a	25
		%	12.0%	12.0%	7.4%	10.9%
		z	.4	.5	-.9	
	With roommates	n	6 ^a	2 ^a	0 ^a	8
		%	8.0%	2.0%	0.0%	3.5%
		z	2.6	-1.1	-1.6	
	With my family	n	59 ^a	75 ^a	46 ^a	180
		%	78.7%	75.0%	85.2%	78.6%
		z	.0	-1.2	1.3	
	Other	n	1 ^a	11 ^b	4 ^{a, b}	16
		%	1.3%	11.0%	7.4%	7.0%
		z	-2.3	2.1	.1	
Total	n	75	100	54	229	
	%	100.0%	100.0%	100.0%	100.0%	

Table 4-3: S2 post-hoc analysis of significant differences in accommodation between roles

Each superscript letter denotes a subset of role categories whose column proportions do not differ significantly from each other at the .05 level (Bonferroni correction applied).

			Role			Total
			Nurse	HCA	Nonclinical	
Years' Experience	<10	n	21 ^a	73 ^b	35 ^b	129
		%	28.0%	73.0%	64.8%	56.3%
		z	-6.0	4.5	1.4	
	≥10	n	54 ^a	27 ^b	19 ^b	100
		%	72.0%	27.0%	35.2%	43.7%
		z	6.0	-4.5	-1.4	
Total	n	75	100	54	229	
	%	100.0%	100.0%	100.0%	100.0%	

Table 4-4: S2 post-hoc analysis of significant differences in years of experience between roles

Each superscript letter denotes a subset of role categories whose column proportions do not differ significantly from each other at the .05 level (Bonferroni correction applied).

			Role			Total
			Nurse	HCA	Nonclinical	
Mental health conditions:	Yes	n	15 ^a	27 ^{a,b}	23 ^b	65
		%	20.0%	27.0%	42.6%	28.4%
		z	-2.0	-0.4	2.6	
	No	n	60 ^a	73 ^{a,b}	31 ^b	164
		%	80.0%	73.0%	57.4%	71.6%
		z	2.0	0.4	-2.6	
Total	n	75	100	54	229	
	%	100.0%	100.0%	100.0%	100.0%	

Table 4-5: S2 post-hoc analysis of the presence of mental illness between roles

Each superscript letter denotes a subset of role categories whose column proportions do not differ significantly from each other at the .05 level (Bonferroni correction applied).

4.3.2.2 S2 exposure to COVID-19

Nursing home staff experience of COVID-19 exposure in S2 is presented in Table 4-6. More than half of staff reported having quarantined (52.4%). A majority reported no history of COVID-19 infection (59.0%). Of those who had contracted COVID-19, 8.8% reported having symptoms for ≥ 9 weeks. 42.6% reported not having fully recovered. A minority of nursing home staff reported no experience of caring for residents with COVID-19 (24.9%). 94.8% reported contact with COVID-19 infected acquaintances.

There were significant differences between groups in their exposure to COVID-19 positive residents ($p < 0.01$). Nurses were significantly less likely to have had no contact with COVID-19 positive residents ($z = -2.7$; Table 4-7) and nonclinical staff were significantly more likely to have had no contact ($z = -2.3$). Initial analysis showed a significant difference between groups in terms of their history of self-quarantine ($p = 0.046$); nonclinical staff were more likely to have quarantined ($z = 2.5$, Table 4-8).

	Total <i>n</i> (%)	Nurses <i>n</i> (%)	HCAs <i>n</i> (%)	Nonclinical <i>n</i> (%)	Chi-square χ^2 <i>p</i>	
Total	229 (100%)	75 (32.8%)	100 (43.7%)	54 (23.6%)		
None	57 (24.9%)	7 (9.3%)	26 (26.0%)	24 (44.4%)		
1-10	81 (35.4%)	24 (32.0%)	41 (41.0%)	16 (29.6%)		
11-20	31 (13.5%)	14 (18.7%)	11 (11.0%)	6 (11.1%)		
21-40	39 (17.0%)	17 (22.7%)	15 (15.0%)	7 (13.0%)		
> 40	21 (9.2%)	13 (17.3%)	7 (7.0%)	1 (1.9%)	30.73*	< 0.01
Previously self-quarantined						
Yes	120 (52.4%)	38 (50.7%)	46 (46.0%)	36 (66.7%)		
No	109 (47.6%)	37 (49.3%)	54 (54.0%)	18 (33.3%)	6.14	0.046
Previous COVID-19 infection						
No	135 (59.0%)	42 (56.0%)	65 (65.0%)	28 (51.9%)		
Yes	94 (41.0%)	33 (44.0%)	35 (35.0%)	26 (48.1%)	2.91	0.23
Symptom severity (<i>n</i> =94)						
No	14 (14.9%)	6 (18.2%)	6 (17.1%)	2 (7.7%)		
Mild/	73 (77.7%)	24 (72.7%)	27 (77.1%)	22 (84.6%)		
Moderate						
Severe	7 (7.4%)	3 (9.1%)	2 (5.7%)	2 (7.7%)	10.53*	0.09
illness						
Symptom duration (weeks; <i>n</i> =80)						
≤ 4	62 (77.5%)	19 (70.4%)	23 (79.3%)	20 (83.3%)		
5 - 8	11 (13.8%)	3 (11.1%)	4 (13.8%)	4 (16.7%)		
≥ 9	7 (8.8%)	5 (18.5%)	2 (6.9%)	0 (0.0%)	7.55*	0.09
Fully recovered (<i>n</i> =94)						
Yes	54 (57.4%)	21 (63.6%)	18 (51.4%)	15 (57.7%)		
No	40 (42.6%)	12 (36.4%)	17 (48.6%)	11 (42.3%)	1.04	0.69
Colleagues/ Acquaintances	180 (78.6%)	67 (89.3%)	73 (73.0%)	40 (74.1%)		
Close friends	118 (51.5%)	43 (57.3%)	53 (53.0%)	22 (40.7%)		
Housemates	110 (48.0%)	38 (50.7%)	45 (45.0%)	27 (50.0%)		
Immediate family	9 (3.9%)	2 (2.7%)	2 (2.0%)	5 (9.3%)		
No contact	13 (5.2%)	1 (1.3%)	6 (6.0%)	6 (11.1%)	5.61*	0.051
Acquaintances hospitalised (<i>n</i> =214)						
Yes	76 (35.5%)	33 (44.6%)	31 (33.7%)	12 (25.0%)		
No	138 (64.4%)	41 (55.4%)	61 (66.3%)	36 (75.0%)	5.11	0.08
Acquaintances died (<i>n</i> =214)						
Yes	51 (23.8%)	22 (29.7%)	18 (24.3%)	11 (22.9%)		
No	163 (76.2%)	52 (70.3%)	74 (75.7%)	37 (77.1%)	2.36	0.32

Table 4-6: S2 nursing home staff exposure to COVID-19, by role

HCAs: Healthcare Assistants. *Fisher's exact test. **Participants could select multiple answers.

***Dichotomised to contact and non-contact for analysis.

			Role			Total
			Nurse	HCA	Nonclinical	
Exposure to COVID-19 positive residents	Definite/ probable exposure	n	58 ^a	53 ^b	19 ^b	
		%	77.3%	53.0%	35.2%	56.8%
		z	4.4	-1.0	-3.7	
	Possible exposure	n	13 ^a	31 ^{a,b}	22 ^b	66
		%	17.3%	31.0%	40.7%	28.8%
		z	-2.7	0.6	2.2	
	No exposure	n	4 ^a	16 ^{a,b}	13 ^b	33
		%	5.3%	16.0%	24.1%	14.4%
		z	-2.7	0.6	2.3	
Total	n	75	100	54	229	
	%	100.0%	100.0%	100.0%	100.0%	

Table 4-7: S2 post-hoc analysis of exposure to COVID-19 positive residents between roles

Each superscript letter denotes a subset of role categories whose column proportions do not differ significantly from each other at the .05 level (Bonferroni correction applied).

			Role			Total
			Nurse	HCA	Nonclinical	
Quarantine History	No	n	37 ^{a, b}	54 ^b	18 ^a	109
		%	49.3%	54.0%	33.3%	47.6%
		z	.4	1.7	-2.4	
	Yes	n	38 ^{a, b}	46 ^b	36 ^a	120
		%	50.7%	46.0%	66.7%	52.4%
		z	-.4	-1.7	2.4	
Total	n	75	100	54	229	
	%	100.0%	100.0%	100.0%	100.0%	

Table 4-8: S2 post-hoc analysis of quarantine history between roles

Each superscript letter denotes a subset of role categories whose column proportions do not differ significantly from each other at the .05 level (Bonferroni correction applied).

4.3.2.3 S2 mental health measures

Mental health outcomes at S2 are summarised in Table 4-9. The prevalence of all staff meeting the threshold for moderate-severe PTSD symptoms was 65.1% (95%CI 58.9-71.3%). There was no significant difference between roles ($p=0.59$) in terms of prevalence of moderate to severe symptoms or on total IES-R mean (32.5, standard deviation (SD) 18.2; $p=0.53$) or subdomain means.

The proportion of staff reporting a WHO-5 score ≤ 32 , indicating low mood, was 56.8% (95%CI 50.4-63.2%). Scores consistent with major depression (WHO-5 ≤ 20) were reported by 37.1% (95%CI 30.8-43.4%) with no significant differences between groups. Suicidal ideation over the previous week was reported by 23.6% (95%CI 18.1-29.1%) of staff and 14.8% (95%CI 10.2-19.4%) reported suicidal planning, with no differences between groups. Insufficient work ability was reported by 40.6% (95%CI 34.2%-47.0%).

The Moral Injury Events Scale (MIES) mean score for the total group was 25.7 (11.3); of the subdomains, the mean “Transgression by others” score was 6.7 (3.3); “Transgression by self” mean was 9.2 (5.4); and the “Betrayal” mean was 9.7 (4.7). There was no significant difference in the overall MIES score between groups, but a significant difference was noted between groups on the “Transgression by others” subscale ($p=0.04$). On this measure, HCAs reported a significantly higher degree of moral injury than nursing staff (mean difference (MD)=1.3, standard error (SE)=0.5, $p=0.03$; Table 4-10).

	Total n=229	Nurses n=75	HCA's n=100	Nonclinical n=54	Chi-square χ^2 <i>p</i>	
IES-R 22 moderate/ severe, % (95% CI)*	65 (59-71)	67 (56-77)	67 (58-76)	59 (46-72)	1.05	0.59
WHO-5*						
Low mood, % (95% CI)	57 (50-63)	56 (45-67)	55 (45-65)	61 (48-74)	0.56	0.76
Likely depression, % (95% CI)	37 (31-43)	43 (32-54)	31 (22-40)	41 (28-54)	2.90	0.24
Suicidal ideation, % (95% CI)**	24 (18-29)	25 (15-35)	20 (12-28)	28 (16-40)	1.37	0.51
Suicidal planning, % (95% CI)**	15 (10-19)	16 (8-24)	11 (5-17)	20 (10-31)	2.55	0.28
Insufficient work ability, % (95% CI)*	41 (34-47)	49 (38-61)	34 (25-43)	41 (28-54)	4.18	0.12
					One-way ANOVA	
IES-R, Mean (SD)					<i>F</i>	<i>p</i>
Total	32.5 (18.2)	34.4 (18.0)	31.8 (16.5)	31.1 (21.5)	0.65	0.53
Avoidance	11.8 (7.0)	12.5 (7.0)	11.6 (6.6)	11.1 (7.8)	0.67	0.51
Hyperarousal	8.7 (5.8)	8.8 (5.4)	8.5 (5.3)	9.1 (7.1)	1.62	0.20
Intrusion	11.9 (7.1)	13.1 (7.1)	11.6 (6.6)	10.9 (7.9)	0.18	0.84
MIES, Mean (SD)						
Total	25.7 (11.3)	23.7 (10.8)	27.4 (11.3)	25.3 (11.8)	2.26	0.11
Transgression - others	6.7 (3.3)	6.0 (3.3)	7.3 (3.1)	6.7 (3.3)	3.35	0.04
Transgression - self	9.2 (5.4)	8.5 (5.3)	9.8 (5.3)	9.0 (5.7)	1.33	0.27
Betrayal	9.7 (4.7)	9.2 (4.6)	10.2 (4.6)	9.6 (5.0)	1.06	0.35
Brief-COPE, Mean (SD)						
Avoidant	23.0 (6.3)	23.2 (6.0)	22.7 (6.3)	23.2 (6.8)	0.19	0.82
Approach	28.4 (7.4)	30.1 (6.9)	27.6 (7.6)	27.5 (7.3)	3.18	0.04
Religion	3.7 (2.0)	3.8 (2.0)	3.7 (2.0)	3.6 (1.8)	0.24	0.79
Humour	3.3 (1.7)	3.4 (1.7)	3.3 (1.7)	3.4 (1.8)	0.30	0.74
COVID-19 perceptions, Mean (SD)						
Health fear	4.8 (1.1)	4.9 (1.1)	4.8 (1.2)	4.6 (1.2)	0.63	0.53
Social isolation/ avoidance	3.7 (1.2)	3.8 (1.1)	3.7 (1.2)	3.7 (1.0)	0.09	0.91
Job Stress	4.7 (1.1)	4.9 (1.0)	4.6 (1.1)	4.8 (1.2)	1.69	0.19
Doubts about protection	2.9 (0.9)	2.7 (0.8)	3.0 (1.0)	3.1 (0.9)	2.14	0.12
Dissatisfaction with system/ processes	3.7 (1.1)	3.5 (1.1)	3.8 (1.2)	3.8 (1.1)	2.63	0.07
Altruism perception, Mean (SD)	4.9 (1.3)	5.1 (1.2)	4.8 (1.3)	4.8 (1.2)	1.37	0.26

Table 4-9: S2 nursing home staff mental health outcomes, by role

HCA's: Healthcare assistants. SD: Standard deviation. 95% CI: 95% Confidence Interval. WHO-5: World Health Organisation-Five Wellbeing Index: maximum of 100; cut-off of 32 or more indicates normal wellbeing. IES-R: Impact of events scale revised (22 items); cut-off of 26 or more indicates moderate to severe symptoms of post-traumatic stress. Work Ability Score: maximum of 10; cut-off of 6 or more indicates sufficient perceived work ability. MIES: Moral Injury Events Scale. Higher scores denote higher intensity of moral injury. Brief-COPE: abbreviated version of the COPE (Coping Orientation to Problems Experienced) Inventory. Higher scores indicate higher utilisation of this coping style. Perceptions of health fear, social isolation and avoidance, job stress, dissatisfaction with system/processes, doubts about protection and altruism: Higher scores indicate increased identification with each subdomain.

*Item dichotomised for analysis using cut-off score. **Items are dichotomised for analysis (any suicidal ideation/planning vs none). ***Following regression analysis adjusting for role, accommodation, years

of experience, mental health conditions, contact with COVID-19 positive residents and quarantine history.

	Role		MD	SE	<i>p</i>	95% CI	
	1	Role 2				Lower	Upper
Transgression by others	Nurse	HCA	-1.28*	0.49	0.03*	-2.45	-0.12
		Nonclinical	-0.73	0.56	0.42	-2.01	0.63
	HCA	Nurse	1.23*	0.49	0.03*	0.11	2.44
		Nonclinical	0.55	0.55	0.57	-0.74	1.83
	Noncl inical	Nurse	0.73	0.58	0.42	-0.63	2.09
		HCA	-0.55	0.55	0.57	-1.84	0.74

Table 4-10: S2 pairwise comparisons of the Moral Injury Events Scale “transgression by others” subscale, by role

MD: Mean difference. SE: Standard error. *The mean difference is significant at the 0.05 level.

4.3.2.4 S2 coping styles, perceptions, and altruism

The groups differed in the use of an approach (adaptive) coping style ($p=0.04$). There were no significant differences found between groups on this measure on post-hoc analysis (Table 4-11). There were no differences between groups in their use of an avoidant (maladaptive) coping style, religion, or humour.

	Role 1	Role 2	MD	SE	<i>p</i>	95% CI	
						Lower	Upper
Approach style	Nurse	HCA	2.56	1.11	0.06	-0.07	5.18
		Nonclinical	2.64	1.30	0.11	-0.42	5.71
	HCA	Nurse	-2.56	1.11	0.06	-5.18	0.07
		Nonclinical	0.09	1.23	1.00	-2.82	2.99
	Nonclinical	Nurse	-2.64	1.30	0.11	-5.71	0.42
		HCA	-0.09	1.23	1.00	-2.99	2.82

Table 4-11: S2 pairwise comparisons of the Brief-COPE approach subscale, by role

On average, staff broadly agreed with statements regarding fear of contracting COVID-19 and job-related stress (see Table 3-6: S1 nursing home staff mental health outcomes, by role). To a slightly lesser extent, they also agreed with statements indicating a degree of concern about social stigma regarding their work and about the systems and processes in place for the pandemic. They expressed less concern about infection protection measures (i.e., facemasks, eye-shields, and handwashing). They agreed with an altruistic statement about accepting risks involved in caring for residents with COVID-19. There were no significant differences between groups regarding these perceptions.

4.3.3 S1 and S2 comparative analyses

4.3.3.1 Demographic and COVID-19 exposure comparisons between surveys.

Results of comparative analyses of demographic and COVID-19 exposure characteristics between S1 and S2 are displayed in Table 4-12. There were no significant differences noted between groups in terms of role proportions. A significant difference between groups was noted in terms of age ($p=0.01$). The sample at S1 included more participants aged 30 or younger (S1: 21.8%; S2: 12.2%; $z=3.0$, Table 4-13) and less participants aged 60 or older (S1: 30.3%; S2 38.0%; $z=-2.0$, Table 4-13). There were no significant differences between surveys in terms of gender, location, accommodation, ethnicity, or years of experience. A significant difference was found between surveys in terms of physical health conditions, with significantly more respondents reporting the presence of a physical health condition at S1 (S1: 67.7%; S2: 57.6%, $z=2.5$, Table 4-14). There was no significant difference found between surveys in terms of the presence of mental health conditions.

	χ^2	<i>p</i>
Demographic features		
Role	0.33	0.85
Age	9.94	0.01
Gender	1.37	0.58
Location (Province)	4.81	0.19
Accommodation	5.67	0.13
Ethnicity	3.84	0.06
Years of experience	4.82	0.09
Physical health condition(s)	6.32	0.01
Mental health conditions(s)	3.41	0.07
Exposure to COVID-19		
Contact with COVID-19 positive residents	55.84	< 0.01
Quarantine history	27.03	< 0.01
COVID-19 infection history	32.75	< 0.01
Symptom severity	1.66	0.66
Hospitalised with COVID-19	0.63	1.00
Duration of COVID-19 symptoms*	11.83	0.44
Recovered from COVID-19	1.38	0.27
Contact with COVID-19 positive acquaintances*	28.31	< 0.01
Acquaintances died of COVID-19	1.81	0.21
Number of COVID-19 residents attended to	96.91	< 0.01

Table 4-12: Demographic and COVID-19 exposure characteristics compared between surveys 1 and 2

			Survey 1 or 2		Total
			2020/21	2021/22	
Age	30 or less	n	85 ^a	28 ^b	113
		%	21.8%	12.2%	18.3%
		z	3.0	-3.0	
	31-59	n	187 ^a	114 ^a	301
		%	47.9%	49.8%	48.6%
		z	-.4	.4	
	60+	n	118 ^a	87 ^b	205
		%	30.3%	38.0%	33.1%
		z	-2.0	2.0	
Total		n	390	229	619

Table 4-13: Post hoc analysis of age compared between surveys 1 and 2

Each superscript letter denotes a subset of Survey 1 or 2 categories whose column proportions do not differ significantly from each other at the .05 level.

		Survey 1 or 2		Total
		2020/21	2021/22	
Physical health condition	Yes	n	126 ^a	97 ^b
		%	32.3%	42.4%
		z	-2.5	2.5
	No	n	264 ^a	132 ^b
		%	67.7%	57.6%
		z	2.5	-2.5
Total	n		390	229
	%		100.0%	100.0%

Table 4-14: Post hoc analysis of physical health conditions compared between surveys 1 and 2

Each superscript letter denotes a subset of Survey 1 or 2 categories whose column proportions do not differ significantly from each other at the .05 level.

There were significant differences noted between S1 and S2 surveys with respect to the amount of exposure to COVID-19 experienced by staff. Significantly higher degrees of exposure were found at S2 in the amount of contact with COVID-19 positive residents ($p<0.01$), acquaintances ($p<0.01$), quarantine history ($p<0.01$), and personal infection history ($p<0.01$). Surprisingly, there were no significant differences noted between S1 and S2 surveys in COVID-19 symptom severity, hospitalisation with COVID-19, duration of COVID-19 symptoms, recovery from COVID-19 and the death of acquaintances from COVID-19.

4.3.3.2 Mental health outcomes comparisons between surveys

The results of comparative analyses of mental health outcomes, coping styles, perceptions and altruism between surveys are displayed in Table 4-15. At S2, every mental health measure was found to be significantly different to S1. 45% reported moderate to severe symptoms at S1; 65% met this cut-off at S2 ($p<0.01$). At S2, mean scores were higher on IES-R total score as well as on each individual subdomain of avoidance, hyperarousal, and intrusion ($p<0.01$). More staff reported scores consistent with low mood (S1: 39%; S2 57%; $p<0.01$), depression (S1: 39%; S2: 57%;

$p<0.01$), suicidal ideation (S1: 14%; S2 18%; $p<0.01$) and suicidal planning (S1: 9%; S2 15%; $p=0.04$) later in the pandemic. MIES scores were significantly higher at S2, indicating a higher degree of moral injury. This was true for the total MIES score ($p<0.01$) as well as for each of the subdomain scores ($p<0.01$).

	S1	S2			
	n=390	n=229	χ^2/F	p	p (adj.)
IES-R 22 moderate/severe, % (95% CI)*	45 (40-50)	65 (59-71)	23.00	< 0.01	< 0.01
WHO-5*					
Low mood, % (95% CI)	39 (34-44)	57 (50-63)	18.97	< 0.01	< 0.01
Likely depression, % (95% CI)	20 (16-24)	37 (31-43)	21.79	< 0.01	< 0.01
Suicidal ideation, % (95% CI)**	14 (10-17)	24 (18-29)	9.49	< 0.01	< 0.01
Suicidal planning, % (95% CI)**	9 (6-12)	15 (10-19)	4.54	0.04	0.02
Insufficient work ability, % (95% CI)*	25 (20-29)	41 (34-47)	17.41	< 0.01	< 0.01
IES-R, Mean (SD)					
Total	25.9 (17.6)	32.5 (18.2)	19.55	< 0.01	< 0.01
Avoidance	9.7 (6.8)	11.8 (7.0)	13.93	< 0.01	< 0.01
Hyperarousal	5.5 (4.7)	8.7 (5.8)	58.59	< 0.01	< 0.01
Intrusion	9.6 (6.8)	11.9 (7.1)	16.42	< 0.01	< 0.01
MIES, Mean (SD)					
Total	20.8 (9.1)	25.7 (11.3)	27.75	< 0.01	< 0.01
Transgression - others	5.9 (3.0)	6.7 (3.3)	11.39	< 0.01	< 0.01
Transgression - self	7.9 (4.8)	9.2 (5.4)	10.05	< 0.01	< 0.01
Betrayal	7.4 (4.0)	9.7 (4.7)	43.74	< 0.01	< 0.01
Brief-COPE, Mean (SD)					
Avoidant	20.8 (6.3)	23.0 (6.3)	16.91	< 0.01	< 0.01
Approach	28.8 (8.1)	28.4 (7.4)	0.44	0.51	0.17
Religion	3.7 (2.0)	3.3 (1.7)	0.03	0.87	0.22
Humour	3.4 (1.8)	3.7 (2.0)	0.00	0.99	< 0.01
COVID-19 perceptions, Mean (SD)					
Health fear	4.5 (1.2)	4.8 (1.1)	9.52	< 0.01	0.01
Social isolation/avoidance	3.5 (1.2)	3.7 (1.2)	7.60	0.01	0.04
Job Stress	4.2 (1.2)	4.7 (1.1)	32.07	< 0.01	< 0.01
Doubts about protection	1.8 (0.8)	2.9 (0.9)	282.18	< 0.01	< 0.01
Dissatisfaction with system/processes	2.2 (0.9)	3.7 (1.1)	312.27	< 0.01	< 0.01
Altruism perception, Mean (SD)	4.8 (1.3)	4.9 (1.3)	1.63	0.20	0.59

Table 4-15: Mental health outcomes, coping, perceptions, and altruism compared between surveys

one and two

S1: Survey 1 (November 2020 to January 2021). S2: Survey 2 (November 2020 to February 2022). SD: Standard deviation. 95% CI: 95% Confidence Interval. WHO-5: World Health Organisation-Five Wellbeing Index: maximum of 100; cut-off of 32 or more indicates normal wellbeing. IES-R: Impact of events scale revised (22 items); cut-off of 26 or more indicates moderate to severe symptoms of post-traumatic stress. Work Ability Score: maximum of 10; cut-off of 6 or more indicates sufficient perceived work ability. MIES: Moral Injury Events Scale. Higher scores denote higher intensity of moral injury. Brief-COPE: abbreviated version of the COPE (Coping Orientation to Problems Experienced) Inventory. Higher scores indicate more utilisation of this coping style. Perceptions of health fear, social isolation and avoidance, job stress, dissatisfaction with system/processes, doubts about protection and altruism: Higher scores indicate increased identification with each subdomain. *Item dichotomised for analysis using cut-off score. **Items are dichotomised for analysis (any suicidal ideation/planning vs none). ***Following regression analysis controlling for significant differences between timepoint demographic characteristics (age and physical health conditions).

4.3.3.3 Coping styles, perceptions, and altruism between surveys

Staff reported higher use of avoidant (maladaptive) coping styles at S2 (S1: 20.8 (6.3); S2 23.0 (6.3); $p<0.01$, see Table 4-15. There were no significant differences found between S1 and S2 surveys in their use of approach (adaptive) coping styles, religion, or humour.

Staff reported significantly higher levels of concern at S2 regarding contracting COVID-19 ($p<0.01$), social stigma ($p=0.01$), job stress ($p<0.01$), doubts about personal protective equipment ($p<0.01$) and nursing home systems and processes ($p<0.01$).

There was no significant difference found in the high levels of altruism reported by staff between these two surveys.

4.4 Discussion

4.4.1 Introduction

To my knowledge, this is the first report of repeated, quantitative, national surveys of nursing home staff experiences during the COVID-19 pandemic. The findings of this study add to the growing body of evidence that nursing home staff report poor mental health outcomes during the pandemic (Laher et al., 2022). Strengths of this study include the large number of validated measures used and the consistent application of recruitment and analytical methods across two surveys at similar times of the year in largely independent samples of the same population. Additionally, in the intervening time there were clear shifts in the societal impact of the pandemic in the Republic of Ireland due to the successful rollout of COVID-19 vaccinations and

changes in restrictions. This provides some insight as to whether these changes may have had impacts on nursing home staff mental health. These concerning findings are seen in a cohort who report similar levels of pre-existing mental illness (29.3%) to that seen in the general population (29.2% 95%CI 25.9–32.6%).

4.4.2 WHO-5

The WHO-5 has been demonstrated to be useful when screening for depression during the previous 14 days (Topp et al., 2015). While my estimate at S1 lies at the top of the range for estimated global prevalence of depressive symptoms in healthcare workers (14-37%, k=28, n=584), the figure at S2 is now significantly higher than both my original study and this global figure (S1: 39%, 95%CI 34-44; S2: 57%, 50-63%, $p<0.01$) (Xiong et al., 2020). Given that the global figure is overwhelmingly formed from hospital studies, this is evidence that, as a group, nursing home staff appear to be suffering from higher rates of depression than their hospital counterparts. This worsening is not easily understood when considering rates of depressive symptoms in the wider society as these prevalences appear to have been stable throughout the pandemic compared to prepandemic levels, both in Ireland and abroad (Robinson et al., 2022). Comparison with the prepandemic prevalences of depression in nursing home staff is difficult due to the differences in measures used. Studies of nursing home staff during the pandemic found prevalences of 56.5% (using the Hospital Anxiety and Depression Scale) and 16.5% using the PHQ-9 (Takahashi et al., 2022).

4.4.3 IES-R

The one-week prevalence of moderate-severe PTSD symptoms in nursing home staff in the Republic of Ireland in S2 (65%, 95%CI 59-71%) is the highest reported in nursing home staff globally to date and is significantly higher than that seen at S1 (45%, 95%CI 40-50%, $\chi^2=19.55$, $p<0.01$). Correspondingly, significant increases were seen in all three sub-domains of the measure.

The only study with serial data examining this measure in nursing home staff is from an Italian randomised controlled trial of “Self Help Plus”, a psychological intervention (n=238). That study reported a similar prevalence of PTSD to that seen in S1 but found no significant difference between their pre- and post-intervention IES-R scores ($z=-0.51$, $p=0.31$) (Riello et al., 2021). However, the two assessments in this Italian study occurred only 14 weeks apart and were earlier in the pandemic than both of the surveys in this thesis.

The best estimate for a pooled prevalence of PTSD symptoms in all healthcare workers during COVID-19 pandemic to date is from a meta-review of systematic reviews and lies at 18.6–56.5% (k=24, n=327) (Chutiyami et al., 2022). This range is lower than my S2 estimate with non-overlapping confidence intervals, indicating that nursing home staff distress may be uniquely severe in healthcare environments. There were no significant differences between nurses, HCAs, and nonclinical staff on either the IES-R total score or the three subscales in both S1 and S2. This is an important finding. The temptation would be that targeted interventions should be directed towards staff that have the most clinical contact with residents, i.e., nurses and HCAs. However, nonclinical staff in these environments are at just as high a risk of developing PTSD symptoms.

4.4.4. Suicidal thinking

Concurrently with this rise in the prevalence of depression, the already high rates of suicidal thinking seen in my second survey are also now significantly higher than that seen initially. Suicidal ideation (S1: 14%, 95%CI 10-17%; S2: 24%, 18-29%, $p<0.01$) and suicidal planning (S1: 9% 95%CI 6-12%; S2: 15% 95%CI 10-19%, $p=0.04$) are both significantly higher in Irish nursing home staff later in the pandemic. There were no differences noted in suicidal ideation between staff based on their role.

There is only one other study to date assessing suicidal thinking in nursing home staff during the pandemic. This Italian study ($n=40$) found that 25% of staff were considered high risk for suicide on the Suicide Behaviours Questionnaire-Revised (N Veronese et al., 2021). Unfortunately, drawing a direct comparison with my findings is not possible due to the different methodologies used. There is a paucity of current evidence on suicidal thoughts and behaviour in healthcare workers during the pandemic globally, but the figures reported here at S2 are higher than those seen in all other international studies. International estimates of suicidal ideation and planning (as a combined prevalence) in hospital workers vary from 5.4% to 12%; however, these are two-week prevalences (Hong et al., 2021; Mortier et al., 2021; Xiaoming et al., 2020; Xu et al., 2021; Young et al., 2020). Only two studies to date have reported suicidal planning as a separate item in hospital workers; one Spanish study ($n=5,450$) found the 30-day prevalence to be 2.7% and a study of Dublin hospital workers ($n=377$) reported that 13% (95% CI 10-15%) reported suicidal ideation and 5% (95% CI 3-7%) reported suicidal planning. (Brady et al., 2022; Eyles et al., 2021; Mortier et al., 2021; Veronese et al., 2021)

4.4.5 Moral injury

The degree of moral injury experienced by Irish nursing home staff has also greatly increased over the course of the pandemic (S1: 25.9 95%CI 24.1-27.6; S2: 32.5 95%CI 30.1-34.9, $p<0.01$). The same is true of each of the moral injury subdomains. There are no other quantitative data on moral injury in nursing home staff globally, but these figures at both surveys are higher than that seen in healthcare professionals across the UK during the pandemic using the same measure ($n=4,375$; MIES 15.5, 95%CI 15.1-16.0) (Lamb et al., 2021).

In S1, HCAs reported significantly higher degrees of moral injury than nonclinical staff (MD 3.3, SE 1.2); this arose largely because of a significantly higher score on the “perceived transgression by others” subscale (MD=1.0, SE=0.38). In S2, there were no significant differences between role in total score, transgression by self or betrayal but HCAs did report significantly higher levels of moral injury on the transgression by others scale when compared to nursing staff (MD 1.23 SE 0.49, $p=0.03$). HCAs were younger and had less job experience, but this difference retained significance once age and years of experience were controlled for. HCAs often form close relationships with residents and, as a result, may have found implementing visiting restrictions (where they would have witnessed the loneliness experienced by residents first hand) and also may have found the more personal experience of resident bereavement more difficult.

4.4.6 Work ability

The proportion of staff reporting insufficient work ability greatly increased over the one year between surveys 1 and 2, from 25% (95%CI 20-29%) to 41% (95%CI 34-47%). There were no significant differences between staff based off their role in

either survey. There are no other comparative data for nursing home staff, but lower levels of insufficient work ability have been recorded in Irish doctors before the pandemic and were associated with burn-out in doctors (Hayes et al., 2019). A survey examining work ability in Dublin hospital staff (which took place in the interval between the surveys in this thesis) found that 39% (95% CI 34-44%) of staff reported insufficient work ability with no between discipline differences (Brady et al., 2022). It seems likely that this large increase in insufficient work ability may be related to burnout and the chronic issues in healthcare facilities that have been exacerbated over the course of the pandemic. While this study did not examine work ability as a correlate of the other mental health outcomes due to the need to constrain the model, it seems likely that there may be a correlation between them given the similar directionality and significant changes.

This apparent decline in work ability is concerning. Insufficient work ability has significant consequences at both the individual and societal levels. For the individual, it is associated with early retirement, work disability and long-term absence due to sickness (Jääskeläinen et al., 2016; Salonen et al., 2003; Sell, 2009). It has also been shown to be a predictor for higher mortality rates and decreased functional capacity as the individual ages (von Bonsdorff et al., 2011).

While these increased risks are very concerning for the individual, they should also be concerning for those planning the future of the nursing home sector. As mentioned previously, one of the key challenges for the sector is chronic understaffing and the ongoing recruitment and retention of staff. Given work ability's relationship to burnout, there is a risk that this may form a negative cycle of work ability leading to reduced staffing, increasing burnout for the remaining staff and further insufficient work ability. Any factor that may play into the loss of experienced staff to sickness or disability should be a priority for intervention. Unfortunately, a

meta-analysis of targeted interventions in the workplace directed at improving work ability has shown only a small positive benefit, although the authors did identify that more research needs to be done in this area given the moderate existing evidence base (Oakman et al., 2018).

4.4.7 Perceptions of the COVID-19 pandemic

Surprisingly, staff reported significantly more concern about contracting COVID-19, social stigma regarding their roles, doubts about protection and COVID-19 systems and processes at S2. This is despite the vast majority of nursing home staff being vaccinated and organisations having had almost two years to implement appropriate policies and procedures (European Centre for Disease Prevention and Control, 2022). There were no differences between staff perceptions based on their role at either timepoint. Many of these problems are seen in qualitative studies of other nursing homes in the pandemic (Laher et al., 2022). Perhaps unsurprisingly, they also report significantly more job stress but similar levels of altruism.

4.4.8 Coping styles

Nursing staff were noted to utilise approach or adaptive coping styles significantly more in S1. The cohort of nurses in S2 also used adaptive coping styles more in S2 but this didn't meet the test for statistical significance ($p=0.06$). Despite maladaptive styles being correlated negatively with all the mental health outcomes analyses above, the nurses improved use of positive coping styles did not significantly protect them from poor outcomes.

To my knowledge, there are no other sequential studies examining coping in nursing home staff during the covid19 pandemic. Interestingly, this study found a significant increase in maladaptive coping as the pandemic wore on. This corresponds with worsening depression, post-traumatic stress, suicidal thinking, moral injury.

While we cannot infer the direction of causality here and while there may be an unmeasured confounder, it seems possible that there may be a bidirectional element to these correlations. For example, those with worsening mental health may turn to maladaptive means to cope which in turn may negatively affect their mental health. While the use of positive or adaptive coping styles did not significantly change, there was a numerical decrease observed between surveys. Unsurprisingly, the use of religion as a coping mechanism did not change during the pandemic. Also, although there was no significant increase in the use of humour as a coping mechanism initially, one emerged when the analysis was adjusted for differences in age and physical health conditions (S1: 3.4 SD 1.8; S2: 3.7 SD 2.0, $p=0.99$, adj. $p<0.01$). On secondary analysis, it emerged that this difference was due to differences in the age grouping between cohorts; the cohort at S2 skews older and appears to utilise humour to cope with challenging situations. Unfortunately, the increased use of humour and maladaptive coping does not appear to have been effective in protecting this cohort of staff from generally dismal mental health outcomes.

4.4.9 Differences between roles

While the outcomes at S2 tended to be significantly worse than at S1, it is notable that many of the significant differences detected between groups of healthcare professionals in my earlier survey are not present at this later stage of the pandemic.

At S2, nurses, HCAs and nonclinical staff appeared to be equally affected in terms of post-traumatic stress symptoms, low mood and depression, suicidal thinking, perceived work ability and overall moral injury. However, I have replicated the finding from S1 that HCAs have numerically higher levels of moral injury than other professionals and both surveys showed a significantly higher level of “perceived transgressions by others” in HCAs although this was in comparison with different groups (nonclinical staff in S1 and nurses in S2).

4.4.10 Limitations

One limitation of this cross-sectional study is that the sample size is relatively small compared to the estimated number of nursing home staff in Ireland. The S2 sample size was also lower than that at S1. Therefore, it is possible that selection bias could explain these poor mental health outcomes. However, the S1 prevalence for PTSD symptoms is similar to that seen in the Italian care home study where the staff response rate was 53% (Riello et al., 2020). While the S2 outcomes are significantly different, the demographic characteristics at S2 (in an almost entirely independent sample) are very similar to S1 (except for age and the presence of physical health conditions). Additionally, my staff response rates in participating nursing homes were similar at S1 and S2. Therefore, this study provides data to show that the high levels of distress in this population are at least as high as they were at S1 and are likely significantly higher.

Secondly, as there are no ethnicity data available for Irish nursing home staff, it was not possible to determine if survey participants are ethnically representative of

the nursing home staff population. Being a HCW of ethnic minority has been shown to be a risk factor for PTSD symptoms in UK HCWs during the pandemic (n=2,773) (Gilleen et al., 2021). However, the Nursing and Midwifery Board of Ireland (Ireland's regulatory body for nurses) show that the proportions of nurses' country of registration corresponds to the ethnicity of the nurse participants in the survey (Nursing and Midwifery Board of Ireland, 2019).

Thirdly, a negligible number of staff performed both surveys, meaning longitudinal analyses of individual level responses was impossible. It is not possible to say if the significant differences noted in this simply represent a different prevalence in a de novo population. Finally, as mentioned in study one, It is impossible to say to state if I have accurately represented the response rate. While I attempted to do so by asking PIC to provide the number of staff working in their workplaces, this is likely only an approximate figure as there were other avenues for staff to access the survey. Again, the uptake overall is lower than I had wished, but the breakdown of staff by role and location appears to broadly represent staff working in nursing homes across Ireland.

4.4.11 Conclusions

My hypothesis that nursing home staff mental health outcomes would improve following the roll-out of vaccinations and the easing of pandemic-related restrictions has not been supported. Many pandemic-related conditions had improved markedly in Ireland between S1 and S2. At the time of the second survey in the Republic of Ireland, the estimate for overall uptake of a full course of vaccination in healthcare workers and those aged ≥ 60 years is estimated to have been nearly 100% (European Centre for Disease Prevention and Control, 2022). While the second survey took

place during a surge of Omicron variant-induced cases, this period was one of widespread optimism regarding the pandemic in Ireland for two reasons. Firstly, the Irish disease burden of the Omicron wave was expected to be mild. Secondly, societal restrictions at the time were relatively benign after a prolonged period of stringent lockdown (Blavatnik School of Government, 2020). Despite this, nursing home staff reported significantly worse mental health outcomes at this time when compared to an already dismal baseline from one year earlier in the pandemic.

This is not easily explained by factors present in wider society: prevalences of mental health issues in the general population appear to have been stable throughout the pandemic, both in Ireland and abroad compared to prepandemic levels (Hyland et al., 2021; Robinson et al., 2022). One clue may lie in the answers provided by staff regarding their perceptions of the pandemic. While I did not include a validated questionnaire assessing work and staffing conditions specifically, the significantly higher concerns regarding nursing home infection control systems and procedures and job stress indicate that working conditions have become more difficult over time. One possibility is that this is due to the combination of high prevalence of Omicron in the community at this time; the impact that this has had on staff shortages due to ongoing mandated COVID-19 quarantining is well documented internationally (Comas-Herrera A, 2022). Staffing shortages are also rife: a January 2022 survey of 118 nursing homes by NHI revealed that an average of 9.4 HCAs and 2.86 nurses left nursing homes in Ireland in the previous year; 80.6% of nursing homes reported it was “extremely difficult” or “impossible” to recruit HCAs; and 61.9% reported the same difficulty with nursing recruitment (Nursing Homes Ireland, 2022). The impact of this problem has likely dwarfed any potential benefits of vaccination or easing of restrictions. Unfortunately, this is unlikely to abate while highly transmissible variants of COVID-19 exist.

To summarise, in this series of national surveys of nursing home staff, despite a robust vaccination programme and widespread easing of restrictions, the extent of post-traumatic stress, low mood, moral injury, suicidal thinking, and job stress are significantly worse later in the COVID-19 pandemic.

CHAPTER 5 – CORRELATES OF DEPRESSION, POST-TRAUMATIC STRESS AND MORAL INJURY

5.1 Introduction

The psychological impact of the COVID-19 pandemic on healthcare workers (HCWs) is well documented. One systematic review of mental health outcomes in HCWs has estimated high prevalences of mental health difficulties; for example, it estimates pooled prevalences of 31.1% for depression (95 %CI, 25.7-36.8) and 20.2% for post-traumatic stress (95 %CI, 9.9-33.0). Additionally, there has been concern that HCWs have been at risk of psychological distress due to witnessing or committing acts that go against their conscience (Xue et al., 2022). Also known as moral injury, it is hypothesised that this could significantly affect healthcare workers during the COVID-19 pandemic due to having to, for example, ration intensive care or implement strict visiting restrictions on family members.

It remains unclear as to how these problems are evolving as the pandemic progresses. Given the fact that the HCW cohort represents a high-risk group for a substantial burden of mental health issues, there is research interest in factors relating to these issues (Chigwedere et al., 2021; Lai et al., 2020). These factors can be broadly categorised into unmodifiable or static factors (e.g., demographic factors such as gender) and modifiable or dynamic factors (e.g., working conditions). Static factors are of interest as they may help identify high-risk groups who may benefit from targeted interventions. Dynamic factors are of interest as these factors themselves may be directly targeted. By using these factors to tailor interventions, the significant psychological distress experienced by HCWs could be mitigated, both now and in future pandemics.

Several studies have demonstrated factors that are correlated with (and may represent predictors of) psychological outcomes for healthcare staff during infectious disease outbreaks (Brooks et al., 2017; Serrano-Ripoll et al., 2020). These can be grouped into broad categories of demographic variables, occupational factors (including those relating to virus exposure and perceptions relating to infection and the pandemic), and coping styles. Demographic factors associated with a higher risk of poor mental health outcomes include younger age, female gender and belonging to an ethnic minority. Younger age has been shown to be a risk factor for depression and PTSD in a study of Indian ophthalmologists (Khanna et al., 2020); it has also been shown to be associated with increased stress in a study of UK healthcare workers (n=2,773) (Gilleen et al., 2021). Female HCWs have consistently been shown to be at higher risk of depression and a subgroup analysis showed a higher prevalence of PTSD in female staff (30%, 95%CI 28-31%) compared to their male colleagues (16%, 95%CI 13-14%) (Elbay et al., 2020; Gilleen et al., 2021; Kurt et al., 2020; Lai et al., 2020; Santamaría et al., 2021; Serrano-Ripoll et al., 2020). In a study of UK healthcare workers during the COVID-19 pandemic (n=2,773), being from an ethnic minority has been shown to be significantly associated with high PTSD symptoms (OR=1.52); no association was found between ethnicity and depression in this study (Gilleen et al., 2021).

Secondly, pandemic-related factors and factors relating to exposure to the virus in the healthcare setting have been identified in several studies as being associated with psychological distress. For example, a study of Singaporean HCWs (n=15,025) during the SARS outbreak found that perceived stigmatization due to their role was associated with stress (Koh et al., 2005). A fear of infection has been shown to be associated with various mental health problems including depression and PTSD (Liu et al., 2012, Maunder et al., 2004). Job stress, social isolation and a lack of social support have similarly been found to contribute to worse outcomes

including post-traumatic stress (Mauder et al., 2004; Park et al., 2018; Xiao et al., 2020). Being forced to quarantine or self-isolate during the COVID-19 pandemic was shown to be associated with depression in one study (n=320) of Californian nurses (OR=2.68; [1.55–4.63], $p<0.01$). In the same study, caring for COVID-19 patients was shown to be associated with moderate/severe stress (OR=2.25; $p=0.012$) and anxiety (OR=3.04; $p<0.001$).

Coping styles have been shown to be associated with differing mental health outcomes in numerous studies (Hannemann et al., 2022). The terminology for coping styles differs in various studies but, broadly, coping styles can be considered to be positive (otherwise known as adaptive/active/approach) or negative (otherwise known as maladaptive/passive/avoidant). The evidence is unclear as to whether positive coping strategies may be protective against depression with divergent effects reported in two studies (Hannemann et al., 2022). However, negative or maladaptive coping styles consistently appear to be related with worse outcomes, including depression and PTSD (Hannemann et al., 2022).

Despite the large number of studies examining these issues in hospital-based HCWs, there are few quantitative studies that have examined correlates of mental health outcomes in nursing homes (Husky et al., 2022; Laher et al., 2022). One French study (n=127) of anxiety, depression and PTSD in nursing home staff found that younger age was associated with a higher risk of a mental disorder (OR 2.53 95% CI 1.02-6.32) as was the presence of a previous mental health disorder (OR 4.27, 95% CI 1.96-9.29) (Husky et al., 2022). There is limited evidence regarding factors relating to moral injury in nursing home staff; this has been identified as a research gap (Laher et al., 2022).

With this in mind, I aimed to conduct a study of correlates of Irish nursing home staff mental health using data from two national, anonymous surveys which

took place during two separate time periods (November 2020-January 2021) and 5th wave (November 2021-February 2022) in largely independent samples. My hypothesis was that demographic factors (i.e., female gender, younger age, and ethnic minority status), occupational and COVID-19 pandemic-related factors (i.e., those with more COVID-19 exposure, less experience, and more negative perceptions of the pandemic) and coping styles (i.e., less use of adaptive coping strategies and those with more use of maladaptive coping strategies) would significantly correlate with higher levels of depression, post-traumatic stress, and moral injury.

5.2 Methods

The methods for this study are as described in sections “2.3.6.3 Regression analyses of IES-R, WHO-5, and MIES scores: assumptions testing”, “2.3.6.4 Regression analyses of IES-R, WHO-5, and MIES scores: independent variable (IV) selection and subjects per variable (SPVs)”, “2.3.6.5 Regression analyses of IES-R, WHO-5, and MIES scores: multiple comparisons testing”, “2.3.6.6 Regression analysis: potential confounding between the IES-R avoidance subdomain and the Brief-COPE avoidant coping styles”, and “2.3.6.7 Reporting of correlates.”

Briefly, having tested for the required assumptions to perform linear regression, I performed multiple linear regression analyses of the datasets from Survey one (S1) and Survey two (S2) using independent variables characterising demographics, COVID-19 exposure, perceptions regarding the pandemic, and coping styles. Survey cohorts were examined separately as some of the independent variables, especially those relating to COVID-19 exposure and COVID-19 occupational factors, may change over time as staff members became both accustomed to operating in this environment and as intervening vaccination may have reduced

distress and consequently, their mediation of the relevant outcomes. The dependent variables selected were the World Healthcare Organisation Wellbeing Index (WHO-5) which measures wellbeing (and conversely depression), the Impact of Events Scale-Revised (IES-R) which measures post-traumatic stress symptomatology, and the Moral Injury Events Scale (MIES) which measures moral injury. I applied identical analyses for each of the three mental health outcomes at both S1 and S2, leading to six regression analysis models in total. I then applied the Benjamini-Hochberg procedure against all outputted p-values to control the false discovery rate. I also repeated the entire analysis with the “Avoidance” subscale of the IES-R removed as I was concerned about the possibility of confounding between this measure and the “Avoidant” coping style measured in the Brief-Coping Orientations to Problems Experienced.

5.3 Results

5.3.1 Assumptions Testing

Assumptions were tested for each model independently for both surveys; in total this represented six datasets. With respect to assumption (i) - that the dependent variables were continuous - all three outcome measures chosen are continuous variables. Violation of assumption (ii) - that the independent variables were interval or ratio variables - was avoided by dichotomising variables where necessary and using dummy coding for the one categorical variable (“Role”) where this was not preferable. Gender also included three categorical categories; given that there were only three non-male/female cases in the dataset, I decided to remove these prior to regression analysis due to, firstly, the small likelihood of these affecting the overall

model and, secondly, as there was no way to sensibly classify these into the two larger categories. For assumption (iii), I tested for outliers by comparing the dataset's Mahalobis distances to a chi-square distribution with nineteen degrees of freedom (Statistics Solutions, 2022). This identified one outlier case which was removed prior to further analysis.

To test assumption (iv) absence of multicollinearity, I checked variance inflation factor (VIF) values with each of the dependent variables in both surveys (Lani, 2022). In datasets where there is no multicollinearity, we expect the VIF values to be below 10.0 and ideally, they should be below 5.0 (Lani, 2022). VIF values for all models are displayed in Table 5-1: Variance inflation factor (VIF) values for the WHO-5, IES-R and MIES at survey one and survey two.; as can be seen, all values are <5.0. Therefore, this assumption was not violated.

	VIF values					
	WHO-5 S1	WHO-5 S2	IES-R S1	IES-R S2	MIES S1	MIES S2
Age	1.28	1.28	1.28	1.28	1.28	1.28
Gender	1.09	1.30	1.09	1.30	1.09	1.30
Ethnicity	1.27	1.33	1.27	1.33	1.27	1.33
HCA	1.60	1.73	1.60	1.73	1.60	1.73
Nonclinical	1.71	1.68	1.71	1.68	1.71	1.68
Years of Experience	1.34	1.47	1.34	1.47	1.34	1.47
Physical health condition	1.15	1.17	1.15	1.17	1.15	1.17
Mental health condition	1.24	1.18	1.24	1.18	1.24	1.18
Exposure to COVID-19 positive resident	1.23	1.13	1.23	1.13	1.23	1.13
Quarantine history	1.40	1.59	1.40	1.59	1.40	1.59
Previous COVID-19 infection	1.41	1.59	1.41	1.59	1.41	1.59
Health fear	1.38	1.57	1.38	1.57	1.38	1.57
Doubts about system and processes	1.21	1.48	1.21	1.48	1.21	1.48
Doubts about protection	1.17	1.46	1.17	1.46	1.17	1.46
Job stress	1.38	1.96	1.38	1.96	1.38	1.96
Social isolation and avoidance	1.31	1.60	1.31	1.60	1.31	1.60
Altruism	1.11	1.21	1.11	1.21	1.11	1.21
Avoidant coping	1.44	1.86	1.44	1.86	1.44	1.86
Approach coping	1.39	1.35	1.39	1.35	1.39	1.35

Table 5-1: Variance inflation factor (VIF) values for the WHO-5, IES-R and MIES at survey one and survey two.

To test for assumption (v) homoscedasticity, I created scatterplots of the residuals in each of the six models (Bobitt, 2020). Ideally, there should be no obvious pattern with points broadly equally distributed above and below zero on the X- and Y-axes (see Figure 5-1 & Figure 5-2). Furthermore, I used the Breusch-Pagan test to assess for homoscedasticity (Bobitt, 2020). This method involves performing linear regression analysis on the squares of the model's unadjusted residuals; the null hypothesis in this case is that homoscedasticity is present, and the test returns a p-value of <0.05 if heteroscedasticity is present. All datasets demonstrated homoscedasticity except for the WHO-5 dataset at S1. In that case, I log-transformed the dependent variable; the subsequent dataset demonstrated homoscedasticity using the Breusch-Pagan test and was used for analysis (Frost, 2017).

Measure	<i>p</i>
WHO-5 S1	0.04
↪WHO-5 S1 (log transformed)	0.06
IES-R S1	0.13
MIES S1	0.08
WHO-5 S2	0.06
IESR S2	0.36
MIES S2	0.44

Table 5-2: Breusch-Pagan test applied to each model.

A p-value of <0.05 means that heteroscedasticity is present. Once the dependent variable in the WHO-5 dataset at S1 was transformed, the data demonstrated homoscedasticity.

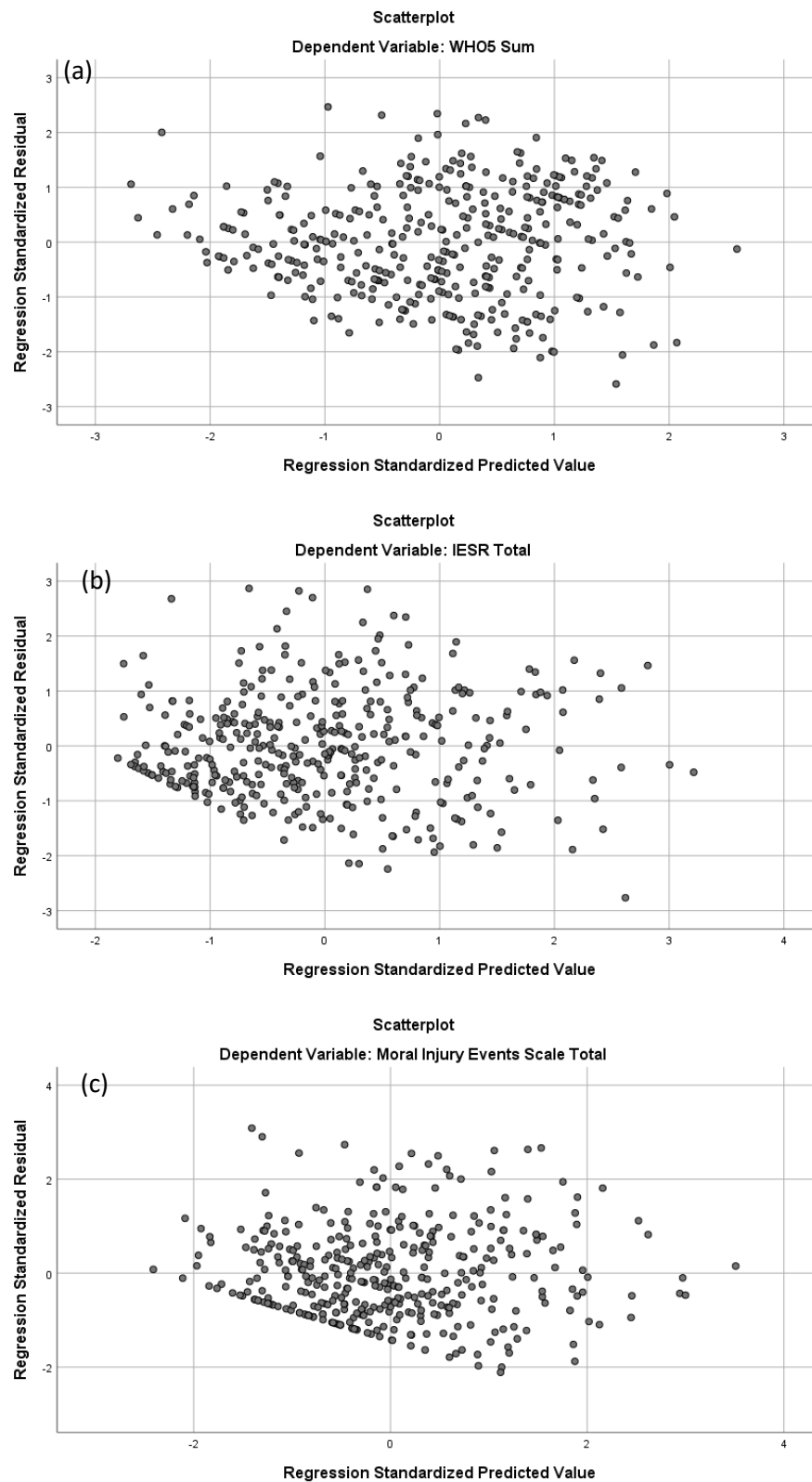


Figure 5-1: Scatterplots of residuals vs predicted values at S1 in (a) WHO-5; (b) IES-R; (c) MIES

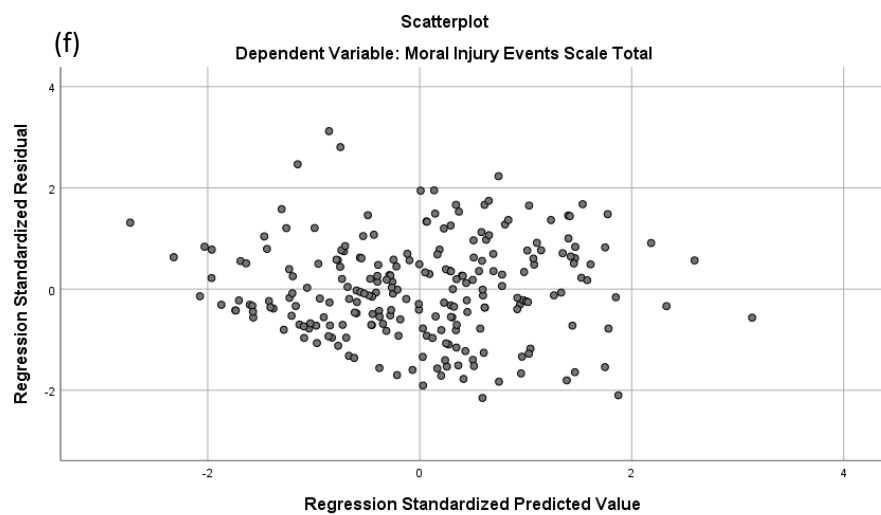
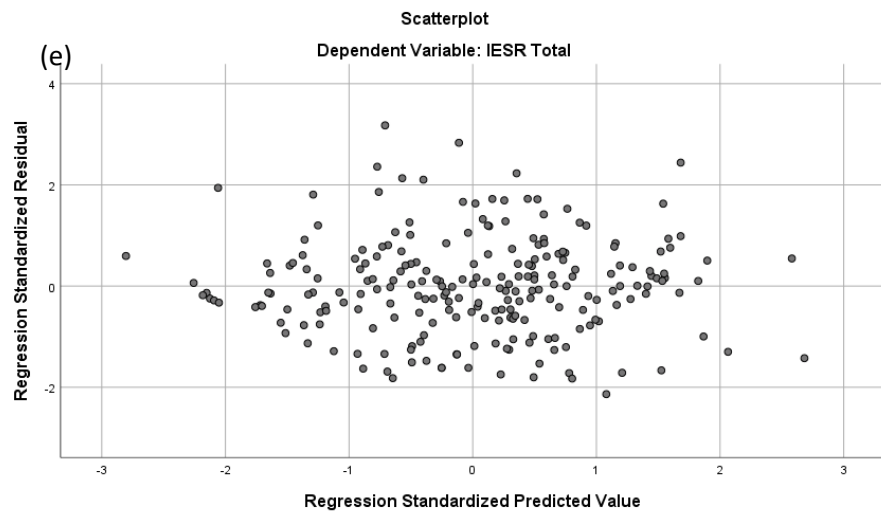
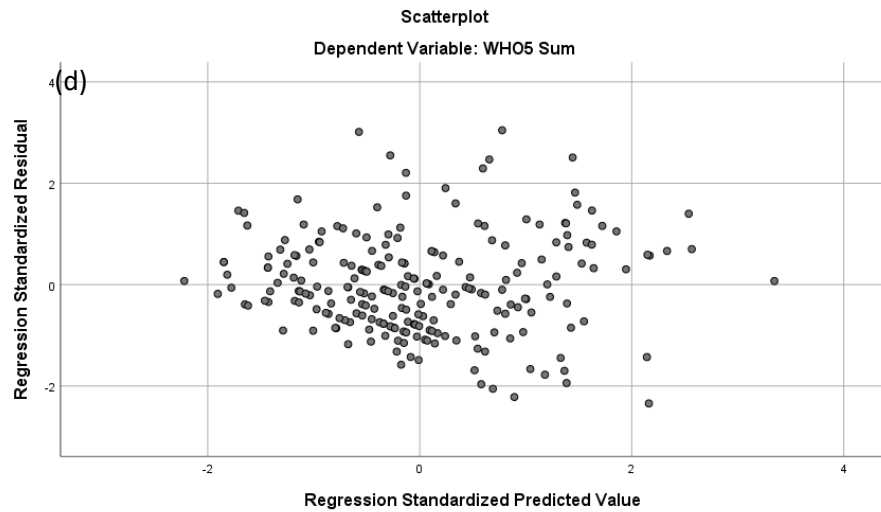


Figure 5-2: Scatterplots of residuals vs predicted values at S2 in (d) WHO-5; (e) IES-R; (f) MIES

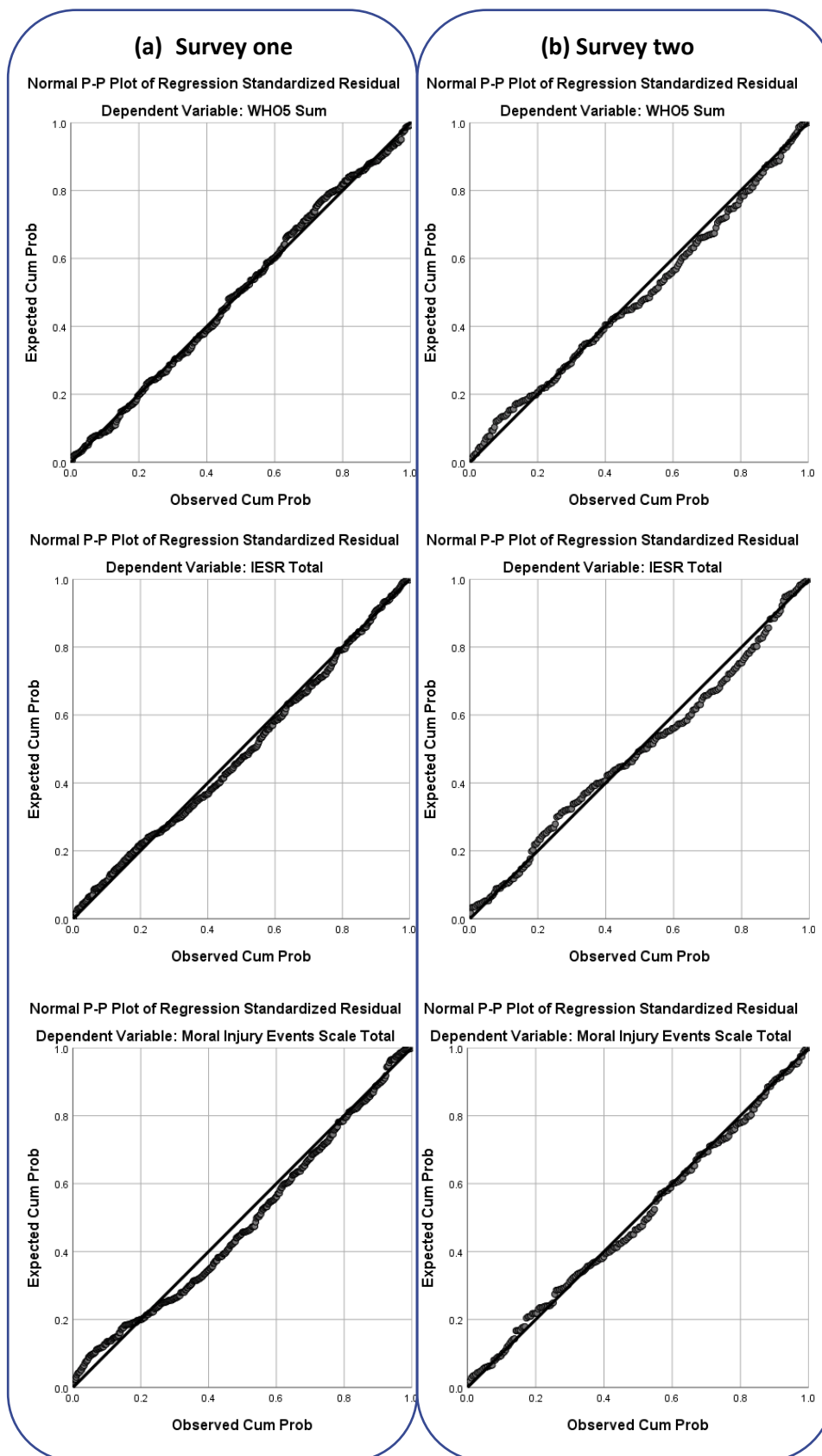


Figure 5-3: Predicted values plotted against residuals (P-P plots).

To test for assumption (vi) normality, i.e., that the residuals of the regression line were approximately normally distributed, I plotted predicted values against residuals in each model. These probability-probability plots (or P-P plots) indicate that the data are normal if they do not deviate significantly from the diagonal line. As can be seen in Figure 5-3, all six datasets demonstrated normality.

With respect to assumption (vii) linearity, it can be assumed that data demonstrate linearity if they demonstrate normality and homoscedasticity. This is the case for five of the six datasets; however, one of the datasets (WHO-5 at S1) did not demonstrate homoscedasticity. Therefore, I plotted its dependent variable against the independent variables to ascertain if these variables demonstrated a linear relationship. It can be seen in Figure 5-4 that a clear linear relationship is present. (It should be noted that WHO-5 scores are reported in multiples of four due to the way they are calculated; therefore, scores appear to cluster in vertical columns along the chart.)

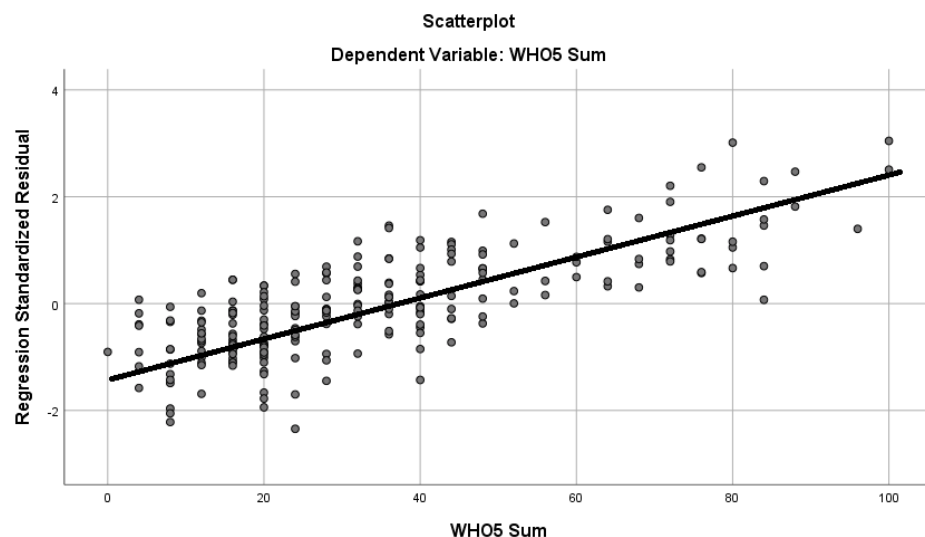


Figure 5-4: WHO-5 data at S1; plot of dependent variable against independent variables.

5.3.2 Subjects per variable (SPV)

After removal of four cases as described in the previous section, the number of subjects in the datasets remained sufficient to perform analyses on 19 independent variables. For S1, the SPV was 20; for S2 the SPV was 12. These both exceed the rule of thumb that one should have 10 cases per independent variable and greatly exceeds the SPV of two recommended by Austin and Steyerberg for linear regression analyses (Austin & Steyerberg, 2015).

5.3.3 S1 WHO-5 model summary

Model summary for the WHO-5 model at S1 is presented in Table 5-3. R was 0.60 indicating a moderate degree of correlation. R^2 was 0.32 indicating that a low-moderate degree of variation was explained by the independent variables in the model. A significant regression equation was found ($F(19,209)=10.57$, $p<0.01$, see Table 5-4Table 5-3).

R	R^2	Adjusted R^2	SE of Estimate
0.60	0.32	0.3	0.23

Table 5-3: WHO-5 at S1 model summary

	Sum of Squares	df	Mean Square	F	p
Regression	11.02	19	.58	10.57	<0.01
Residual	19.92	363	.06		
Total	30.94	382			

Table 5-4: WHO-5 at S1 ANOVA

5.3.4 S1 IES-R model summary

Model summary for the IES-R model at S1 is presented in Table 5-5. R was 0.73 indicating a moderate-high degree of correlation. R^2 was 0.53 indicating that a moderate degree of variation was explained by the independent variables in the model. A significant regression equation was found ($F(19,209)=22.05$, $p<0.01$, see Table 5-6).

R	R^2	Adjusted R^2	SE of Estimate
0.73	0.53	0.51	12.34

Table 5-5: IES-R at S1 model summary

	Sum of Squares	df	Mean Square	F	p
Regression	63751.14	19	3355.32	22.05	<0.01
Residual	55691.07	366	152.16		
Total	119442.21	385			

Table 5-6: IES-R at S1 ANOVA

5.3.5 S1 MIES model summary

Model summary for the MIES model at S1 is presented Table 5-7. R was 0.54 indicating a moderate degree of correlation. R^2 was 0.29 indicating that a low-moderate degree of variation was explained by the independent variables in the model. A significant regression equation was found ($F(19,209)=7.93$, $p<0.01$, see Table 5-8).

R	R^2	Adjusted R^2	SE of Estimate
0.54	0.29	0.26	8.51

Table 5-7: MIES at S1 model summary

	Sum of Squares	df	Mean Square	F	p
Regression	10916.69	19	574.56	7.93	<0.01
Residual	26515.06	366	72.45		
Total	37431.75	385			

Table 5-8: MIES at S1 ANOVA

5.3.6 S2 WHO-5 model summary

The model summary for the WHO-5 model at S2 is presented Table 5-9. R was 0.65 indicating a moderate degree of correlation. R^2 was 0.43 indicating that a moderate degree of variation was explained by the independent variables in the model. A significant regression equation was found ($F(19,209)=8.20$, $p<0.01$, see Table 5-10).

<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	SE of Estimate
0.65	0.43	0.38	17.62

Table 5-9: WHO-5 at S2 model summary

	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Regression	48363.66	19	2545.46	8.20	<0.01
Residual	64907.26	209	310.56		
Total	113270.917	228			

Table 5-10: WHO-5 at S2 ANOVA

5.3.7 S2 IES-R model summary

The model summary for the IES-R model at S2 is presented in Table 5-11Table 5-3. *R* was 0.58 indicating a moderate degree of correlation. *R*² was 0.54 indicating that a moderate degree of variation was explained by the independent variables in the model. A significant regression equation was found ($F(19,209)=15.02$, $p<0.01$, see Table 5-12).

<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	SE of Estimate
0.76	0.58	0.54	12.38

Table 5-11: IES-R at S2 model summary

Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
----------------	----	-------------	----------	----------

Regression	43755.94	19	2302.94	15.02	<0.01
Residual	32043.30	209	153.32		
Total	75799.24	228			

Table 5-12: IES-R at S2 ANOVA

5.3.8 S2 MIES model summary

Model summary for the MIES model at S2 is presented in Table 5-13Table 5-3. R was 0.65 indicating a low-moderate degree of correlation. R^2 was 0.43 indicating that a moderate degree of variation was explained by the independent variables in the model. A significant regression equation was found ($F(19,209)=8.25$, $p<0.01$, see Table 5-14).

R	R^2	Adjusted R^2	SE of Estimate
0.65	0.43	0.38	8.91

Table 5-13: MIES at S2 model summary

	Sum of Squares	df	Mean Square	F	p
Regression	12461.89	19	655.89	8.25	<0.01
Residual	16609.84	209	79.47		
Total	29071.73	228			

Table 5-14: MIES at S2 ANOVA

5.3.9 Composite table of correlates with mental health outcomes

Following regression analysis of all six models, I applied the Benjamini-Hochberg method to all outputted p-values. A composite of all p-values from this analysis is displayed in Table 5-15. A positive β indicates a positive direction of correlation by that independent variable with that outcome; a negative β indicates a negative direction of correlation. β also indicates the effect size, with <0.1 indicating a small effect size, $0.1-0.5$ indicating a moderate effect size and >0.5 indicating a large effect size. In total, 18 interactions between independent and dependent variables met the cut-off for significance following the application of this procedure. Tables summarising the significant correlations for each of the dependent variables are found in the below sections.

	WHO5						IES-R						MIES					
	S1			S2			S1			S2			S1			S2		
	β	p		β	p		β	p		β	p		β	p		β	p	
Constant	-	<0.01		-	<0.01		-	0.63		-	<0.01		-	0.98		-	<0.01	
Demographics: Age (40 or less)	-0.03	0.53		-0.03	0.63		-0.02	0.69		0.01	0.83		0.07	0.13		0.11	0.07	
Demographics: Male gender	-0.03	0.49		0.05	0.38		-0.05	0.21		0.08	0.14		-0.04	0.38		0.05	0.40	
Demographics: White ethnicity	-0.03	0.50		-0.15	0.01*		-0.08	0.04		-0.04	0.47		0.08	0.11		-0.02	0.72	
Role: Nurse (dummy coded)	-	-		-	-		-	-		-	-		-	-		-	-	
Role: Healthcare assistant	0.17	<0.01*		0.02	0.80		0.01	0.85		-0.02	0.73		0.13	0.02		0.19	0.01*	
Role: Nonclinical	0.00	0.95		0.06	0.37		0.08	0.08		-0.05	0.39		0.00	0.95		0.04	0.52	
Years of experience (<10 years)	0.05	0.32		0.10	0.11		-0.10	0.01*		0.03	0.55		-0.06	0.23		-0.06	0.33	
Absence of physical health condition(s)	0.07	0.10		0.00	0.96		-0.02	0.69		-0.05	0.29		-0.07	0.14		0.01	0.80	
Absence of mental health condition(s)	0.20	<0.01*		0.15	0.01*		-0.07	0.07		-0.02	0.74		0.05	0.31		0.04	0.47	
Exposure to COVID-19 positive resident(s)	-0.17	<0.01*		-0.04	0.50		0.05	0.18		0.05	0.32		0.08	0.12		-0.08	0.18	
History of self-quarantine	-0.09	0.07		0.02	0.81		0.05	0.28		0.06	0.32		0.01	0.89		0.14	0.04	
COVID-19 infection history	-0.03	0.61		-0.03	0.66		0.12	<0.01*		0.08	0.17		0.02	0.67		-0.04	0.58	
Perceptions: Health fear	0.00	0.94		0.01	0.83		0.01	0.90		0.13	0.03		-0.03	0.56		0.02	0.81	
Perceptions: Job stress	-0.01	0.82		-0.43	<0.01*		-0.01	0.80		0.13	0.04		0.01	0.89		0.24	<0.01*	
Perceptions: Social isolation and Avoidance	0.01	0.91		0.00	1.00		-0.06	0.18		0.14	0.02		-0.04	0.41		0.08	0.23	
Perceptions: Doubts about protection	-0.02	0.73		0.01	0.84		0.01	0.85		0.04	0.46		0.10	0.05		0.08	0.21	
Perceptions: Dissatisfaction with system or processes	-0.03	0.47		0.00	0.97		-0.01	0.77		0.03	0.64		0.09	0.07		0.23	<0.01*	
Altruism	-0.03	0.46		0.11	0.05		0.03	0.37		0.11	0.03		0.03	0.56		0.05	0.37	
Brief-COPE Avoidant (maladaptive)	-0.41	<0.01*		-0.23	<0.01*		0.63	<0.01*		0.46	<0.01*		0.42	<0.01*		0.28	<0.01*	
Brief-COPE Approach (adaptive)	0.19	<0.01*		0.12	0.05		0.05	0.21		-0.02	0.72		0.03	0.50		-0.03	0.67	

Table 5-15: Correlates of WHO-5, IES-R (including Avoidance) and MIES at S1 and S2.

*Significant association following correction for multiple testing using the Benjamini-Hochberg method.

A positive t-statistic indicates a positive correlation by an independent variable with that outcome.

5.3.10 Correlates of the WHO-5 at S1 and S2 following regression

analysis

WHO-5		
	S1	
	β	p
Role: Healthcare assistant	0.17	<0.01*
Absence of mental health condition(s)	0.20	<0.01*
Exposure to COVID-19 positive resident(s)	-0.17	<0.01*
Brief-COPE Avoidant (maladaptive)	-0.41	<0.01*
Brief-COPE Approach (adaptive)	0.19	<0.01*
	S2	
Demographics: White ethnicity	-0.15	0.01*
Absence of mental health condition(s)	0.15	0.01*
Perceptions: Job stress	-0.43	<0.01*
Brief-COPE Avoidant (maladaptive)	-0.23	<0.01*

Table 5-16 : Summary of significant correlates of WHO-5 at S1 and S2.

*Significant association following correction for multiple testing using the Benjamini-Hochberg method.

WHO-5: World Health Organisation-Five Wellbeing Index. A positive correlation indicates greater wellbeing. S1: Survey 1 (November 2020 to January 2021). S2: Survey 2 (November 2021 to February 2022). Perceptions of health fear, social isolation and avoidance, job stress, dissatisfaction with system/processes, doubts about protection and altruism: Higher scores indicate increased identification with each subdomain. Brief-COPE: abbreviated version of the COPE (Coping Orientation to Problems Experienced) Inventory.

None of the selected demographic variables (age, gender, or ethnicity) were significantly correlated with WHO-5 scores at S1. However, a negative correlation was seen at S2 with those of white ethnicity reporting lower WHO-5 scores (i.e., poorer wellbeing) ($\beta=-0.15$, $p < 0.01$). The model found a positive significant correlation between HCAs and WHO-5 scores at S1 ($\beta=0.17$, $p<0.01$); this correlation was not found at S2 ($\beta=0.02$, $p=0.80$). No significant correlation was found between nonclinical staff and WHO-5 scores at S1 ($\beta=0.00$, $p=0.95$) or S2 ($\beta=0.06$, $p=0.37$). There were no significant correlations between years of experience or physical illness with WHO-5 scores found. The absence of a mental health condition was correlated with significantly higher WHO-5 (i.e., greater wellbeing) scores at both S1 ($\beta=0.20$,

$p < 0.01$) and S ($\beta = 0.15$, $p < 0.01$). Exposure to COVID-19 positive residents was significantly associated with lower WHO-5 scores at S1 ($\beta = -0.17$, $p < 0.01$); this was not the case at S2 ($\beta = -0.04$, $p = 0.50$). Neither a history of self-quarantine (S1: $\beta = -0.09$, $p = 0.07$; S2: $\beta = 0.02$, $p = 0.81$) nor a personal history of COVID-19 infection (S1: $\beta = -0.03$, $p = 0.61$; S2: $\beta = -0.03$, $p = 0.66$) was correlated with WHO-5 scores at S1 or S2.

Health fear was not correlated with WHO-5 scores at S1 or S2 (S1: $\beta = 0.00$, $p = 0.94$, S2: $\beta = 0.01$, $p = 0.83$). However, while job stress did not demonstrate a significant correlation at S1 ($\beta = -0.01$, $p = 0.82$), it did at S2 ($\beta = -0.43$, $p < 0.01$), indicating that self-reported lower degrees of job stress were correlated with greater wellbeing at that time.

There were no significant correlates noted in either survey for the remaining perceptions regarding the pandemic (social isolation and avoidance, doubts about protection and dissatisfaction with system or processes).

Altruism was not correlated with wellbeing at either S1 or S2 (S1: $\beta = -0.03$, $p = 0.46$; $\beta = 0.11$, $p = 0.05$).

Higher use of avoidant (maladaptive) coping styles was significantly correlated with worse WHO-5 scores (i.e., poorer wellbeing) at both S1 ($\beta = -0.41$, $p < 0.01$) and S2 ($\beta = -0.23$, $p < 0.01$). Approach (adaptive) coping styles were significantly correlated with greater wellbeing at S1 ($\beta = 0.19$, $p < 0.01$) but not at S2 ($\beta = 0.12$, $p < 0.05$).

5.3.11 Correlates of the IES-R at S1 and S2 following regression analysis

IES-R		
	S1	
	β	p
Years of experience (<10 years)	-0.10	0.01*
COVID-19 infection history	0.12	<0.01*
Brief-COPE Avoidant (maladaptive)	0.63	<0.01*
	S2	
	β	p
Brief-COPE Avoidant (maladaptive)	0.46	<0.01*

Table 5-17: Summary of significant correlates of IES-R at S1 and S2.

*Significant association following correction for multiple testing using the Benjamini-Hochberg method. IES-R: Impact of events scale revised. A positive correlation indicates more post-traumatic stress symptoms. S1: Survey 1 (November 2020 to January 2021). S2: Survey 2 (November 2021 to February 2022). Perceptions of health fear, social isolation and avoidance, job stress, dissatisfaction with system/processes, doubts about protection and altruism: Higher scores indicate increased identification with each subdomain. Brief-COPE: abbreviated version of the COPE (Coping Orientation to Problems Experienced) Inventory.

There were no significant correlates noted for age, gender, ethnicity, or role with IES-R scores. However, less work experience was significantly correlated with less post-traumatic symptoms at S1 ($\beta=-0.10$, $p<0.01$); this was not present at S2 ($\beta=0.03$, $p=0.55$). Having a physical or mental illness did not significantly correlate with IES-R scores at either S1 or S2. Neither exposure to residents with COVID-19 nor a history of self-quarantining significantly correlated with IES-R scores at either S1 or S2. However, a personal history of COVID-19 was found to significantly correlate with more post-traumatic symptoms at S1 ($\beta=0.12$, $p<0.01$) but not at S2 ($\beta=0.08$, $p=0.17$). Perceptions regarding health fear, job stress, social isolation and avoidance, doubts about protection, dissatisfaction with systems and processes, and altruism were not found to significantly correlate with IES-R scores at either S1 or S2.

Avoidant (maladaptive) coping was found to significantly correlate with more post-traumatic symptoms at both S1 ($\beta=0.63$, $p<0.01$) and S2 ($\beta=0.46$, $p<0.01$).

Approach coping was not found to correlate with IES-R scores at either S1 or S2.

5.3.12 Correlates of the MIES at S1 and S2 following regression analysis

MIES		
	S1	
	β	p
Brief-COPE Avoidant (maladaptive)	0.42	<0.01*
	S2	
	β	p
Role: Healthcare assistant	0.19	0.01*
Perceptions: Job stress	0.24	<0.01*
Perceptions: Dissatisfaction with system or processes	0.23	<0.01*
Brief-COPE Avoidant (maladaptive)	0.28	<0.01*

Table 5-18: Summary of significant correlates of MIES at S1 and S2.

*Significant association following correction for multiple testing using the Benjamini-Hochberg method.

MIES: Moral injury events scale (adapted for healthcare professions. A positive correlation indicates a higher degree of moral injury. S1: Survey 1 (November 2020 to January 2021). S2: Survey 2 (November 2021 to February 2022). Perceptions of health fear, social isolation and avoidance, job stress, dissatisfaction with system/processes, doubts about protection and altruism: Higher scores indicate increased identification with each subdomain. Brief-COPE: abbreviated version of the COPE (Coping Orientation to Problems Experienced) Inventory.

Age, gender and ethnicity were not found to be correlated with MIES scores at either S1 or S2. Being a HCA, while not significantly correlated with MIES scores at S1 ($\beta=0.13$, $p=0.02$) was found to be significantly correlated with a higher degree of moral injury at S2 ($\beta=0.19$, $p=0.01$). Nonclinical staff did not demonstrate a similar correlation with moral injury scores at either S1 or S2. There were no correlations between years of experience, physical or mental illness, exposure to COVID-19 residents, or quarantine history with moral injury at S1 or S2.

Health fear was not found to correlate with moral injury at S1 or S2. Elevated levels of job stress, while not correlated with moral injury at S1 ($\beta=0.01$, $p=0.89$), was

found to have a significant correlation with higher degrees of moral injury at S2 ($\beta=0.24$, $p<0.01$). However, there was no significant correlation between social isolation and avoidance or doubts about protection and moral injury at S1 or S2. Dissatisfaction with systems or processes, while not correlated with the MIES at S1 ($\beta=0.09$, $p=0.07$), was correlated with significantly higher levels of moral injury at S2 ($\beta=0.23$, $p<0.01$). Altruism was not found to correlate with moral injury in either survey.

Avoidant (maladaptive) coping was correlated with significantly higher degrees of moral injury at both S1 ($\beta=0.28$, $p<0.01$) and S2 ($\beta=0.28$, $p<0.01$). There was no significant correlation noted between approach coping and MIES scores at either S1 or S2.

5.3.13 Regression analysis of entire model without the IES-R avoidance subdomain

The entire process was repeated to analyse the datasets with the IES-R avoidance subdomain removed. Outputted p-values can be seen in Table 5-19. Even with the avoidance subdomain removed, avoidant coping continued to demonstrate a significant correlation with higher levels of post-traumatic stress symptoms at S1 ($\beta=0.60$, $p<0.01$) and S2 ($\beta=0.41$, $p<0.01$).

	WHOS5						IES-R						MIES					
	S1			S2			S1			S2			S1			S2		
	β	p	β	β	p	β	β	p	β	β	p	β	β	p	β	β	p	β
Constant	-	<0.01	-	-	<0.01	-	-	0.63	-	-	<0.01	-	-	0.98	-	-	<0.01	-
Demographics: Age (40 or less)	-0.03	0.53	-0.03	-0.03	0.63	-0.02	-0.02	0.69	-0.02	0.01	0.83	0.07	0.13	0.13	0.11	0.11	0.07	0.07
Demographics: Male gender	-0.03	0.49	0.05	0.05	0.38	-0.05	-0.05	0.21	-0.05	0.08	0.14	-0.04	0.38	0.38	0.05	0.05	0.40	0.40
Demographics: White ethnicity	-0.03	0.50	-0.15	-0.15	0.01*	-0.08	-0.08	0.04	-0.08	-0.04	0.47	0.08	0.11	0.11	-0.02	-0.02	0.72	0.72
Role: Nurse (dummy coded)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Role: Healthcare assistant	0.17	<0.01*	0.02	0.02	0.80	0.01	0.01	0.85	0.01	-0.02	0.73	0.13	0.02	0.02	0.19	0.19	0.01*	0.01*
Role: Nonclinical	0.00	0.95	0.06	0.06	0.37	0.08	0.08	0.08	0.08	-0.05	0.39	0.00	0.95	0.95	0.04	0.04	0.52	0.52
Years of experience (<10 years)	0.05	0.32	0.10	0.10	0.11	-0.10	-0.10	0.01*	-0.10	0.03	0.55	-0.06	0.23	0.23	-0.06	-0.06	0.33	0.33
Absence of physical health condition(s)	0.07	0.10	0.00	0.00	0.96	-0.02	-0.02	0.69	-0.02	-0.05	0.29	-0.07	0.14	0.14	0.01	0.01	0.80	0.80
Absence of mental health condition(s)	0.20	<0.01*	0.15	0.15	0.01*	-0.07	-0.07	0.07	-0.07	-0.02	0.74	0.05	0.31	0.31	0.04	0.04	0.47	0.47
Exposure to COVID-19 positive resident(s)	-0.17	<0.01*	-0.04	-0.04	0.50	0.05	0.05	0.18	0.05	0.05	0.32	0.08	0.12	0.12	-0.08	-0.08	0.18	0.18
History of self-quarantine	-0.09	0.07	0.02	0.02	0.81	0.05	0.05	0.28	0.05	0.06	0.32	0.01	0.89	0.89	0.14	0.14	0.04	0.04
COVID-19 infection history	-0.03	0.61	-0.03	-0.03	0.66	0.12	0.12	<0.01*	0.12	0.08	0.17	0.02	0.67	0.67	-0.04	-0.04	0.58	0.58
Perceptions: Health fear	0.00	0.94	0.01	0.01	0.83	0.01	0.01	0.90	0.01	0.13	0.03	-0.03	0.56	0.56	0.02	0.02	0.81	0.81
Perceptions: Job stress	-0.01	0.82	-0.43	-0.43	<0.01*	-0.01	-0.01	0.80	-0.01	0.13	0.04	0.01	0.89	0.89	0.24	0.24	<0.01*	<0.01*
Perceptions: Social isolation and Avoidance	0.01	0.91	0.00	0.00	1.00	-0.06	-0.06	0.18	-0.06	0.14	0.02	-0.04	0.41	0.41	0.08	0.08	0.23	0.23
Perceptions: Doubts about protection	-0.02	0.73	0.01	0.01	0.84	0.01	0.01	0.85	0.01	0.04	0.46	0.10	0.05	0.05	0.08	0.08	0.21	0.21
Perceptions: Dissatisfaction with system or processes	-0.03	0.47	0.00	0.00	0.97	-0.01	-0.01	0.77	-0.01	0.03	0.64	0.09	0.07	0.07	0.23	0.23	<0.01*	<0.01*
Altruism	-0.03	0.46	0.11	0.11	0.05	0.03	0.03	0.37	0.03	0.11	0.03	0.03	0.56	0.56	0.05	0.05	0.37	0.37
Brief-COPE Avoidant (maladaptive)	-0.41	<0.01*	-0.23	-0.23	<0.01*	0.63	0.63	<0.01*	0.63	0.46	<0.01*	0.42	<0.01*	<0.01*	0.28	0.28	<0.01*	<0.01*
Brief-COPE Approach (adaptive)	0.19	<0.01*	0.12	0.12	0.05	0.05	0.05	0.21	0.05	-0.02	0.72	0.03	0.50	0.50	-0.03	-0.03	0.67	0.67

Table 5-19: Correlates of WHO-5, IES-R (excluding Avoidance) and MIES at S1 and S2.

*Significant association following correction for multiple testing using the Benjamini-Hochberg method. A positive t-statistic indicates a positive correlation by an independent variable with that outcome.

5.4 Discussion

5.4.1 Introduction

This is the first study of correlates of mental health outcomes in Irish nursing home staff during the COVID-19 pandemic. It is also the first study to quantitatively examine correlates of moral injury in nursing home staff globally. Only one previous study (n=127) has examined correlates of mental health outcomes in nursing home staff (not including moral injury), either before or since the pandemic (Husky et al., 2022). The only factor identified in that study was that having a previous mental health disorder was related to have a mental disorder during the pandemic.

5.4.2 Correlates of depression

5.4.2.1 Demographic correlates of depression

Age was not found to be correlated with depression in either survey. With respect to other studies looking at correlates of depression in healthcare workers, younger age has been found to be a factor for depression in one study of Indian ophthalmologists-in-training and ophthalmologists during the pandemic (Khanna et al., 2020). This appears not to be the case in Irish nursing home staff. Gender was also not found to be correlated with depression in either survey). This is an interesting finding given that female gender has been found to consistently be associated with higher levels of HCW depression in several other studies (Elbay et al., 2020; Kurt et al., 2020; Jianbo Lai et al., 2020; Santamaría et al., 2021; Yildirim et al., 2020; Zhu et al., 2020).

Ethnicity was not found to correlate with depression at S1 ($\beta=-0.67$, $p=0.50$) but

being of white ethnicity was found to significantly correlate with more depressive symptoms at S2 with a low/moderate effect size ($\beta=-0.15$, $p<0.01$). This is a novel finding which is not easily explained and runs contrary to that seen in a study of UK healthcare workers during the pandemic ($n=2,773$); this study found that those of ethnic minority status met the criterion for high levels of depressive symptoms (Gilleen et al., 2021). My finding is all the more surprising when one considers that, at S1, ethnicity did not even trend towards significance on this measure. However, it should be noted that the proportion of non-white respondents in my survey was small; as a result, this finding should not be overstated. It is interesting that these three demographic variables had no impact on outcomes in this cohort; it may be that the smaller numbers of staff working in these settings fosters a more inclusive occupational environment than the hospital setting.

With respect to role, HCAs reported significantly fewer depressive symptoms in the subsequent regression analyses of correlates of WHO-5 scores with a moderate effect size ($\beta=0.17$, $p<0.01$). This correlation was not seen by the time of the second survey, with HCAs reporting similar levels of depressive symptoms to nurses and nonclinical staff ($\beta=0.02$, $p=0.80$). There is little research on depressive symptoms on healthcare assistants specifically; the expectation would be that they would be affected to a greater degree than other specialities given their significant differences as a group from nonclinical and nursing staff in terms of youth and experience, factors which have been shown to be associated with depression (Hannemann et al., 2022; Khanna et al., 2020) although as noted above, these factors do not seem to be relevant to mental health outcomes in this cohort. The cause of their significantly better wellbeing than other staff early in the pandemic is unclear but perhaps HCAs were protected from some of the organisational challenges which fell to nursing staff and nonclinical staff to resolve

Years of experience (S1: $\beta=0.05$, $p=0.32$; S2: $\beta=0.10$, $p=0.11$) was not correlated with depressive symptoms in either survey; this is somewhat surprising given that less experience has been found to correlate with poor outcomes in other mental health constructs (Serrano-Ripoll et al., 2020). Again, it is possible that a smaller and more inclusive working environment may make nursing home outcomes “flatter” than that seen in hospital environments which are larger and more hierarchical.

Having a physical health condition (S1: $\beta=0.07$, $p=0.10$; S2: $\beta=0.00$, $p=0.96$) was not found to correlate with WHO-5 scores in the regression analyses in either survey. Perhaps unsurprisingly, those with a history of mental illness reported worse depression scores at both S1 ($\beta=-0.20$, $p<0.01$) and at S2 ($\beta=-0.15$, $p=0.01$) in the regression analyses with a moderate effect size in both samples. There is no literature that mentions the link between a history of mental illness and further depression in HCWs specifically; however, one study of Portuguese healthcare workers ($n=2008$) published during the COVID-19 pandemic did demonstrate a relationship between having a diagnosed physical or mental health problem and increased work-related burnout and depression (Serrão et al., 2021).

5.4.2.2 COVID-19 exposure correlates of depression

Exposure to COVID-19 positive residents was significantly associated with more depressive symptoms at S1 with a moderate effect size ($\beta=-0.17$, $p<0.01$) but not at S2 ($\beta=-0.04$, $p<0.50$). The finding at S1 is supported by the fact that exposure to COVID-19 has been shown to correlate with psychological distress (including depressive symptoms) (Dong et al., 2020). That this is not seen at S2 is interesting and suggests familiarity with the pandemic and a degree of resilience in nursing home staff. There are, at present, few studies showing if the severe mental health

outcomes seen early in the pandemic continue unabated. Having said that, this sample of nursing home staff who had not come across COVID-19 positive residents after almost two years of the pandemic in a society where there was widespread transmission may have unusual characteristics; this result should therefore be interpreted with caution.

A history of self-quarantine was not associated with depression scores at either S1 ($\beta=-0.09, p=0.07$) or at S2 ($\beta=0.02, p=0.81$). This is contrary to the finding in a study of nurses in California that a quarantine history was a positive predictor for symptoms of depression (OR = 2.68; [1.55–4.63], $p < 0.001$) but in line with a study on medical workers in China during the COVID-19 pandemic (Kim et al., 2021; Si et al., 2020). Whether self-quarantining may be associated with depression is dependent on many institutional and cultural factors but perhaps it is unsurprising that previously quarantined nursing home staff did not become depressed.

A personal history of COVID-19 infection was not correlated with depression scores at either S1 ($\beta=-0.03, p=0.61$) or S2 ($\beta=0.03, p=0.66$). This is perhaps unexpected given that a history of COVID-19 infection is associated with increased rates of depression; a caveat is that I did not ask participants about how long ago they had contracted COVID-19 and it may take longer for depressive symptoms to manifest in this cohort (Taquet et al., 2021).

5.4.2.3 Perceptions of the pandemic, altruism as correlates of depression

Health fear (i.e., the fear of contracting COVID-19 or of passing it on to others) was not correlated with depression scores in either survey (S1: $\beta=0.00, p=0.94$; S2: $\beta=0.01, p=0.83$). This is similar to a result seen in a Turkish study of nurses and midwives ($n=377$) during the pandemic where no significant correlation

was found (Yörük & Güler, 2021) but contrary to that seen in a study of Swedish medical staff (n=100) where the perceived risk of contracting the virus was a significant predictor for depressive symptoms with a moderate effect size ($\beta=0.21$, $p<0.01$) (Krammer et al., 2020). Job stress was not significantly correlated with depression scores at S1 ($\beta=0.01$, $p=0.91$) but a significant correlation was noted at S2 ($\beta=-0.43$, $p<0.01$). The effect size of this finding is moderate; increased job stress is correlated with more depressive symptoms later in the pandemic. While I did not ask specifically about burnout, chronic job stress is associated with burnout and burnout is correlated with depression in healthcare workers (Serrão et al., 2021). We cannot infer causality from these data, but it is possible that this may be a bidirectional association, especially given the reasonably high degree of correlation; job stress had the largest association with wellbeing scores of any independent variable in the regression model at S2. The chronic stresses of working in a nursing home environment may be increasing the risk of depression as the pandemic evolves, and the entire nursing home workforce may be more depressed and consequently less able to cope with their occupational stress.

Concerns regarding social isolation and avoidance were not correlated with depressive symptoms at either timepoint. Previous literature has pointed to social rejection increasing the risk of depression in Indian doctors during the COVID-19 pandemic (Chatterjee et al., 2020). While stigma regarding COVID-19 infection in healthcare workers has likely subsided as the pandemic progresses and the general population experiences high prevalences of COVID-19 infection, it is interesting that nursing home staff were not concerned about this even relatively early in the pandemic.

Interestingly, concerns regarding infection control measures (i.e., PPE, infection control procedures and processes) were not correlated with depression in

either survey sample. Perceived safety through access to PPE and training have been shown to mitigate psychological outcomes in previous outbreaks (Brooks et al., 2017).

Additionally, respondent altruism had no correlation with depression scores at S1 ($\beta=-0.03$, $p=0.46$). While altruism at S2 did not meet the test for significance following testing for multiple comparisons, it did trend towards significance with a moderate effect size at S1 ($\beta=0.11$, $p=0.05$). This is a sizeable change in effect size between the samples and, while this result should not be overstated as these data are not longitudinal, it may indicate that altruism could have a mitigating impact for the development of depressive symptoms in the stressful setting of a chronic pandemic. This warrants further exploration; altruism has been shown to mitigate post-traumatic symptoms in previous outbreaks and it is possible that fostering altruism may have similar benefits for the prevention of depressive symptoms (Wu et al., 2009).

5.4.2.4 Coping styles and depression

Of any measure, the Brief-COPE scores demonstrate the strongest correlations with depressive scores in both surveys. Avoidant (maladaptive) coping styles were significantly associated with increased depressive symptoms at both S1 ($\beta=-0.41$, $p<0.01$) and S2 ($\beta=-0.23$, $p<0.01$) with moderate effect sizes in both surveys.

At S1, this was the strongest predictor for more depressive symptoms. This, in addition to being the first reported association between maladaptive coping and depression in nursing home staff, adds to the substantial body of evidence that maladaptive coping is a prominent risk factor for depression in HCWs (Chen et al.,

2021; Pang et al., 2021; Sharma et al., 2020). Pang et al. (2021) reported a similar effect size for a correlation between negative coping styles and depression, using a different Chinese measure (n=282, $\beta=0.33$, $p<0.01$). Chen et al. (2021) found avoidant coping to be an independent risk factor for depression (n=902, OR 4.8, 95% CI 3.3–7.1).

Adaptive (approach) coping was significantly associated with less depressive symptoms in S1 with a moderate effect size ($\beta=0.19$, $p<0.01$). It was not significantly associated with WHO-5 scores in S2 following testing for multiple comparisons; however, it did trend towards significance with a moderate effect size ($\beta=0.12$, $p=0.05$). This adds to the body of evidence demonstrating an association between positive coping styles and a reduced risk of depression in HCWs (Pang et al., 2021).

5.4.2.5 Depression conclusion

At S1, the variables that significantly correlated with an increased risk of depression were having a history of mental illness, exposure to COVID-19 positive residents and utilising maladaptive coping style. Protective factors included: being employed as a HCA and utilising adaptive or positive coping styles. At S2, having white ethnicity, a history of diagnosis of a mental health condition, increased job stress and maladaptive coping styles were correlated with depression. No significant protective factors were identified at this timepoint.

Only two variables were consistent across both surveys in their correlation with more depressive symptoms: having a mental health condition and maladaptive coping styles. Given their consistency and their moderate effect sizes, it is likely that these two variables are predictors for depression in nursing home staff. These are novel findings in this setting, and the findings are strengthened by the fact that these

correlations appeared over time in two independent samples. These could provide valuable targets for early intervention in future pandemics to reduce the risk of developing depressive symptoms. While a history of mental illness is not a modifiable risk factor, those with mental illness could be educated regarding their increased risk and signposted towards supports - for example, signposting towards mental health services and pre-emptively teaching coping skills (otherwise known as “psychological PPE”) (Raso, 2022). Staff may benefit from education and support in utilising healthy coping mechanisms and the deleterious impacts of maladaptive coping on their mental health.

5.4.3 Correlates of post-traumatic stress

5.4.3.1 Demographic correlates of post-traumatic stress symptoms

Age was not found to correlate with PTS in either survey 1 ($\beta=-0.02$, $p=0.69$) or survey 2 ($\beta=0.01$, $p=0.83$). This is contrary to previous research in other healthcare workers. Tang et al. (2017) found that younger age was associated with more symptoms of PTSD in a study of HCWs during a H7N9 influenza outbreak ($n=102$) and Sim et al. (2004) found that younger age was associated with more post-traumatic symptoms during the SARS outbreak ($n=277$) (Sim et al., 2004; Tang et al., 2017).

Gender was also found to have no correlation with PTSD symptoms in either survey (S1: $\beta=-0.05$, $p=0.21$); S1: $\beta=0.08$, $p=0.14$). This differs from previous research where associations female gender and higher PTSD scores have been demonstrated (Serrano-Ripoll et al., 2020; Tang et al., 2017). Ethnicity was not correlated with PTSD symptoms in either survey (S1: $\beta=-0.08$, $p=0.04$; S2: $\beta=-0.04$, $p=0.47$). This runs contrary to a finding of an association between belonging to an ethnic minority and high PTSD symptoms in a study of UK HCWs ($n=2,773$) (Gilleen et al., 2021). As

speculated upon above, this is further evidence to support the idea that nursing homes may be more inclusive environments to work in; this inclusivity may mitigate significant differences between staff members based upon purely demographic variables.

Job role was also not found to correlate with PTSD symptoms at either timepoint. This is interesting given that other studies have found significant association between clinical exposure to COVID-19 infected patients and there are likely differing levels of clinical contact between, for example, HCAs and administrators (Serrano-Ripoll et al., 2020). However, it should be noted that, compared to hospitals, many Irish nursing homes are small in size and there is probably a reasonable level of resident-contact among non-clinical staff as a result. The amount of work experience was found to significantly correlate with post-traumatic symptomatology at S1 ($\beta=-0.10$, $p=0.01$). However, contrary to previous research on HCWs, less experience was associated with fewer post-traumatic symptoms (Tang et al., 2017). The effect size was low and was no longer found at S2 ($\beta=0.03$, $p=0.55$); this finding should not be overstated as a result.

Neither physical nor mental illness were correlated with PTSD symptoms at either timepoint. The latter appears to agree with the finding that there was no significant association found between having a history of mental illness and PTSD symptoms in a study of UK HCWs during the pandemic ($n=2,773$) (Gilleen et al., 2021). Therefore, it is perhaps unsurprising that this result is reflected in the nursing home staff cohort.

5.4.3.2 COVID-19 exposure correlates of post-traumatic stress

Interestingly, contact with COVID-19 positive residents did not predict PTSD symptom scores in either survey. A previous study on the Middle East Respiratory Syndrome (MERS) outbreak (n=386) demonstrated that those working in environments where MERS exposure was likely showed a significantly higher level of post-traumatic symptomatology (Bukhari et al., 2016). Similarly, a study of Singaporean GPs during the SARS outbreak (n=721) found differences in all three IES-R subscales (Verma et al., 2004). The much higher mortality rate consequent to MERS and SARS infection may have driven some of these difficulties, but another factor may be a lower perception of risk in the nursing home environment; this has been shown to be associated with PTSD in several other studies (Mauder et al., 2004; Styra et al., 2008; Wu et al., 2009).

A personal history of COVID-19 infection was found to be correlated with post-traumatic symptomatology at S1 ($\beta=0.12$, $p<0.01$) but not at S2 ($\beta=0.08$, $p=0.17$). This may represent a recency effect in relation to the acute stress of COVID-19 infection in the data as a larger proportion of staff will have had had COVID-19 in the more distant past by the time of the second survey. Alternatively, it may represent a normalisation of the experience of having had COVID-19 by the time of S2.

5.4.3.3 Perceptions of the pandemic and altruism as correlates of post-traumatic stress

None of the examined perceptions (health fear, job stress, social isolation and avoidance, doubts about protection, and dissatisfaction with systems and processes) demonstrated significant correlations with post-traumatic stress symptomatology in nursing home staff. Other studies have found significant correlations for some of

these constructs. For example, fear of infection has been shown to be correlated with PTSD symptoms in one study (Si et al., 2020).

In my surveys, the social isolation and avoidance questions focus on work-related stigma. One study during the SARS outbreak (n=1,557) found that the likelihood of developing PTSD was higher in staff who were concerned about social isolation (Maunder et al., 2004). Another longitudinal study (n=274) found that stigma was associated with IES-R score in Singaporean doctors during the COVID-19 pandemic with a moderate effect size ($\beta=0.303$, $p<0.01$) (Chew et al., 2020).

It should be noted that three of the constructs (health fear ($\beta=0.13$, $p=0.03$), job stress ($\beta=0.13$, $p=0.04$) and social isolation ($\beta=0.14$, $p=0.02$)) did trend towards significance at S2 with moderate effect sizes for each domain. No such trend was noted for doubts about protection and dissatisfaction with systems and processes.

Altruism was not found to correlate with PTSD symptoms in either survey (S1: $\beta=0.03$, $p=0.37$; S2 $\beta=0.11$, $p=0.03$) despite the fact that altruistic acceptance of risk has been shown to reduce the level of PTSD symptoms in a study (n=549) focusing on the SARS outbreak in China (Wu et al., 2009). To date, there have been no studies examining this relationship during the COVID-19 pandemic in healthcare personnel. For all the above, it may be that nursing home staff were relatively protected from these factors mediating PTSD symptoms due to working in a less acute setting than the hospital environment.

5.4.3.4 Coping styles as correlates of post-traumatic stress

Avoidant (maladaptive) coping had a significant correlation with more severe PTSD symptomatology in both surveys. At S1, it was found to have large effect size ($\beta=0.63$, $p=0.01$). At S2, the effect size was moderate ($\beta=0.46$, $p<0.01$). These were respectively the largest effect sizes for correlations with the IES-R at both S1 and S2.

This agrees with the finding of Chew et al. that negative coping styles were associated with more post-traumatic stress (n=274) (Chew et al., 2020).

This finding did not substantially change even when the entire model was analysed with the avoidance subscale of the IES-R omitted to prevent confounding between the IES-R Avoidance subscale and the Brief-COPE avoidant/maladaptive subscale. In this secondary analysis, maladaptive coping retained its significance after testing for multiple comparisons at both S1 ($\beta=-0.60$, $p<0.01$) and S2 ($\beta=0.41$, $p<0.01$). In fact, even the effect sizes are similar, although marginally smaller than what was seen in the original model.

Adaptive coping was not found to correlate with IES-R at either timepoint (S1: $\beta=0.05$, $p=0.21$; S2: $\beta=-0.02$, $p=0.72$). The evidence on the effects of positive coping styles on the development of post-traumatic stress in HCWs during the pandemic is mixed. The Brief-COPE adaptive coping subscale is a composite of two smaller subscales called “emotion-focused coping” and “problem-focused coping.” One study of Italian emergency workers (n=513) found that emotion-focused coping was a protective factor for the development of hyperarousal, avoidance, and intrusion with a very small effect size; however, problem-focused coping was not significantly correlated with post-traumatic stress (Vagni et al., 2020).

5.4.3.5 Post-traumatic stress conclusion

The evidence from this study for correlates of post-traumatic stress is mixed in that it agrees with the previous evidence of risk factors for PTSD in healthcare workers in some respects but not in others. The only consistent finding at both S1 and S2 is that maladaptive coping is associated with more post-traumatic stress disorder symptoms; this is a finding which is consistent with the previous literature in

healthcare staff generally. This effect appears to have been larger at the beginning of the pandemic but remained sizeable at S2. This could be considered a risk factor for the development of PTSD in nursing home staff and may represent a worthwhile target for reducing PTSD symptomatology in this cohort in future pandemics.

5.4.4 Correlates of moral injury

5.4.4.1 Demographic correlates of moral injury

There are no studies to date examining the relationship between demographic data and moral injury in nursing staff (Laher et al., 2022; Xue et al., 2022). None of the included basic demographic variables in my analysis (age, gender, and ethnicity) were found to correlate with moral injury during either S1 or S2. Based off the data in this study, it would seem that the comparatively high level of moral injury experienced by Irish nursing home staff seems to affect staff equally based off their demographic profile.

With respect to role, working as a HCA significantly correlated with elevated moral injury during S2 with a moderate effect size ($\beta=0.19$, $p<0.01$). While the figure from S1 did not meet the test for significance following testing for multiple comparisons, the effect size was moderate and the p -value was relatively small ($\beta=0.13$, $p=0.02$). It may be reasonable to assume that being a HCA is associated with elevated moral injury; an interesting finding especially when the fact that HCA wellbeing appeared to be comparatively high in S1.

It is unclear why this may be the case but a systematic review of themes in qualitative studies of nursing home staff highlights that inexperience and/or training deficits may be linked to moral injury (Laher et al., 2022; Sarabia-Cobo et al., 2021; Si Zhao et al., 2021). HCAs do not require a professional qualification and typically do

not receive extensive training regarding microbiology, infectious disease, and infection control outside of their basic induction requirements. Nurses' undergraduate qualifications and knowledge may have protected them from this to some degree as they will have increased awareness of the consequences of unchecked spread of the virus in the nursing home environment. While nonclinical staff (who may or may not have training in this area) did not report comparatively higher moral injury than HCAs, HCAs also work uniquely closely with residents. This combination of resident proximity and lack of training may be related to their higher moral injury scores. Related to this, it should be noted that the level of experience was not a correlate for moral injury at either S1 or S2.

A diagnosis of previous physical or mental illness was not correlated with moral injury in either survey; there is no other research studying this relationship to date.

5.4.4.2 COVID-19 exposure correlates of moral injury

There has been considerable interest into the relationship between moral injury and (i) staff exposure to viral outbreaks, (ii) quarantine history and (iii) infection (Xue et al., 2022). The hypotheses are varied. Firstly, staff may feel guilty due to spreading the virus from their workplace to family and friends (Nyashanu et al., 2022). Secondly, those staff who have had to quarantine and leave their co-workers to struggle in understaffed workplaces may experience increased guilt and moral injury (Williamson et al., 2020). Thirdly, those staff who survive COVID-19 infection, when colleagues or residents died, may experience survivor's guilt, which is closely related to the concept of moral injury (Iheduru-Anderson, 2021).

However, none of the three related independent variables in my analysis (exposure to COVID-19 positive residents, quarantine history and COVID-19 infection history) were significantly correlated with moral injury. Only one of the variables -

quarantine history - came close to significance in S2 with a moderate effect size and this was not a consistent finding, with no relationship at all demonstrated in S1 (S1: 0.01, $p=0.89$; S2: $\beta=0.14$, $p=0.04$). However, there is a notable change in effect size between the two surveys for this variable. It may be that guilt, related to self-quarantine, has become more exacerbated as job stress has increased (S1: 4.2 SD 1.2, S2: 4.7 SD 1.1, $F=32.07$, $p<0.01$, adj. $p<0.01$) and that we may see more moral injury in deteriorating work conditions. A second cause may be that the perception of the usefulness of quarantining has declined over the course of the pandemic. COVID-19 has become a significantly less virulent condition due to widespread vaccination. Staff may therefore increasingly feel that quarantining, while important, may not be as important as it was initially and the trade-off of overburdening colleagues with additional work may not be as clear as it once was.

My findings reduce the likelihood of these hypotheses being supported. However, it would seem reasonable to examine the relationship between quarantine history and nursing home staff moral injury on an ongoing basis given the large change in effect size between the two surveys.

5.4.4.3 Perceptions of the pandemic and altruism as correlates of moral injury

Fear of infection was not found to correlate with moral injury in either survey. This is somewhat surprising as the expectation would be that health fear would conflict with the moral imperative to work in direct contact with the virus (Dhar & Wani, 2020). It would also intuitively make sense that those who were afraid of contracting the virus may have sought redeployment away from contact with COVID-19 positive residents and consequently experienced guilt or shame in relation to this.

Job stress was not found to correlate with moral injury in S1 ($\beta=0.01$, $p=0.89$) but demonstrated a significant correlation with a higher degree of moral injury in S2 ($\beta=0.24$, $p<0.01$); this correlation had a moderate effect size. It is not unexpected that increased job stress may foster moral injury as understaffed or under-resourced environments may create conditions where staff feel guilty as they are unable to provide appropriate care (Fawaz & Itani, 2022; Iheduru-Anderson, 2021; Kaelen et al., 2021; Patterson et al., 2021; Whitehead et al., 2021). Therefore, the lack of correlation at S1 is surprising.

Social isolation and avoidance did not correlate with moral injury in either survey. There has been limited examination of this in other studies; one systematic review of circumstances related to moral injury in HCWS noted that the topic of stigma represents a small distribution across moral injury themes (Xue et al., 2022). In one study, the experience of social isolation has been associated with feelings of betrayal (Wang et al., 2022). However, this is not borne out in the Irish nursing home data.

Doubts about protection were not correlated with moral injury in either survey. This may seem initially surprising, as stories regarding poor provision of PPE to nursing homes were widespread early in the pandemic (Rocard et al., 2021). However, these problems had largely been rectified in Ireland by the time of the first survey with provision of PPE to nursing home staff facilitated by the HSE (Comas-Herrera et al., 2020). Even so, it may seem unusual that staff did not harbour any resentment regarding the previous poor procurement of equipment. Dissatisfaction with infection control procedures was not significantly correlated with moral injury in S1 although it was reasonably correlated with a small effect size ($\beta=0.09$, $p=0.07$). It was, however, significantly associated with higher degrees of moral injury in S2 with a moderate effect size ($\beta=0.23$, $p<0.01$). This seems reasonable; staff perceptions of

betrayal by authorities are likely to be related to the policies implemented by those in charge and this may be closely related to feelings of abandonment by leadership (Blanco-Donoso et al., 2022).

Altruism was not related to differences in moral injury at either timepoint. It may have been expected that this would mediate some of the other factors mentioned above, including job stress, but no significant association was found in the model. To my knowledge, there is no other published research examining this relationship to date.

5.4.4.4 Coping styles as correlates of moral injury

As was seen with both depression and post-traumatic stress symptoms, maladaptive coping was demonstrated to be a significant and consistent correlate of higher degrees of moral injury in both S1 ($\beta=0.42$, $p<0.01$) and S2 ($\beta=0.28$, $p<0.01$) with moderate effect sizes. This is a novel finding and again provides a target for the reduction of moral injury in nursing home staff. Adaptive/approach coping was not found to protect against moral injury in either survey; related to this is the fact that moral injury has been found to be associated with alcohol misuse in a study of 4,378 UK-based HCWs (Lamb et al., 2021).

5.4.4.5 Moral injury conclusion

This is the first body of research to quantitatively examine correlates of moral injury in nursing home staff. This study was also carried out in a comparatively highly morally distressed cohort (Lamb et al., 2021). Of the significant correlations, only maladaptive coping demonstrated consistent significance. However, working as a

HCA, and dissatisfaction with infection control policies may also represent targets for mitigating moral injury.

5.4.5 Limitations

One limitation of this cross-sectional study is that there are no ethnicity data available for Irish nursing home staff. Therefore, it was not possible to determine if survey participants are ethnically representative of the nursing home staff population. However, the Nursing and Midwifery Board of Ireland (Ireland's regulatory body for nurses) show that the proportions of nurses' country of registration corresponds to the ethnicity of the nurse participants in the survey (Nursing and Midwifery Board of Ireland, 2019). There are unfortunately no similar data available for HCAs and nonclinical staff. Secondly, a negligible number of staff performed both surveys, meaning longitudinal analyses of individual level responses was impossible. However, this did allow for independent verification of findings in both surveys.

Finally, a large number of independent variables were included in the regression models examining correlates, meaning that there is a risk of overfitting the entire model. Additionally, the use of multiple models for the three mental health outcomes means that there is a risk of false positive results. Therefore, the results of these analyses should not be overinterpreted and they should be considered exploratory findings; further studies should be performed to confirm these results. However, an appropriate test was used to control the false discovery rate, and some of the results appear consistent across both samples with reasonable effect sizes.

CHAPTER 6 : CONCLUSIONS AND FUTURE DIRECTIONS

6.1 Conclusions

This is the first series of studies incorporating repeated, quantitative, national surveys of nursing home staff experiences during the COVID-19 pandemic. The findings of this study add to the growing body of evidence that nursing home staff report poor mental health outcomes during the pandemic (Comas-Herrera A, 2022).

Strengths of this study include the large number of validated measures used and the consistent application of recruitment and analytical methods across two surveys at similar times of the year in largely independent samples of the same population. With respect to the analysis of correlates of the WHO-5, IES-R and MIES, this repeated analysis allows for the verification of correlates in independent samples over time. Additionally, in the intervening time there were clear shifts in the societal impact of the pandemic in the Republic of Ireland due to the successful rollout of COVID-19 vaccinations and changes in restrictions (Blavatnik School of Government, 2020; European Centre for Disease Prevention and Control, 2022). This provides some insight as to whether these changes may have had impacts on nursing home staff mental health.

This research highlights several important areas. The first conclusion is that all types of staff working in nursing homes suffer from substantial levels of psychological distress, irrespective of profession. These levels of distress appear to be comparatively higher than that seen in those working in the hospital environment. This seems to be borne out in a recent study examining psychological outcomes in a study of 560 Canadian HCWs in a variety of healthcare environments: LTC staff reported the highest numerical prevalence of distress compared to all other

environments (Voth et al., 2022). However, it should be noted that the sample size of LTC staff in this study was small (n=16).

The second conclusion is that these levels of distress are worse on every measure in the second survey period. It is notable that many of the significant differences detected between outcomes in groups of healthcare professionals in my earlier survey are not present at the later stage of the pandemic. In S2, nurses, HCAs and nonclinical staff appeared to be equally affected in terms of post-traumatic stress symptoms, low mood and depression, suicidal thinking, perceived work ability and overall moral injury. However, I have replicated the finding from S1 that HCAs have numerically higher levels of moral injury than other professionals and both surveys showed a significantly higher level of “perceived transgressions by others” in HCAs (although this was in comparison with different groups: nonclinical staff at S1 and nurses at S2).

The third major conclusion is that maladaptive coping may be predictive of significantly worse mental health outcomes in all the tested measures. This may provide a target for intervention to help mitigate these problems. Job stress, while not significantly associated with all three mental health outcomes, trends towards significance with respect to all three outcomes later in the pandemic. Further research is needed to explore this finding, but it seems reasonable that elevated job stress is likely associated with worsening mental health outcomes. Improving work conditions for staff should be a high priority in the nursing home sector.

My hypothesis that nursing home staff mental health outcomes would improve following the roll-out of vaccinations and the easing of pandemic-related restrictions has not been supported. Many pandemic-related conditions had improved markedly in Ireland between S1 and S2. At the time of the second survey in the Republic of Ireland, the estimate for overall uptake of a full course of vaccination

in healthcare workers and those aged ≥ 60 years is estimated to have been nearly 100% (European Centre for Disease Prevention and Control, 2022). While the second survey took place during a surge of Omicron variant-induced cases, this period was one of widespread optimism regarding the pandemic in Ireland for two reasons. Firstly, the Irish disease burden of the Omicron wave was expected to be mild given the high vaccination rates achieved. Secondly, societal restrictions at the time were relatively benign after a prolonged period of stringent lockdown (Blavatnik School of Government, 2020). Despite this, nursing home staff reported significantly worse mental health outcomes at this time when compared to an already dismal baseline from one year earlier in the pandemic.

Concerningly, in many cases the proportions of staff reporting poor mental health outcomes in S2 were not just significantly different but were substantially larger than those observed at S1. This is not easily explained by factors present in wider society: prevalences of mental health issues in the general population appear to have been stable throughout the pandemic, both in Ireland and abroad compared to prepandemic levels (Hyland et al., 2021; Robinson et al., 2022). A systematic review of mental health in the general population by Robinson et al. (2022) showed that, compared to before the pandemic, there was an overall increase in mental health symptoms observed at the beginning of the pandemic which quickly declined and became non-significant by July 2020 (Robinson et al., 2022). Similarly, in Ireland, one longitudinal study found no change in mental health problems in the general population throughout the pandemic (Hyland et al., 2021; Robinson et al., 2022). This speaks to a measure of resilience in society for managing distress amidst disaster. Unfortunately, the situation within the walls of nursing homes appears to be overwhelming this resilience.

6.2 Future directions

The worsening mental health outcomes shown in this study should make further research in the area a priority for those who want to ensure a sufficient workforce in this growing sector. Further research needs to be carried out to firstly, assess for the causes of these poor mental health outcomes, and secondly, to find appropriate interventions to alleviate them. With respect to the former, the increasingly negative responses staff give towards questions regarding the culture of their organisations as their mental health outcomes worsen indicates that this may be a direction worth exploring. With respect to interventional studies, the findings of this project indicate that these should be directed towards all staff working in nursing homes, not just clinical staff. Additionally, interventional studies targeting maladaptive coping styles in nursing home staff may be worth exploring.

There is a lack of clarity as to the relationship between moral injury, depression, and post-traumatic stress (Jones, 2020). It is not clear as to whether moral injury should be considered a separate construct from PTSD entirely, a component of the standard PTSD diagnosis not captured by the three DSM-V subdomains discussed above, or as a type of PTSD (Jones, 2020). Equally the interactions between depression and moral injury have not been fully elucidated as yet, although there is some evidence that moral injury may affect depression symptoms (Rodríguez et al., 2021). There are few other datasets with quantitative measures in all three constructs; I plan to perform a secondary analysis of the data from this study that may help to clarify these relationships.

As mentioned previously (see section “**Error! Reference source not found.**”), the nursing home sector is a challenging area to study. The major limitation for this study has been the recruitment of staff, leading to poor response rates and potential

selection bias. Following up on these exploratory results, one approach would be to recruit a smaller number of nursing homes that would be representative of variables that we were unable to target in this study e.g., large vs small nursing homes, urban vs rural nursing homes, private vs HSE nursing homes. These could be visited individually with the aim of recruiting a high proportion of staff in these institutions; this is also now possible due to the reduction in restrictions in the post-pandemic world. This approach would also allow us to collect many other variables of interest directly from the PICs such as the length of outbreaks in these institutions and other institutional factors such as the availability of appropriate private rooms for isolation. Visiting these nursing homes individually would also provide a valuable opportunity to identify if there are unknown factors that may impede staff from participating in such a study – for example, language barriers. I am collaborating with a research group who are examining research awareness and readiness in the nursing home sector in Ireland as an embedded study in an ongoing feasibility pilot-cluster randomised trial in Ireland (Leroi, 2022). This study will explore motivators and barriers to participation in research for nursing home facilities, their staff, and residents as well as perceived research priorities for research among stakeholders in the sector. While the focus of this study is on dementia research in LTC residents, it seems likely that these results will also help inform further research projects of nursing home staff mental health.

REFERENCES

- Arnold, C. (2020, 31 Mar 2020). New York City's coronavirus outbreak is already overwhelming hospitals. *New Scientist*.
<https://www.newscientist.com/article/2239247-new-york-citys-coronavirus-outbreak-is-already-overwhelming-hospitals/>
- Austin, P. C., & Steyerberg, E. W. (2015, Jun). The number of subjects per variable required in linear regression analyses. *J Clin Epidemiol*, 68(6), 627-636.
<https://doi.org/10.1016/j.jclinepi.2014.12.014>
- Baradaran, H. R., Dehghanbanadaki, H., Moradpour, F., Eshrati, B., Moradi, G., Azami, M., Haji Ghadery, A., Mehrabi Nejad, M. M., & Moradi, Y. (2022, Jul 13). The effect of COVID-19 mRNA vaccines against postvaccination laboratory-confirmed SARS-CoV-2 infection, symptomatic COVID-19 infection, hospitalization, and mortality rate: a systematic review and meta-analysis. *Expert Rev Vaccines*, 1-10. <https://doi.org/10.1080/14760584.2022.2102001>
- Barber, R. (2022, Apr 16). Estimating excess mortality due to the COVID-19 pandemic: a systematic analysis of COVID-19-related mortality, 2020-21. *Lancet*, 399(10334), 1513-1536. [https://doi.org/10.1016/s0140-6736\(21\)02796-3](https://doi.org/10.1016/s0140-6736(21)02796-3)
- Barello, S., Palamenghi, L., & Graffigna, G. (2020). Burnout and somatic symptoms among frontline healthcare professionals at the peak of the Italian COVID-19 pandemic. *Psychiatry research*, 290, 113129.
- Bech, P. (1993). Rating Scales for Psychopathology, Health Status and Quality of Life. A Compendium on Documentation in Accordance with the DSM-III-R and WHO Systems. [Book]. *Berlin, Springer*. (1993)
- Bech, P., Gudex, C., & Johansen, K. S. (1996). The WHO (Ten) Well-Being Index: validation in diabetes. *Psychother Psychosom*, 65(4), 183-190.
<https://doi.org/10.1159/000289073>
- Berry, S. D., Baier, R. R., Syme, M., Gouskova, N., Bishnoi, C., Patel, U., Leitson, M., Gharpure, R., Stone, N. D., Link-Gelles, R., & Gifford, D. R. (2022). Strategies associated with COVID-19 vaccine coverage among nursing home staff. *Journal of the American Geriatrics Society*, 70(1), 19-28.
<https://doi.org/https://doi.org/10.1111/jgs.17559>
- Blanco-Donoso, L. M., Moreno-Jiménez, J., Gallego-Alberto, L., Amutio, A., Moreno-Jiménez, B., & Garrosa, E. (2022). Satisfied as professionals, but also exhausted and worried!!: The role of job demands, resources and emotional

experiences of Spanish nursing home workers during the COVID-19 pandemic. *Health & social care in the community*, 30(1), e148-e160.

- Blavatnik School of Government. (2020). *Coronavirus Government Response Tracker*. University of Oxford. Retrieved 11 February 2021 from <https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker>
- Bobitt, Z. (2020). The Breusch-Pagan Test: Definition & Example [Webpage]. *Statology*. <https://www.statology.org/breusch-pagan-test/>
- Brady, C., Fenton, C., Loughran, O., Hayes, B., Hennessy, M., Higgins, A., Leroi, I., Shanagher, D., & McLoughlin, D. M. (2021, Nov 2). Nursing home staff mental health during the Covid-19 pandemic in the Republic of Ireland. *Int J Geriatr Psychiatry*, 37(1). <https://doi.org/10.1002/gps.5648>
- Brady, C., Fenton, C., Loughran, O., Hayes, B., Hennessy, M., Higgins, A., & McLoughlin, D. M. (2022, 2022/06/22). Dublin hospital workers' mental health during the peak of Ireland's COVID-19 pandemic. *Irish Journal of Medical Science (1971 -)*. <https://doi.org/10.1007/s11845-022-03056-0>
- Brooks, S. K., Dunn, R., Amlôt, R., Rubin, G. J., & Greenberg, N. (2017, Aug). Social and occupational factors associated with psychological wellbeing among occupational groups affected by disaster: a systematic review. *J Ment Health*, 26(4), 373-384. <https://doi.org/10.1080/09638237.2017.1294732>
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020, Mar 14). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*, 395(10227), 912-920. [https://doi.org/10.1016/s0140-6736\(20\)30460-8](https://doi.org/10.1016/s0140-6736(20)30460-8)
- Brydon, A., Bhar, S., Doyle, C., Batchelor, F., Lovelock, H., Almond, H., Mitchell, L., Nedeljkovic, M., Savvas, S., & Wuthrich, V. (2022, 2022/01/01). National Survey on the Impact of COVID-19 on the Mental Health of Australian Residential Aged Care Residents and Staff. *Clinical Gerontologist*, 45(1), 58-70. <https://doi.org/10.1080/07317115.2021.1985671>
- Bukhari, E. E., Tamsah, M. H., Aleyadhy, A. A., Alrabiaa, A. A., Alhboob, A. A., Jamal, A. A., & Binsaeed, A. A. (2016). Middle East respiratory syndrome coronavirus (MERS-CoV) outbreak perceptions of risk and stress evaluation in nurses. *The Journal of Infection in Developing Countries*, 10(08), 845-850.
- Burton, J. K., Bayne, G., Evans, C., Garbe, F., Gorman, D., Honhold, N., McCormick, D., Othieno, R., Stevenson, J. E., Swietlik, S., Templeton, K. E., Tranter, M., Willocks, L., & Guthrie, B. (2020). Evolution and effects of COVID-19 outbreaks in care homes: a population analysis in 189 care homes in one

geographical region of the UK. *The Lancet Healthy Longevity*, 1(1), e21-e31.
[https://doi.org/10.1016/S2666-7568\(20\)30012-X](https://doi.org/10.1016/S2666-7568(20)30012-X)

Cabezas, C., Coma, E., Mora-Fernandez, N., Li, X., Martinez-Marcos, M., Fina, F., Fabregas, M., Hermosilla, E., Jover, A., Contel, J. C., Lejardi, Y., Enfedaque, B., Argimon, J. M., Medina-Peralta, M., & Prieto-Alhambra, D. (2021, Aug 18). Associations of BNT162b2 vaccination with SARS-CoV-2 infection and hospital admission and death with covid-19 in nursing homes and healthcare workers in Catalonia: prospective cohort study. *Bmj*, 374, n1868.
<https://doi.org/10.1136/bmj.n1868>

Cai, Q., Feng, H., Huang, J., Wang, M., Wang, Q., Lu, X., Xie, Y., Wang, X., Liu, Z., Hou, B., Ouyang, K., Pan, J., Li, Q., Fu, B., Deng, Y., & Liu, Y. (2020, 2020/10/01/). The mental health of frontline and non-frontline medical workers during the coronavirus disease 2019 (COVID-19) outbreak in China: A case-control study. *Journal of Affective Disorders*, 275, 210-215.
<https://doi.org/https://doi.org/10.1016/j.jad.2020.06.031>

Carver, C. S. (1997). You want to measure coping but your protocol's too long: consider the brief COPE. *Int J Behav Med*, 4(1), 92-100.
https://doi.org/10.1207/s15327558ijbm0401_6

Chan, D. K. Y., McLaws, M.-L., & Forsyth, D. R. (2021). COVID-19 in aged care homes: a comparison of effects initial government policies had in the UK (primarily focussing on England) and Australia during the first wave. *International Journal for Quality in Health Care*, 33(1), mzab033.
<https://doi.org/10.1093/intqhc/mzab033>

Chatterjee, S. S., Bhattacharyya, R., Bhattacharyya, S., Gupta, S., Das, S., & Banerjee, B. B. (2020). Attitude, practice, behavior, and mental health impact of COVID-19 on doctors. *Indian Journal of Psychiatry*, 62(3), 257.

Chen, J., Liu, X., Wang, D., Jin, Y., He, M., Ma, Y., Zhao, X., Song, S., Zhang, L., & Xiang, X. (2021). Risk factors for depression and anxiety in healthcare workers deployed during the COVID-19 outbreak in China. *Social Psychiatry and Psychiatric Epidemiology*, 56(1), 47-55.

Chen, M. K., Chevalier, J. A., & Long, E. F. (2021, Jan 7). Nursing home staff networks and COVID-19. *Proc Natl Acad Sci U S A*, 118(1).
<https://doi.org/10.1073/pnas.2015455118>

Chew, Q. H., Chia, F. L.-A., Ng, W. K., Lee, W. C. I., Tan, P. L. L., Wong, C. S., Puah, S. H., Shelat, V. G., Seah, E.-J. D., Huey, C. W. T., Phua, E. J., & Sim, K. (2020). Perceived Stress, Stigma, Traumatic Stress Levels and Coping Responses amongst Residents in Training across Multiple Specialties during COVID-19 Pandemic—A Longitudinal Study. *International journal of environmental research and public health*, 17(18), 6572. <https://www.mdpi.com/1660-4601/17/18/6572>

- Chigwedere, O. C., Sadath, A., Kabir, Z., & Arensman, E. (2021, Jun 22). The Impact of Epidemics and Pandemics on the Mental Health of Healthcare Workers: A Systematic Review. *Int J Environ Res Public Health*, 18(13).
<https://doi.org/10.3390/ijerph18136695>
- Chutiyami, M., Cheong, A. M. Y., Salihu, D., Bello, U. M., Ndwiga, D., Maharaj, R., Naidoo, K., Kolo, M. A., Jacob, P., Chhina, N., Ku, T. K., Devar, L., Pratitha, P., & Kannan, P. (2022, 2022-January-17). COVID-19 Pandemic and Overall Mental Health of Healthcare Professionals Globally: A Meta-Review of Systematic Reviews [Systematic Review]. *Frontiers in Psychiatry*, 12.
<https://doi.org/10.3389/fpsyt.2021.804525>
- Citizens Information. (2022). COVID-19 restrictions in Ireland [Website].
https://www.citizensinformation.ie/en/covid19/living_with_covid19_plan.html
- Comas-Herrera, A., Ashcroft, E., & Lorenz-Dant, K. (2020). International examples of measures to prevent and manage COVID-19 outbreaks in residential care and nursing home settings. *LTCcovid. org, International Long-Term Care Policy Network, CPEC-LSE*.
- Comas-Herrera A, M. J., Byrd W, Lorenz-Dant K, Patel D, Pharoah D (eds.) and LTCcovid contributors. (2022). LTCcovid International living report on COVID-19 and Long-Term Care. *LTCcovid, Care Policy & Evaluation Centre, London School of Economics and Political Science*. .
<https://doi.org/10.21953/lse.mlre15e0u6s6>
- Comas-Herrera A, Z. J., Lemmon E, Henderson D, Litwin C, Hsu AT, Schmidt AE, Arling G, Kruse F and Fernández J-L (2020). *Mortality associated with COVID-19 in care homes: international evidence*. . International Long-Term Care Policy Network, CPEC-LSE. Retrieved 2 March 2021 from
- Creamer, M., Bell, R., & Failla, S. (2003, Dec). Psychometric properties of the Impact of Event Scale - Revised. *Behav Res Ther*, 41(12), 1489-1496.
<https://doi.org/10.1016/j.brat.2003.07.010>
- Department of Health. (2020). *COVID-19 Nursing Homes Expert Panel: Final Report*. Department of Health,. Retrieved 11 February 2021 from
<https://www.gov.ie/en/publication/3af5a-covid-19-nursing-homes-expert-panel-final-report/>
- Dhar, S. A., & Wani, Z. A. (2020, 2020/10/14). My fear, my morals: a surgeon's perspective of the COVID crisis. *Philosophy, Ethics, and Humanities in Medicine*, 15(1), 10. <https://doi.org/10.1186/s13010-020-00094-3>
- Dong, Z.-Q., Ma, J., Hao, Y.-N., Shen, X.-L., Liu, F., Gao, Y., & Zhang, L. (2020). The social psychological impact of the COVID-19 pandemic on medical staff in

China: A cross-sectional study. *European Psychiatry*, 63(1), e65, Article e65.
<https://doi.org/10.1192/j.eurpsy.2020.59>

El Fassi, M., Bocquet, V., Majery, N., Lair, M. L., Couffignal, S., & Mairiaux, P. (2013, 2013/04/08). Work ability assessment in a worker population: comparison and determinants of Work Ability Index and Work Ability score. *BMC Public Health*, 13(1), 305. <https://doi.org/10.1186/1471-2458-13-305>

Elbay, R. Y., Kurtulmuş, A., Arpacioğlu, S., & Karadere, E. (2020). Depression, anxiety, stress levels of physicians and associated factors in Covid-19 pandemics. *Psychiatry research*, 290, 113130.

European Centre for Disease Prevention and Control. (2022). [Interactive Dashboard].
<https://www.ecdc.europa.eu/en/publications-data/covid-19-vaccine-tracker>

Eyles, E., Moran, P., Okolie, C., Dekel, D., Macleod-Hall, C., Webb, R. T., Schmidt, L., Knipe, D., Sinyor, M., McGuinness, L. A., Arensman, E., Hawton, K., O'Connor, R. C., Kapur, N., O'Neill, S., Olorisade, B., Cheng, H.-Y., Higgins, J. P. T., John, A., & Gunnell, D. (2021, 2021/12/01/). Systematic review of the impact of the COVID-19 pandemic on suicidal behaviour amongst health and social care workers across the world. *Journal of affective disorders reports*, 6, 100271.
<https://doi.org/https://doi.org/10.1016/j.jadr.2021.100271>

Fan, W. (2022). New Details of Shanghai Nursing Home Covid Deaths Suggest City Is Overwhelmed [Newspaper article]. *Wall Street Journal*.
<https://www.wsj.com/articles/shanghai-nursing-home-covid-deaths-11650641053>

Fawaz, M., & Itani, M. (2022). The psychological experiences of Lebanese ground zero front-line nurses during the most recent COVID-19 outbreak post Beirut blast: A qualitative study. *International journal of social psychiatry*, 68(4), 754-761.

Fenton, C., & McLoughlin, D. M. (2021). Usefulness of Hamilton rating scale for depression subset scales and full versions for electroconvulsive therapy. *PLoS One*, 16(11), e0259861. <https://doi.org/10.1371/journal.pone.0259861>

Firth, H., McKeown, P., McIntee, J., & Britton, P. (1987, 1987/01/01/). Professional depression, 'burnout' and personality in longstay nursing. *International Journal of Nursing Studies*, 24(3), 227-237.
[https://doi.org/https://doi.org/10.1016/0020-7489\(87\)90005-8](https://doi.org/https://doi.org/10.1016/0020-7489(87)90005-8)

Frost, J. (2017, 2017). Heteroscedasticity in Regression Analysis [Webpage].
<https://statisticsbyjim.com/regression/heteroscedasticity-regression/>

Gao, Y.-d., Ding, M., Dong, X., Zhang, J.-j., Kursat Azkur, A., Azkur, D., Gan, H., Sun, Y.-l., Fu, W., Li, W., Liang, H.-l., Cao, Y.-y., Yan, Q., Cao, C., Gao, H.-y., Brüggem,

- M.-C., van de Veen, W., Sokolowska, M., Akdis, M., & Akdis, C. A. (2021). Risk factors for severe and critically ill COVID-19 patients: A review. *Allergy*, 76(2), 428-455. <https://doi.org/https://doi.org/10.1111/all.14657>
- Giebel, C., Lion, K. M., Lorenz-Dant, K., Suárez-González, A., Talbot, C., Wharton, E., Cannon, J., Tetlow, H., & Thyrian, J. R. (2022). The early impacts of COVID-19 on people living with dementia: part I of a mixed-methods systematic review. *Aging & Mental Health*, 1-14. <https://doi.org/10.1080/13607863.2022.2084509>
- Gilleen, J., Santaolalla, A., Valdearenas, L., Salice, C., & Fusté, M. (2021). Impact of the COVID-19 pandemic on the mental health and well-being of UK healthcare workers. *BJPsych Open*, 7(3), e88, Article e88. <https://doi.org/10.1192/bjo.2021.42>
- Gordon, A. L., Goodman, C., Achterberg, W., Barker, R. O., Burns, E., Hanratty, B., Martin, F. C., Meyer, J., O'Neill, D., Schols, J., & Spilsbury, K. (2020). Commentary: COVID in care homes—challenges and dilemmas in healthcare delivery. *Age and Ageing*, 49(5), 701-705. <https://doi.org/10.1093/ageing/afaa113>
- Government of Ireland. (2021). Profile of County & LEA Statistics. <https://covid19ireland-geohive.hub.arcgis.com/pages/detailed-county-statistics>
- Hamilton, M. (1960). A RATING SCALE FOR DEPRESSION. *Journal of Neurology, Neurosurgery & Psychiatry*, 23(1), 56-62. <https://doi.org/10.1136/jnnp.23.1.56>
- Hannemann, J., Abdalrahman, A., Erim, Y., Morawa, E., Jerg-Bretzke, L., Beschoner, P., Geiser, F., Hiebel, N., Weidner, K., Steudte-Schmiedgen, S., & Albus, C. (2022). The impact of the COVID-19 pandemic on the mental health of medical staff considering the interplay of pandemic burden and psychosocial resources—A rapid systematic review. *PLoS One*, 17(2), e0264290. <https://doi.org/10.1371/journal.pone.0264290>
- Harrell, F. E. (2001). *Regression modeling strategies: with applications to linear models, logistic regression, and survival analysis* (Vol. 608). Springer.
- Hayes, B., Prihodova, L., Walsh, G., Doyle, F., & Doherty, S. (2019). Doctors don't Do-little: a national cross-sectional study of workplace well-being of hospital doctors in Ireland. *BMJ Open*, 9(3), e025433. <https://doi.org/10.1136/bmjopen-2018-025433>
- Health Information and Quality Authority. (2020a, 20 Nov 2020). HIQA statement on Oaklands Nursing Home. *HIQA.ie* <https://www.hiqa.ie/hiqa-news-updates/hiqa-statement-oaklands-nursing-home>

- Health Information and Quality Authority. (2020b). The impact of COVID-19 on nursing homes in Ireland [Regulatory Authority Report].
https://www.hiqa.ie/sites/default/files/2020-07/The-impact-of-COVID-19-on-nursing-homes-in-Ireland_0.pdf
- Hennigan, W. (2020). Lost in the Pandemic: Inside New York City's Mass Graveyard on Hart Island [Newspaper article]. *TIME Magazine*.
<https://time.com/5913151/hart-island-covid/>
- Hines, S. E., Chin, K. H., Glick, D. R., & Wickwire, E. M. (2021, Jan 9). Trends in Moral Injury, Distress, and Resilience Factors among Healthcare Workers at the Beginning of the COVID-19 Pandemic. *Int J Environ Res Public Health*, 18(2).
<https://doi.org/10.3390/ijerph18020488>
- Hines, S. E., Chin, K. H., Levine, A. R., & Wickwire, E. M. (2020). Initiation of a survey of healthcare worker distress and moral injury at the onset of the COVID-19 surge. *American Journal of Industrial Medicine*, 63(9), 830-833.
<https://doi.org/https://doi.org/10.1002/ajim.23157>
- Hjarsbech, P. U., Christensen, K. B., Andersen, R. V., Borg, V., Aust, B., & Rugulies, R. (2013). Do psychosocial working conditions modify the effect of depressive symptoms on long-term sickness absence? *American Journal of Industrial Medicine*, 56(11), 1329-1340.
<https://doi.org/https://doi.org/10.1002/ajim.22230>
- Hochberg, Y., & Benjamini, Y. (1990, Jul). More powerful procedures for multiple significance testing. *Stat Med*, 9(7), 811-818.
<https://doi.org/10.1002/sim.4780090710>
- Hong, S., Ai, M., Xu, X., Wang, W., Chen, J., Zhang, Q., Wang, L., & Kuang, L. (2021). Immediate psychological impact on nurses working at 42 government-designated hospitals during COVID-19 outbreak in China: A cross-sectional study. *Nursing Outlook*, 69(1), 6-12.
<https://doi.org/10.1016/j.outlook.2020.07.007>
- Husky, M. M., Villeneuve, R., Tabue Teguo, M., Alonso, J., Bruffaerts, R., Swendsen, J., & Amieva, H. (2022, Jul). Nursing Home Workers' Mental Health During the COVID-19 Pandemic in France. *J Am Med Dir Assoc*, 23(7), 1095-1100.
<https://doi.org/10.1016/j.jamda.2022.04.001>
- Hyland, P., Vallières, F., McBride, O., Murphy, J., Shevlin, M., Bentall, R. P., Butter, S., Hartman, T. K., Karatzias, T., MacLachlan, M., Maguire, R., Power, J. M., Spikol, E., & Daly, M. (2021). Mental health of adults in Ireland during the first year of the COVID-19 pandemic: Results from a nationally representative, longitudinal study. *Psychological Medicine*, 1-6.
<https://doi.org/10.1017/S0033291721004360>

- Iheduru-Anderson, K. (2021, Jan). Reflections on the lived experience of working with limited personal protective equipment during the COVID-19 crisis. *Nurs Inq*, 28(1), e12382. <https://doi.org/10.1111/nin.12382>
- Ioannidis, J. P. A., Axfors, C., & Contopoulos-Ioannidis, D. G. (2021, Feb 10). Second versus first wave of COVID-19 deaths: Shifts in age distribution and in nursing home fatalities. *Environ Res*, 195, 110856. <https://doi.org/10.1016/j.envres.2021.110856>
- Iritani, O., Okuno, T., Hama, D., Kane, A., Kodera, K., Morigaki, K., Terai, T., Maeno, N., & Morimoto, S. (2020, Jul). Clusters of COVID-19 in long-term care hospitals and facilities in Japan from 16 January to 9 May 2020. *Geriatr Gerontol Int*, 20(7), 715-719. <https://doi.org/10.1111/ggi.13973>
- Istituto Superiore di Sanità. (2020). *2020 National Survey on COVID-19 Contagion in residential and social-health structures. Third report*. . Istituto Superiore di Sanità,. Retrieved 11 February 2021 from <https://www.epicentro.iss.it/coronavirus/pdf/sars-cov-2-survey-rsa-rapporto-3.pdf>.
- Jääskeläinen, A., Kausto, J., Seitsamo, J., Ojajärvi, A., Nygård, C.-H., Arjas, E., & Leino-Arjas, P. (2016, 6VL - 42). Work ability index and perceived work ability as predictors of disability pension: a prospective study among Finnish municipal employees. *Scandinavian Journal of Work, Environment & Health*(6), 490-499. <https://doi.org/10.5271/sjweh.3598>
- Jefferies, S., French, N., Gilkison, C., Graham, G., Hope, V., Marshall, J., McElnay, C., McNeill, A., Muellner, P., Paine, S., Prasad, N., Scott, J., Sherwood, J., Yang, L., & Priest, P. (2020). COVID-19 in New Zealand and the impact of the national response: a descriptive epidemiological study. *The Lancet Public Health*, 5(11), e612-e623. [https://doi.org/10.1016/S2468-2667\(20\)30225-5](https://doi.org/10.1016/S2468-2667(20)30225-5)
- Jones, E. (2020). Moral injury in a context of trauma. *The British Journal of Psychiatry*, 216(3), 127-128. <https://doi.org/10.1192/bjp.2020.46>
- Kaelen, S., van den Boogaard, W., Pellecchia, U., Spiers, S., De Cramer, C., Demaegd, G., Fouqueray, E., Van den Bergh, R., Goublomme, S., & Decroo, T. (2021). How to bring residents' psychosocial well-being to the heart of the fight against Covid-19 in Belgian nursing homes—A qualitative study. *PLoS One*, 16(3), e0249098.
- Kennelly, S. P., Dyer, A. H., Noonan, C., Martin, R., Kennelly, S. M., Martin, A., O'Neill, D., & Fallon, A. (2021). Asymptomatic carriage rates and case fatality of SARS-CoV-2 infection in residents and staff in Irish nursing homes. *Age and Ageing*, 50(1), 49-54. <https://doi.org/10.1093/ageing/afaa220>

- Khanna, R. C., Honavar, S. G., Metla, A. L., Bhattacharya, A., & Maulik, P. K. (2020). Psychological impact of COVID-19 on ophthalmologists-in-training and practising ophthalmologists in India. *Indian journal of ophthalmology*, 68(6), 994.
- Kim, S. C., Quiban, C., Sloan, C., & Montejano, A. (2021). Predictors of poor mental health among nurses during COVID-19 pandemic. *Nursing Open*, 8(2), 900-907. <https://doi.org/https://doi.org/10.1002/nop2.697>
- Koh, D., Lim, M. K., Chia, S. E., Ko, S. M., Qian, F., Ng, V., Tan, B. H., Wong, K. S., Chew, W. M., & Tang, H. K. (2005). Risk perception and impact of severe acute respiratory syndrome (SARS) on work and personal lives of healthcare Workers in Singapore What can we Learn? *Medical care*, 676-682.
- Krammer, S., Augstburger, R., Haeck, M., & Maercker, A. (2020). Adjustment disorder, depression, stress symptoms, Corona related anxieties and coping strategies during the Corona pandemic (COVID-19) in Swiss medical staff. *Psychother Psychosom Med Psychol*, 272-282.
- Krieger, T., Zimmermann, J., Huffziger, S., Ubl, B., Diener, C., Kuehner, C., & Grosse Holtforth, M. (2014, Mar). Measuring depression with a well-being index: further evidence for the validity of the WHO Well-Being Index (WHO-5) as a measure of the severity of depression. *J Affect Disord*, 156, 240-244. <https://doi.org/10.1016/j.jad.2013.12.015>
- Krzyzaniak, N., Scott, A. M., Bakhit, M., Bryant, A., Taylor, M., & Del Mar, C. (2021). Impact of the COVID-19 pandemic on the Australian residential aged care facility (RACF) workforce. *The Australian Journal of Advanced Nursing*, 38(3), 47-58.
- Kurt, O., Deveci, S. E., & Oguzoncul, A. F. (2020). Levels of anxiety and depression related to COVID-19 among physicians: An online cross-sectional study from Turkey. *Annals of Clinical and Analytical Medicine*, 11(Suppl 3), S288-S293.
- Laher, Z., Robertson, N., Harrad-Hyde, F., & Jones, C. R. (2022, Aug 4). Prevalence, Predictors, and Experience of Moral Suffering in Nursing and Care Home Staff during the COVID-19 Pandemic: A Mixed-Methods Systematic Review. *Int J Environ Res Public Health*, 19(15). <https://doi.org/10.3390/ijerph19159593>
- Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., & Li, R. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Network Open*, 3(3), e203976-e203976.
- Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., & Hu, S. (2020). Factors Associated With Mental Health Outcomes Among Health Care

- Workers Exposed to Coronavirus Disease 2019. *JAMA Network Open*, 3(3), e203976-e203976. <https://doi.org/10.1001/jamanetworkopen.2020.3976>
- Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., & Hu, S. (2020, Mar 2). Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open*, 3(3), e203976. <https://doi.org/10.1001/jamanetworkopen.2020.3976>
- Lamb, D., Gnanapragasam, S., Greenberg, N., Bhundia, R., Carr, E., Hotopf, M., Razavi, R., Raine, R., Cross, S., Dewar, A., Docherty, M., Dorrington, S., Hatch, S., Wilson-Jones, C., Leightley, D., Madan, I., Marlow, S., McMullen, I., Rafferty, A. M., Parsons, M., Polling, C., Serfioti, D., Gaunt, H., Aitken, P., Morris-Bone, J., Simela, C., French, V., Harris, R., Stevelink, S. A. M., & Wessely, S. (2021, Jun 28). Psychosocial impact of the COVID-19 pandemic on 4378 UK healthcare workers and ancillary staff: initial baseline data from a cohort study collected during the first wave of the pandemic. *Occup Environ Med*. <https://doi.org/10.1136/oemed-2020-107276>
- Lani, J. (2022). Assumptions of Multiple Linear Regression. *Statistics Solutions*. <https://www.statisticssolutions.com/free-resources/directory-of-statistical-analyses/assumptions-of-multiple-linear-regression/>
- Leroi, I. (2022). SENSE-Cog Residential CARE: hearing and vision support for residents with dementia [Protocol]. *ISRCTN registry*. <https://doi.org/https://doi.org/10.1186/ISRCTN14462472>
- Lima, V. (2021, 2021). The Pandemic One Year on: Trends and Statistics Between Three Waves of the COVID-19 Pandemic in Ireland. [Report]. *publicpolicy.ie*. (2021)
- Liu, X., Kakade, M., Fuller, C. J., Fan, B., Fang, Y., Kong, J., Guan, Z., & Wu, P. (2012). Depression after exposure to stressful events: lessons learned from the severe acute respiratory syndrome epidemic. *Comprehensive psychiatry*, 53(1), 15-23.
- Liu, Y., & Rocklöv, J. (2022). The effective reproductive number of the Omicron variant of SARS-CoV-2 is several times relative to Delta. *Journal of Travel Medicine*, 29(3), taac037. <https://doi.org/10.1093/jtm/taac037>
- Lund, A., & Lund, M. (2022). Linear Regression Analysis using SPSS Statistics. *Laerd Statistics*. <https://statistics.laerd.com/spss-tutorials/linear-regression-using-spss-statistics.php>
- Maunder, R. G., Lancee, W. J., Balderson, K. E., Bennett, J. P., Borgundvaag, B., Evans, S., Fernandes, C. M., Goldbloom, D. S., Gupta, M., Hunter, J. J., McGillis Hall, L., Nagle, L. M., Pain, C., Peczeniuk, S. S., Raymond, G., Read, N., Rourke, S. B., Steinberg, R. J., Stewart, T. E., VanDeVelde-Coke, S., Veldhorst, G. G., & Wasylenki, D. A. (2006, Dec). Long-term psychological and occupational

effects of providing hospital healthcare during SARS outbreak. *Emerg Infect Dis*, 12(12), 1924-1932. <https://doi.org/10.3201/eid1212.060584>

Malinauskienė, V., & Bernotaitė, L. (2016). The Impact of Event Scale - Revised: psychometric properties of the Lithuanian version in a sample of employees exposed to workplace bullying. *Acta Med Litu*, 23(3), 185-192. <https://doi.org/10.6001/actamedica.v23i3.3384>

Manning, J. M. (2021, Oct 8). Feats, Flops, and Free Lessons From NZ's Response to the COVID-19 Pandemic. *Med Law Rev*, 29(3), 468-496. <https://doi.org/10.1093/medlaw/fwab025>

Marvaldi, M., Mallet, J., Dubertret, C., Moro, M. R., & Guessoum, S. B. (2021, Jul). Anxiety, depression, trauma-related, and sleep disorders among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Neurosci Biobehav Rev*, 126, 252-264. <https://doi.org/10.1016/j.neubiorev.2021.03.024>

Maunder, R. G., Lancee, W. J., Balderson, K. E., Bennett, J. P., Borgundvaag, B., Evans, S., Fernandes, C. M., Goldbloom, D. S., Gupta, M., Hunter, J. J., McGillis Hall, L., Nagle, L. M., Pain, C., Peczeniuk, S. S., Raymond, G., Read, N., Rourke, S. B., Steinberg, R. J., Stewart, T. E., VanDeVelde-Coke, S., Veldhorst, G. G., & Wasylenki, D. A. (2006, Dec). Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerg Infect Dis*, 12(12), 1924-1932. <https://doi.org/10.3201/eid1212.060584>

Maunder, R. G., Lancee, W. J., Rourke, S., Hunter, J. J., Goldbloom, D., Balderson, K., Petryshen, P., Steinberg, R., Wasylenki, D., Koh, D., & Fones, C. S. (2004, Nov-Dec). Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. *Psychosom Med*, 66(6), 938-942. <https://doi.org/10.1097/01.psy.0000145673.84698.18>

McGarry, B. E., Grabowski, D. C., & Barnett, M. L. (2020, Oct). Severe Staffing And Personal Protective Equipment Shortages Faced By Nursing Homes During The COVID-19 Pandemic. *Health Aff (Millwood)*, 39(10), 1812-1821. <https://doi.org/10.1377/hlthaff.2020.01269>

McLeod, S. (2019, 2019). Z-Score: Definition, Calculation and Interpretation. *Simply Psychology*. <https://www.simplypsychology.org/z-score.html>

McMaster National Collaborating Centre for Methods and Tools. (2020). What risk factors are associated with COVID-19 outbreaks and mortality in long-term care facilities and what strategies mitigate risk? Update 1. <https://www.nccmt.ca/knowledge-repositories/covid-19-rapid-evidence-service>

- Mee, E. (2020, 19 Mar 2020). Coronavirus: Italian army called in as crematorium struggles to cope with deaths. *Sky News*.
<https://news.sky.com/story/coronavirus-italian-army-called-in-to-carry-away-corpses-as-citys-crematorium-is-overwhelmed-11959994>
- Miller, V. J., Fields, N. L., Anderson, K. A., Kusmaul, N., & Maxwell, C. (2021). Nursing home social workers perceptions of preparedness and coping for COVID-19. *The Journals of Gerontology: Series B*, 76(4), e219-e224.
- Mitani, S. (2008, May-Jun). Comparative analysis of the Japanese version of the revised impact of event scale: a study of firefighters. *Prehosp Disaster Med*, 23(3), s20-26.
- Mo, S., & Shi, J. (2020, Oct). The Psychological Consequences of the COVID-19 on Residents and Staff in Nursing Homes. *Work Aging Retire*, 6(4), 254-259.
<https://doi.org/10.1093/workar/waaa021>
- Mortier, P., Vilagut, G., Ferrer, M., Serra, C., Molina, J. D., López-Fresneña, N., Puig, T., Pelayo-Terán, J. M., Pijoan, J. I., Emparanza, J. I., Espuga, M., Plana, N., González-Pinto, A., Ortí-Lucas, R. M., de Salazar, A. M., Rius, C., Aragonès, E., del Cura-González, I., Aragón-Peña, A., Campos, M., Parellada, M., Pérez-Zapata, A., Forjaz, M. J., Sanz, F., Haro, J. M., Vieta, E., Pérez-Solà, V., Kessler, R. C., Bruffaerts, R., Alonso, J., & Group, t. M. W. (2021). Thirty-day suicidal thoughts and behaviors among hospital workers during the first wave of the Spain COVID-19 outbreak. *Depression and Anxiety*, 38(5), 528-544.
<https://doi.org/https://doi.org/10.1002/da.23129>
- Motlagh, H. (2010, 2010/01/01/). Impact of Event Scale-Revised. *Journal of Physiotherapy*, 56(3), 203. [https://doi.org/https://doi.org/10.1016/S1836-9553\(10\)70029-1](https://doi.org/https://doi.org/10.1016/S1836-9553(10)70029-1)
- Mucci, N., Giorgi, G., Fiz Perez, J., Iavicoli, I., & Arcangeli, G. (2015). Predictors of trauma in bank employee robbery victims. *Neuropsychiatr Dis Treat*, 11, 2605-2612. <https://doi.org/10.2147/ndt.S88836>
- Muntaner, C., Li, Y., Xue, X., O'Campo, P., Chung, H. J., & Eaton, W. W. (2004, 2004/10/01). Work Organization, Area Labor-market Characteristics, and Depression among U.S. Nursing Home Workers: A Cross-classified Multilevel Analysis. *International Journal of Occupational and Environmental Health*, 10(4), 392-400. <https://doi.org/10.1179/oeh.2004.10.4.392>
- Muntaner, C., Li, Y., Xue, X., Thompson, T., Chung, H., & O'Campo, P. (2006, 2006/09/01/). County and organizational predictors of depression symptoms among low-income nursing assistants in the USA. *Social Science & Medicine*, 63(6), 1454-1465.
<https://doi.org/https://doi.org/10.1016/j.socscimed.2006.03.042>

- Muntaner, C., Ng, E., Prins, S. J., Bones-Rocha, K., Espelt, A., & Chung, H. (2015). Social class and mental health: testing exploitation as a relational determinant of depression. *Int J Health Serv*, 45(2), 265-284. <https://doi.org/10.1177/0020731414568508>
- Muntaner, C., Van Dussen, D. J., Li, Y., Zimmerman, S., Chung, H., & Benach, J. (2006). Work Organization, Economic Inequality, and Depression among Nursing Assistants: A Multilevel Modeling Approach. *Psychological Reports*, 98(2), 585-601. <https://doi.org/10.2466/pr0.98.2.585-601>
- Murphy, D., Ross, J., Ashwick, R., Armour, C., & Busuttil, W. (2017). Exploring optimum cut-off scores to screen for probable posttraumatic stress disorder within a sample of UK treatment-seeking veterans. *Eur J Psychotraumatol*, 8(1), 1398001. <https://doi.org/10.1080/20008198.2017.1398001>
- Nash, W. P., Marino Carper, T. L., Mills, M. A., Au, T., Goldsmith, A., & Litz, B. T. (2013a, Jun). Psychometric evaluation of the Moral Injury Events Scale. *Mil Med*, 178(6), 646-652. <https://doi.org/10.7205/milmed-d-13-00017>
- Nash, W. P., Marino Carper, T. L., Mills, M. A., Au, T., Goldsmith, A., & Litz, B. T. (2013b). Psychometric Evaluation of the Moral Injury Events Scale. *Military Medicine*, 178(6), 646-652. <https://doi.org/10.7205/MILMED-D-13-00017>
- Nasiri, M. (2020, November 11, 2020). In Iran, a massive cemetery struggles to keep up with virus [Newspaper article]. *AP News*. <https://apnews.com/article/iran-massive-cemetery-virus-a0110a5c8a2813fd48cab4ec15e2288>
- Nursing and Midwifery Board of Ireland. (2019). The NMBI Register of Nurses and Midwives.
- Nursing Homes Ireland. (2022). Nursing home staffing emergency will have consequences for health & social care [Press Release]. <https://nhi.ie/nursing-home-staffing-emergency-will-have-consequences-for-health-social-care/>
- Nyashanu, M., Pfende, F., & Ekpenyong, M. S. (2022, Feb). Triggers of mental health problems among frontline healthcare workers during the COVID-19 pandemic in private care homes and domiciliary care agencies: Lived experiences of care workers in the Midlands region, UK. *Health Soc Care Community*, 30(2), e370-e376. <https://doi.org/10.1111/hsc.13204>
- O'Connor, R. C., Wetherall, K., Cleare, S., McClelland, H., Melson, A. J., Niedzwiedz, C. L., O'Carroll, R. E., O'Connor, D. B., Platt, S., Scowcroft, E., Watson, B., Zortea, T., Ferguson, E., & Robb, K. A. (2021). Mental health and well-being during the COVID-19 pandemic: longitudinal analyses of adults in the UK COVID-19 Mental Health & Wellbeing study. *The British Journal of Psychiatry*, 218(6), 326-333. <https://doi.org/10.1192/bjp.2020.212>

- O'Donnell, E. M., Ertel, K. A., & Berkman, L. F. (2011, 2011/11/16). Depressive Symptoms in Extended-Care Employees: Children, Social Support, and Work-Family Conditions. *Issues in Mental Health Nursing*, 32(12), 752-765. <https://doi.org/10.3109/01612840.2011.609958>
- O'Neill, D. (2006). Leas Cross Report [Report]. *Health Service Executive*. <https://www.hse.ie/eng/services/publications/olderpeople/leas-cross-report-.pdf>
- Oakman, J., Neupane, S., Proper, K. I., Kinsman, N., & Nygård, C. H. (2018, Mar 1). Workplace interventions to improve work ability: A systematic review and meta-analysis of their effectiveness. *Scand J Work Environ Health*, 44(2), 134-146. <https://doi.org/10.5271/sjweh.3685>
- OECD. (2020). *Who Cares? Attracting and Retaining Care Workers for the Elderly*. <https://doi.org/doi:https://doi.org/10.1787/92c0ef68-en>
- Pang, Y., Fang, H., Li, L., Chen, M., Chen, Y., & Chen, M. (2021). Predictive factors of anxiety and depression among nurses fighting coronavirus disease 2019 in China. *International Journal of Mental Health Nursing*, 30(2), 524-532. <https://doi.org/https://doi.org/10.1111/inm.12817>
- Panneer, S., Kantamaneni, K., Palaniswamy, U., Bhat, L., Pushparaj, R. R. B., Nayar, K. R., Soundari Manuel, H., Flower, F., & Rice, L. (2022, Apr 21). Health, Economic and Social Development Challenges of the COVID-19 Pandemic: Strategies for Multiple and Interconnected Issues. *Healthcare (Basel)*, 10(5). <https://doi.org/10.3390/healthcare10050770>
- Park, J.-S., Lee, E.-H., Park, N.-R., & Choi, Y. H. (2018). Mental health of nurses working at a government-designated hospital during a MERS-CoV outbreak: a cross-sectional study. *Archives of Psychiatric Nursing*, 32(1), 2-6.
- Patterson, J. E., Edwards, T. M., Griffith, J. L., & Wright, S. (2021, Apr). Moral distress of medical family therapists and their physician colleagues during the transition to COVID-19. *J Marital Fam Ther*, 47(2), 289-303. <https://doi.org/10.1111/jmft.12504>
- Philip, K. E. J., Lonergan, B., Cumella, A., Farrington-Douglas, J., Laffan, M., & Hopkinson, N. S. (2020, 2020/12/09). COVID-19 related concerns of people with long-term respiratory conditions: a qualitative study. *BMC Pulmonary Medicine*, 20(1), 319. <https://doi.org/10.1186/s12890-020-01363-9>
- Pirdal, B. Z., Toplu, F. S., Esen, B. K., Aydın, S. N., Erginoz, E., & Can, G. (2022, Jul 25). An assessment on loss of workforce due to COVID-19 among healthcare personnel: A university hospital experience. *Work*. <https://doi.org/10.3233/wor-211308>

- Posner, K., Brown, G. K., Stanley, B., Brent, D. A., Yershova, K. V., Oquendo, M. A., Currier, G. W., Melvin, G. A., Greenhill, L., Shen, S., & Mann, J. J. (2011, Dec). The Columbia-Suicide Severity Rating Scale: initial validity and internal consistency findings from three multisite studies with adolescents and adults. *Am J Psychiatry*, 168(12), 1266-1277.
<https://doi.org/10.1176/appi.ajp.2011.10111704>
- Radkiewicz, P., & Widerszal-Bazyl, M. (2005, 2005/06/01/). Psychometric properties of Work Ability Index in the light of comparative survey study. *International Congress Series*, 1280, 304-309.
<https://doi.org/https://doi.org/10.1016/j.ics.2005.02.089>
- Raidió Teilifís Éireann. (2020). Kerry nursing home 'in chaos' as HSE takes charge following court order [Newspaper article]. *rte.ie*.
<https://www.rte.ie/news/2020/1119/1179256-kerry-nursing-home-covid/> (20 Nov 2020)
- Raso, R. (2022, Feb 1). Psychological PPE for leaders. *Nurs Manage*, 53(2), 5.
<https://doi.org/10.1097/01.NUMA.0000816280.12003.db>
- Riello, M., Purgato, M., Bove, C., MacTaggart, D., & Rusconi, E. (2020, Sep). Prevalence of post-traumatic symptomatology and anxiety among residential nursing and care home workers following the first COVID-19 outbreak in Northern Italy. *R Soc Open Sci*, 7(9), 200880.
<https://doi.org/10.1098/rsos.200880>
- Riello, M., Purgato, M., Bove, C., Tedeschi, F., MacTaggart, D., Barbui, C., & Rusconi, E. (2021). Effectiveness of self-help plus (SH+) in reducing anxiety and post-traumatic symptomatology among care home workers during the COVID-19 pandemic: a randomized controlled trial. *Royal Society Open Science*, 8(11), 210219. <https://doi.org/doi:10.1098/rsos.210219>
- Riello, M., Purgato, M., Bove, C., Tedeschi, F., MacTaggart, D., Barbui, C., & Rusconi, E. (2021, Nov). Effectiveness of self-help plus (SH+) in reducing anxiety and post-traumatic symptomatology among care home workers during the COVID-19 pandemic: a randomized controlled trial. *R Soc Open Sci*, 8(11), 210219. <https://doi.org/10.1098/rsos.210219>
- Ritchie, H., Mathieu, M., Rodés-Guirao, L., Appel, C., Giattino, C., Ortiz-Ospina, E., Hasell, J., Macdonald, B., Beltekian, D., & Roser, M. (2022). Coronavirus Pandemic (COVID-19): Ireland: Coronavirus Pandemic Country Profile [Website]. *Online at OurWorldInData.org*.
<https://ourworldindata.org/coronavirus/country/ireland>
- Robinson, E., Sutin, A. R., Daly, M., & Jones, A. (2022, Jan 1). A systematic review and meta-analysis of longitudinal cohort studies comparing mental health before versus during the COVID-19 pandemic in 2020. *J Affect Disord*, 296, 567-576.
<https://doi.org/10.1016/j.jad.2021.09.098>

- Rocard, E., Sillitti, P., & Llana-Nozal, A. (2021). COVID-19 in long-term care: Impact, policy responses and challenges. *OECD Health Working Papers*(131). <https://doi.org/https://doi.org/10.1787/b966f837-en> (OECD Publishing)
- Rodríguez, E. A., Agüero-Flores, M., Landa-Blanco, M., Agurcia, D., & Santos-Midence, C. (2021, Dec). Moral Injury and Light Triad Traits: Anxiety and Depression in Health-Care Personnel During the Coronavirus-2019 Pandemic in Honduras. *Hisp Health Care Int*, 19(4), 230-238. <https://doi.org/10.1177/15404153211042371>
- Rodwell, J., & Demir, D. (2012). Psychological consequences of bullying for hospital and aged care nurses. *International Nursing Review*, 59(4), 539-546. <https://doi.org/https://doi.org/10.1111/j.1466-7657.2012.01018.x>
- Rothe, C., Schunk, M., Sothmann, P., Bretzel, G., Froeschl, G., Wallrauch, C., Zimmer, T., Thiel, V., Janke, C., Guggemos, W., Seilmaier, M., Drosten, C., Vollmar, P., Zwirgmaier, K., Zange, S., Wölfel, R., & Hoelscher, M. (2020, Mar 5). Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany. *N Engl J Med*, 382(10), 970-971. <https://doi.org/10.1056/NEJMc2001468>
- Ruitenburt, M. M., Frings-Dresen, M. H., & Sluiter, J. K. (2012, Aug 31). The prevalence of common mental disorders among hospital physicians and their association with self-reported work ability: a cross-sectional study. *BMC Health Serv Res*, 12, 292-298. <https://doi.org/10.1186/1472-6963-12-292>
- Salcher-Konrad, M., Jhass, A., Naci, H., Tan, M., El-Tawil, Y., & Comas-Herrera, A. (2020). COVID-19 related mortality and spread of disease in long-term care: a living systematic review of emerging evidence. *medRxiv*, 2020.2006.2009.20125237. <https://doi.org/10.1101/2020.06.09.20125237>
- Salonen, P., Arola, H., Nygård, C. H., Huhtala, H., & Koivisto, A. M. (2003). Factors associated with premature departure from working life among ageing food industry employees. *Occupational Medicine*, 53(1), 65-68. <https://doi.org/10.1093/occmed/kqg012>
- Sampath, S., Khedr, A., Qamar, S., Tekin, A., Singh, R., Green, R., & Kashyap, R. (2021, Sep). Pandemics Throughout the History. *Cureus*, 13(9), e18136. <https://doi.org/10.7759/cureus.18136>
- Sanford, A. M., Orrell, M., Tolson, D., Abbatecola, A. M., Arai, H., Bauer, J. M., Cruz-Jentoft, A. J., Dong, B., Ga, H., Goel, A., Hajjar, R., Holmerova, I., Katz, P. R., Koopmans, R. T., Rolland, Y., Visvanathan, R., Woo, J., Morley, J. E., & Vellas, B. (2015, Mar). An international definition for "nursing home". *J Am Med Dir Assoc*, 16(3), 181-184. <https://doi.org/10.1016/j.jamda.2014.12.013>

- Santamaría, M. D., Ozamiz-Etxebarria, N., Rodríguez, I. R., Albondiga-Mayor, J. J., & Gorrochategi, M. P. (2021). Psychological impact of COVID-19 on a sample of Spanish health professionals. *Revista de Psiquiatría y Salud Mental (English Edition)*, 14(2), 106-112.
- Sarabia-Cobo, C., Pérez, V., de Lorena, P., Hermosilla-Grijalbo, C., Sáenz-Jalón, M., Fernández-Rodríguez, A., & Alconero-Camarero, A. R. (2021, Feb). Experiences of geriatric nurses in nursing home settings across four countries in the face of the COVID-19 pandemic. *J Adv Nurs*, 77(2), 869-878. <https://doi.org/10.1111/jan.14626>
- Sarabia-Cobo, C., Pérez, V., de Lorena, P., Hermosilla-Grijalbo, C., Sáenz-Jalón, M., Fernández-Rodríguez, A., & Alconero-Camarero, A. R. (2021). Experiences of geriatric nurses in nursing home settings across four countries in the face of the COVID-19 pandemic. *Journal of advanced nursing*, 77(2), 869-878.
- Sell, L. (2009, 2009/10/01). Predicting long-term sickness absence and early retirement pension from self-reported work ability. *International Archives of Occupational and Environmental Health*, 82(9), 1133-1138. <https://doi.org/10.1007/s00420-009-0417-6>
- Serrano-Ripoll, M. J., Meneses-Echavez, J. F., Ricci-Cabello, I., Fraile-Navarro, D., Fiol-deRoque, M. A., Pastor-Moreno, G., Castro, A., Ruiz-Pérez, I., Zamanillo Campos, R., & Gonçalves-Bradley, D. C. (2020, Dec 1). Impact of viral epidemic outbreaks on mental health of healthcare workers: a rapid systematic review and meta-analysis. *J Affect Disord*, 277, 347-357. <https://doi.org/10.1016/j.jad.2020.08.034>
- Serrão, C., Duarte, I., Castro, L., & Teixeira, A. (2021). Burnout and depression in portuguese healthcare workers during the covid-19 pandemic—the mediating role of psychological resilience. *International journal of environmental research and public health*, 18(2), 636.
- Sharif, N., Alzahrani, K. J., Ahmed, S. N., Khan, A., Banjer, H. J., Alzahrani, F. M., Parvez, A. K., & Dey, S. K. (2022). Genomic surveillance, evolution and global transmission of SARS-CoV-2 during 2019–2022. *PLoS One*, 17(8), e0271074. <https://doi.org/10.1371/journal.pone.0271074>
- Sharma, R., Seth, S., Solanki, H. K., Mishra, N., Srivastava, A., & Jakhar, K. (2020, Dec 16). COVID-19 and Obstetrical Care: Coping With New Stress. *Cureus*, 12(12), e12116. <https://doi.org/10.7759/cureus.12116>
- Si, M.-Y., Su, X.-Y., Jiang, Y., Wang, W.-J., Gu, X.-F., Ma, L., Li, J., Zhang, S.-K., Ren, Z.-F., & Ren, R. (2020). Psychological impact of COVID-19 on medical care workers in China. *Infectious Diseases of Poverty*, 9(1), 1-13.
- Si, M.-Y., Su, X.-Y., Jiang, Y., Wang, W.-J., Gu, X.-F., Ma, L., Li, J., Zhang, S.-K., Ren, Z.-F., Ren, R., Liu, Y.-L., & Qiao, Y.-L. (2020, 2020/08/12). Psychological impact of

- COVID-19 on medical care workers in China. *Infectious Diseases of Poverty*, 9(1), 113. <https://doi.org/10.1186/s40249-020-00724-0>
- Sim, K., Chong, P. N., Chan, Y. H., & Soon, W. S. W. (2004). Severe acute respiratory syndrome-related psychiatric and posttraumatic morbidities and coping responses in medical staff within a primary health care setting in Singapore. *Journal of Clinical Psychiatry*, 65(8), 1120-1127.
- Simoni-Wastila, L., Wallem, A., Fleming, S. P., Le, T. T., Kepczynska, P., Yang, J., & Qato, D. M. (2021, Dec). Staffing and Protective Equipment Access Mitigated COVID-19 Penetration and Spread in US Nursing Homes During the Third Surge. *J Am Med Dir Assoc*, 22(12), 2504-2510. <https://doi.org/10.1016/j.jamda.2021.09.030>
- Somsen, G. A., van Rijn, C., Kooij, S., Bem, R. A., & Bonn, D. (2020, Jul). Small droplet aerosols in poorly ventilated spaces and SARS-CoV-2 transmission. *Lancet Respir Med*, 8(7), 658-659. [https://doi.org/10.1016/s2213-2600\(20\)30245-9](https://doi.org/10.1016/s2213-2600(20)30245-9)
- Song, X., Fu, W., Liu, X., Luo, Z., Wang, R., Zhou, N., Yan, S., & Lv, C. (2020). Mental health status of medical staff in emergency departments during the Coronavirus disease 2019 epidemic in China. *Brain, behavior, and immunity*, 88, 60-65.
- Statistics Solutions. (2022). Identifying Multivariate Outliers in SPSS. *Complete Dissertation by Statistics Sollutions*. <https://www.statisticssolutions.com/identifying-multivariate-outliers-in-spss/>
- Steel, Z., Marnane, C., Iranpour, C., Chey, T., Jackson, J. W., Patel, V., & Silove, D. (2014). The global prevalence of common mental disorders: a systematic review and meta-analysis 1980–2013. *International Journal of Epidemiology*, 43(2), 476-493. <https://doi.org/10.1093/ije/dyu038>
- Styra, R., Hawryluck, L., Robinson, S., Kasapinovic, S., Fones, C., & Gold, W. L. (2008). Impact on health care workers employed in high-risk areas during the Toronto SARS outbreak. *Journal of psychosomatic research*, 64(2), 177-183.
- Suzumura, M., Fushiki, Y., Kobayashi, K., Oura, A., Suzumura, S., Yamashita, M., & Mori, M. (2013). A Prospective Study of Factors Associated with Risk of Turnover among Care Workers in Group Homes for Elderly Individuals with Dementia. *Journal of Occupational Health*, 55(6), 487-494. <https://doi.org/https://doi.org/10.1539/joh.12-0265-OA>
- Takahashi, T., Ekoyama, S., Tachikawa, H., Midorikawa, H., Shiratori, Y., Ota, M., Takahashi, S., & Arai, T. (2022). Mental Health of Caregivers Working in Nursing Homes during the COVID-19 Pandemic. *Dement Geriatr Cogn Disord*, 51(3), 233-240. <https://doi.org/10.1159/000524953>

- Tang, L., Pan, L., Yuan, L., & Zha, L. (2017). Prevalence and related factors of post-traumatic stress disorder among medical staff members exposed to H7N9 patients. *International journal of nursing sciences*, 4(1), 63-67.
- Taquet, M., Luciano, S., Geddes, J. R., & Harrison, P. J. (2021). Bidirectional associations between COVID-19 and psychiatric disorder: retrospective cohort studies of 62 354 COVID-19 cases in the USA. *The Lancet Psychiatry*, 8(2), 130-140. [https://doi.org/10.1016/S2215-0366\(20\)30462-4](https://doi.org/10.1016/S2215-0366(20)30462-4)
- Thomas, R. E. (2021). Reducing Morbidity and Mortality Rates from COVID-19, Influenza and Pneumococcal Illness in Nursing Homes and Long-Term Care Facilities by Vaccination and Comprehensive Infection Control Interventions. *Geriatrics*, 6(2), 48. <https://www.mdpi.com/2308-3417/6/2/48>
- Topp, C. W., Østergaard, S. D., Søndergaard, S., & Bech, P. (2015). The WHO-5 Well-Being Index: a systematic review of the literature. *Psychother Psychosom*, 84(3), 167-176. <https://doi.org/10.1159/000376585>
- Tyrrell, C. S. B., Mytton, O. T., Gentry, S. V., Thomas-Meyer, M., Allen, J. L. Y., Narula, A. A., McGrath, B., Lupton, M., Broadbent, J., Ahmed, A., Mavrodaris, A., & Abdul Pari, A. A. (2021). Managing intensive care admissions when there are not enough beds during the COVID-19 pandemic: a systematic review. *Thorax*, 76(3), 302-312. <https://doi.org/10.1136/thoraxjnl-2020-215518>
- Vagni, M., Maiorano, T., Giostra, V., & Pajardi, D. (2020). Hardiness and coping strategies as mediators of stress and secondary trauma in emergency workers during the COVID-19 pandemic. *Sustainability*, 12(18), 7561.
- Verma, S., Mythily, S., Chan, Y., Deslypere, J., Teo, E., & Chong, S. (2004). Post-SARS psychological morbidity and stigma among general practitioners and traditional Chinese medicine practitioners in Singapore. *Ann Acad Med Singapore*, 33(6), 743-748.
- Veronese, N., Trabucchi, M., Vecchiato, C., Demurtas, J., & De Leo, D. (2021). The risk of suicide in healthcare workers in nursing home: An exploratory analysis during COVID-19 epidemic. *International Journal of Geriatric Psychiatry*, 36(10), 1588-1589. <https://doi.org/https://doi.org/10.1002/gps.5562>
- Veronese, N., Trabucchi, M., Vecchiato, C., Demurtas, J., & De Leo, D. (2021, Oct). The risk of suicide in healthcare workers in nursing home: An exploratory analysis during COVID-19 epidemic. *Int J Geriatr Psychiatry*, 36(10), 1588-1589. <https://doi.org/10.1002/gps.5562>
- von Bonsdorff, M. B., Seitsamo, J., Ilmarinen, J., Nygård, C.-H., von Bonsdorff, M. E., & Rantanen, T. (2011). Work ability in midlife as a predictor of mortality and disability in later life: a 28-year prospective follow-up study. *Canadian Medical Association Journal*, 183(4), E235-E242. <https://doi.org/10.1503/cmaj.100713>

- Voth, J., Jaber, L., MacDougall, L., Ward, L., Cordeiro, J., & Miklas, E. P. (2022, 2022-August-29). The presence of psychological distress in healthcare workers across different care settings in Windsor, Ontario, during the COVID-19 pandemic: A cross-sectional study [Brief Research Report]. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.960900>
- Wang, Z., Koenig, H. G., Tong, Y., Wen, J., Sui, M., Liu, H., Zaben, F. A., & Liu, G. (2022, Feb). Moral injury in Chinese health professionals during the COVID-19 pandemic. *Psychol Trauma*, 14(2), 250-257. <https://doi.org/10.1037/tra0001026>
- Weathers, F. W., Litz, B. T., Herman, D. S., Huska, J. A., & Keane, T. M. (1993). The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. annual convention of the international society for traumatic stress studies, San Antonio, TX,
- White, E. M., Wetle, T. F., Reddy, A., & Baier, R. R. (2021, Jan). Front-line Nursing Home Staff Experiences During the COVID-19 Pandemic. *J Am Med Dir Assoc*, 22(1), 199-203. <https://doi.org/10.1016/j.jamda.2020.11.022>
- Whitehead, P. B., Carter, K. F., Garber, J. S., & Epstein, B. (2021, Jun 1). The Nurse Manager's Experience of Moral Distress. *J Nurs Adm*, 51(6), 334-339. <https://doi.org/10.1097/nna.0000000000001023>
- Wiersinga, W. J., Rhodes, A., Cheng, A. C., Peacock, S. J., & Prescott, H. C. (2020, Aug 25). Pathophysiology, Transmission, Diagnosis, and Treatment of Coronavirus Disease 2019 (COVID-19): A Review. *Jama*, 324(8), 782-793. <https://doi.org/10.1001/jama.2020.12839>
- Williamson, E. J., Walker, A. J., Bhaskaran, K., Bacon, S., Bates, C., Morton, C. E., Curtis, H. J., Mehrkar, A., Evans, D., Inglesby, P., Cockburn, J., McDonald, H. I., MacKenna, B., Tomlinson, L., Douglas, I. J., Rentsch, C. T., Mathur, R., Wong, A. Y. S., Grieve, R., Harrison, D., Forbes, H., Schultze, A., Croker, R., Parry, J., Hester, F., Harper, S., Perera, R., Evans, S. J. W., Smeeth, L., & Goldacre, B. (2020, 2020/08/01). Factors associated with COVID-19-related death using OpenSAFELY. *Nature*, 584(7821), 430-436. <https://doi.org/10.1038/s41586-020-2521-4>
- Williamson, V., Murphy, D., & Greenberg, N. (2020). COVID-19 and experiences of moral injury in front-line key workers. *Occupational Medicine*, 70(5), 317-319. <https://doi.org/10.1093/occmed/kqaa052>
- Wisco, B. E., Marx, B. P., May, C. L., Martini, B., Krystal, J. H., Southwick, S. M., & Pietrzak, R. H. (2017, Mar 29). Moral injury in U.S. combat veterans: Results from the national health and resilience in veterans study. *Depress Anxiety*. <https://doi.org/10.1002/da.22614>

- Wu, P., Fang, Y., Guan, Z., Fan, B., Kong, J., Yao, Z., Liu, X., Fuller, C. J., Susser, E., & Lu, J. (2009). The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *The Canadian Journal of Psychiatry*, 54(5), 302-311.
- Wu, P., Fang, Y., Guan, Z., Fan, B., Kong, J., Yao, Z., Liu, X., Fuller, C. J., Susser, E., Lu, J., & Hoven, C. W. (2009, May). The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry*, 54(5), 302-311. <https://doi.org/10.1177/070674370905400504>
- Xiao, H., Zhang, Y., Kong, D., Li, S., & Yang, N. (2020, Mar 5). The Effects of Social Support on Sleep Quality of Medical Staff Treating Patients with Coronavirus Disease 2019 (COVID-19) in January and February 2020 in China. *Med Sci Monit*, 26, e923549. <https://doi.org/10.12659/msm.923549>
- Xiaoming, X., Ming, A., Su, H., Wo, W., Jianmei, C., Qi, Z., Hua, H., Xuemei, L., Lixia, W., Jun, C., Lei, S., Zhen, L., Lian, D., Jing, L., Handan, Y., Haitang, Q., Xiaoting, H., Xiaorong, C., Ran, C., Qinghua, L., Xinyu, Z., Jian, T., Jing, T., Guanghua, J., Zhiqin, H., Nkundimana, B., & Li, K. (2020, 2020/11/01/). The psychological status of 8817 hospital workers during COVID-19 Epidemic: A cross-sectional study in Chongqing. *Journal of Affective Disorders*, 276, 555-561. <https://doi.org/https://doi.org/10.1016/j.jad.2020.07.092>
- Xiong, J., Lipsitz, O., Nasri, F., Lui, L. M. W., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A., & McIntyre, R. S. (2020, Dec 1). Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *J Affect Disord*, 277, 55-64. <https://doi.org/10.1016/j.jad.2020.08.001>
- Xu, X., Wang, W., Chen, J., Ai, M., Shi, L., Wang, L., Hong, S., Zhang, Q., Hu, H., Li, X., Cao, J., Lv, Z., Du, L., Li, J., Yang, H., He, X., Chen, X., Chen, R., Luo, Q., Zhou, X., Tan, J., Tu, J., Jiang, G., Han, Z., & Kuang, L. (2021, Feb). Suicidal and self-harm ideation among Chinese hospital staff during the COVID-19 pandemic: Prevalence and correlates. *Psychiatry Res*, 296, 113654. <https://doi.org/10.1016/j.psychres.2020.113654>
- Xue, Y., Lopes, J., Ritchie, K., D'Alessandro, A. M., Banfield, L., McCabe, R. E., Heber, A., Lanius, R. A., & McKinnon, M. C. (2022). Potential Circumstances Associated With Moral Injury and Moral Distress in Healthcare Workers and Public Safety Personnel Across the Globe During COVID-19: A Scoping Review. *Front Psychiatry*, 13, 863232. <https://doi.org/10.3389/fpsy.2022.863232>
- Yesudhas, D., Srivastava, A., & Gromiha, M. M. (2021, 2021/04/01). COVID-19 outbreak: history, mechanism, transmission, structural studies and therapeutics. *Infection*, 49(2), 199-213. <https://doi.org/10.1007/s15010-020-01516-2>

- Yildirim, T. T., Atas, O., Asafov, A., Yildirim, K., & Balibey, H. (2020). Psychological Status of Healthcare Workers during the Covid-19 Pandemic. *Age*, 20(30), 31-40.
- Yoo, S. H., Yoon, S. Y., Woo, K. H., Kim, J. S., Cho, S. Y., Lee, S. S., Lim, H. S., Ahn, Y. S., & Yang, W. H. (2017). Psychological effects of a disastrous hydrogen fluoride spillage on the local community. *Ann Occup Environ Med*, 29, 40. <https://doi.org/10.1186/s40557-017-0196-6>
- Yörük, S., & Güler, D. (2021). The relationship between psychological resilience, burnout, stress, and sociodemographic factors with depression in nurses and midwives during the COVID-19 pandemic: A cross-sectional study in Turkey. *Perspectives in psychiatric care*, 57(1), 390-398.
- Young, K. P., Kolcz, D. L., O'Sullivan, D. M., Ferrand, J., Fried, J., & Robinson, K. (2020, 2021/02/01). Health Care Workers' Mental Health and Quality of Life During COVID-19: Results From a Mid-Pandemic, National Survey. *Psychiatric Services*, 72(2), 122-128. <https://doi.org/10.1176/appi.ps.202000424>
- Zangani, C., Ostinelli, E. G., Smith, K. A., Hong, J. S. W., Macdonald, O., Reen, G., Reid, K., Vincent, C., Syed Sheriff, R., Harrison, P. J., Hawton, K., Pitman, A., Bale, R., Fazel, S., Geddes, J. R., & Cipriani, A. (2022, Jul 21). Impact of the COVID-19 Pandemic on the Global Delivery of Mental Health Services and Telemental Health: Systematic Review. *JMIR Ment Health*. <https://doi.org/10.2196/38600>
- Zhao, S., Yin, P., Xiao, L. D., Wu, S., Li, M., Yang, X., Zhang, D., Liao, L., & Feng, H. (2021). Nursing home staff perceptions of challenges and coping strategies during COVID-19 pandemic in China. *Geriatric Nursing*, 42(4), 887-893.
- Zhao, S., Yin, P., Xiao, L. D., Wu, S., Li, M., Yang, X., Zhang, D., Liao, L., & Feng, H. (2021, Jul-Aug). Nursing home staff perceptions of challenges and coping strategies during COVID-19 pandemic in China. *Geriatr Nurs*, 42(4), 887-893. <https://doi.org/10.1016/j.gerinurse.2021.04.024>
- Zhu, J., Sun, L., Zhang, L., Wang, H., Fan, A., Yang, B., Li, W., & Xiao, S. (2020). Prevalence and influencing factors of anxiety and depression symptoms in the first-line medical staff fighting against COVID-19 in Gansu. *Frontiers in Psychiatry*, 11, 386.

APPENDICES

Appendix I: Patient Information Sheet

Who is conducting this research?

Prof Declan McLoughlin (Trinity College Dublin; TCD) is the principal investigator on this project. The study is a collaboration between researchers in TCD, Royal College of Surgeons in Ireland (RCSI) and University College Dublin (UCD). The other co-investigators are: Dr Blánaid Hayes (RCSI), Prof. Agnes Higgins (TCD), Prof. Martina Hennessy (TCD) and Dr Ricardo Segurado (UCD).

What is this research about?

The global coronavirus (COVID-19) pandemic has lasted many months and challenged healthcare services, with major psychosocial consequences. Healthcare workers (HCWs) are particularly at high-risk for exposure and account for about one third of confirmed Irish COVID-19 cases. To date, the vast majority of COVID-19 patients in Ireland have been treated in the major Dublin teaching hospitals associated with TCD, RCSI and UCD.

Why is this research being done?

The research team wish to investigate and understand the effects of the COVID-19 pandemic on HCWs' mental health and identify what resources are required to support HCW's wellbeing during this unprecedented and stressful time and any similar future events.

Who has approved this study?

Approval for this study is being sought from the National Research Ethics Committee (NREC) for COVID-19 (<https://www.hrb.ie/covid-19-ethical-review/nrec-covid-19-overview/>).

Why have you been invited to take part?

You are being asked to take part because you are a HCW (doctor, nurse, radiographer or healthcare assistant) in a Dublin teaching hospital during the COVID-19 pandemic. These include St James's Hospital, Tallaght University Hospital, Beaumont Hospital, Connolly Hospital Blanchardstown, St Vincent's University Hospital and The Mater Hospital.

What is involved?

This anonymous online survey asks you to complete a set of questions, none of which will enable researchers to personally identify you. The survey should take 25-30 minutes to complete and we advise setting aside some time to enable you to complete the survey. You will first be asked some brief general questions about yourself and your work, followed by questions regarding your mental health and wellbeing, your personal experience with COVID-19 and caring for patients with COVID-19. You are not required to respond to any questions that you do not wish to answer. We would request that you do not reveal any potentially identifying information in your open ended responses.

Do I have to take part?

No, only if you want to. There is an online consent process below for you to confirm your willingness to participate. If you do decide to take part, you are still free to withdraw at any time without giving a reason and/or withdraw your information, where possible, up until such time as the research findings are submitted for analysis.

How will my data be used?

All data in the study are anonymous. Data from the survey will be analysed and submitted for publication in scientific journals and presented at academic meetings and conferences. However, at no time will you be personally identifiable. Additionally, the data may be shared with similar national/international studies that, along with the recent National study of wellbeing of hospital doctors in Ireland, can act as ecological controls for the COWORKER survey. Ultimately, the findings of this study will be used to tailor support for HCWs during this and any future outbreaks.

How will my privacy be protected?

Your participation in this study is strictly confidential, and details of your participation (or not), will not be shared. Your computer ID address will not be recorded. To ensure confidentiality of data, we ask that you please do not name, or identify anyone in any responses to the survey questions. Data will be securely stored in encrypted software only on password-protected computer drives. Data transfer between researchers at different study sites will be conducted via secure end-to-end encrypted data transfer services. Your anonymous data will be stored for ten years by Trinity College Dublin after the end of the research, after which it will be destroyed.

What are the benefits of taking part in this research study?

There are no direct benefits to you by taking part in this study itself. However, you will be contributing to an important piece of research. Additionally, many HCWs engage in research but have little opportunity to be the subject of research themselves.

What are the risks of taking part in this research study?

The risks to you are very low. However, a small number of respondents may experience unease since some of the issues explored are sensitive. A debriefing page at the end of the survey provides weblinks to relevant information and support services during this period.

Can I take part in a follow-up survey?

Yes. To assess the longer-term effects of the COVID-19 outbreak on HCWs, we plan to repeat this survey within 6 months. Notifications to participate in this second wave COWORKER survey will be distributed through your hospital workplace. If you decide not to participate in the first survey, you will still be able to participate in the second survey. While separate surveys are very useful, it is even more powerful to be able to link the data from the second survey to the first survey. One well-established way to achieve this, while still maintaining anonymity, is via a self-generated unique identifier. We are therefore asking you to create your own anonymized identification code as part of the present study. This secret code ensures that your survey responses cannot be connected to you but allows researchers to collect matched data across time points.

Contact details for further information

If you need any further information, please contact the research team at COWORKER@tcd.ie. If you have concerns about this study and wish to contact an independent person, please contact: Chair of the National Research Ethics Committee (NREC) for COVID-19 at nationaloffice@nrec.ie.

Appendix II: Patient Consent

By clicking below, you are agreeing to the below statements and providing your consent to participate in the research study 'Effects of COVID-19 on the mental health and wellbeing of nursing home staff in Ireland'.

- I confirm that I have read and understood the study Participant Information Sheet for the study “Effects of COVID-19 on the mental health and wellbeing of nursing home staff in Ireland”.
- I confirm that I have had sufficient time to consider whether or not to take part in this study.
- I understand that my participation is completely voluntary.
- I confirm that I am a nurse, healthcare assistant, activity coordinator, household staff member, catering staff or administrative staff working in a nursing home in the Republic of Ireland.
- I understand that I am permitted to withdraw from the study at any time, without disadvantage or needing to provide a reason.
- I understand that I can withdraw my consent for my data to be analysed, up until final data submission following debriefing.
- I understand that the results of this study are for research purposes only and that the information collected as part of the study is anonymous and strictly confidential.
- I agree for my anonymous data to be used for future research projects and may be shared for research purposes only with third parties.

Please select either:

1. I hereby provide consent to take part in this study.
2. I do not provide consent to take part in this study.

Appendix III: Nursing home staff survey

a. Demographic details

We'd like to start by asking some questions about you and your current job. Choose the options that best describe you.

1. What age are you now?
 - a. 25 or under
 - b. 26-30
 - c. 31-40
 - d. 41-50
 - e. 51-60
 - f. 60+

2. What is your gender?
 - a. Male
 - b. Female
 - c. Non-binary
 - d. Prefer not to say

3. How would you describe your current living arrangements?
 - a. Alone
 - b. With roommates
 - c. With coworker roommates
 - d. With my family
 - e. Other (please specify)

4. What is your ethnicity?
 - a. White - Irish/British/Other

- b. Asian.Asian Irish (Indian, Pakistani, Bangladeshi, other)
 - c. Black/Black Irish (Caribbean, African, other)
 - d. Chinese/Chinese Irish
 - e. Irish traveller
 - f. Middle Eastern/Middle Eastern Irish (Arab, Turkish, other)
 - g. Mixed race (White and Black/Black Irish)
 - h. Mixed race (other)
 - i. Southeast Asian/Southeast Asian Irish (Filipino,Malaysian)
 - j. Other ethnic group (please specify)
-

- k. Prefer not to say

5. My job type is (select one)

- a. Nurse
- b. Healthcare assistant
- c. Activity Coordinator
- d. Household staff
- e. Catering staff
- f. Administrative staff

6. How many years have you worked in this role?

- a. Less than 5 years
- b. 5-10 years
- c. >10 years

7. The nursing home where I work is in

- a. Carlow
- b. Cavan
- c. Clare
- d. Cork
- e. Donegal
- f. Dublin
- g. Galway

- h. Kerry
- i. Kildare
- j. Kilkenny
- k. Laois
- l. Leitrim
- m. Limerick
- n. Longford
- o. Louth
- p. Mayo
- q. Meath
- r. Monaghan
- s. Offaly
- t. Roscommon
- u. Sligo
- v. Tipperary
- w. Waterford
- x. Westmeath
- y. Wexford
- z. Wicklow

b. Mental Health and Medical Conditions

8. Do you have any of the following medical conditions? (Select all that apply)

- a. ☐ Diabetes
- b. ☐ High blood pressure
- c. ☐ Irregular heart beat
- d. ☐ Asthma
- e. ☐ Chronic airways disease
- f. ☐ Cancer
- g. ☐ Immunosuppression
- h. ☐ Obesity
- i. ☐ Other (please specify)

j. ☐ None

10. Do you have any of the following mental health conditions?

- a. ☐ Anxiety disorder
- b. ☐ Depression
- c. ☐ Bipolar disorder
- d. ☐ Obsessive compulsive disorder
- e. ☐ Substance/alcohol dependency
- f. ☐ Schizophrenia
- g. ☐ Other (please describe)

h. ☐ None

c. Experience of working with COVID-19

We'd like to ask some questions about your own experience with the COVID-19 outbreak since it started in Ireland. Choose the options that best describe you.

11. The nature of my work has involved personally attending to:

- a. Definite/probable COVID residents
- b. Possible COVID residents
- c. Non-COVID residents

12. Have you had to self-isolate (quarantine) at home because of possible exposure to COVID-19?

- a. No
- b. Yes (please specify why)

13. Irrespective of any test result, do you believe you have been infected with COVID-19?

- a. No
- b. Yes

Display This Question: If Irrespective of any test result, do you believe you have been infected with COVID-19? = Yes:

14. What severity of symptoms did you experience?

- a. No symptoms
- b. Mild illness
- c. Moderate illness
- d. Severe illness

Display This Question: If What severity of symptoms did you experience? = Severe illness

15. Were you:

- a. Hospitalised
- b. Admitted to ICU
- c. Required ventilator in ICU

Display This Question:

If What severity of symptoms did you experience? = Mild illness

Or What severity of symptoms did you experience? = Moderate illness

Or What severity of symptoms did you experience? = Severe illness

16. For how many weeks did you have symptoms of COVID-19?

Numerical selection: Less than 1, one week... up to 20 weeks or more

Display This Question: If Irrespective of any test result, do you believe you have been infected with COVID-19? = Yes

17. Do you feel you have now fully recovered?

- a. Yes
- b. No

18. I personally know people infected with COVID-19 who are my: (select all that apply)

- a. ☐ Immediate family members
- b. ☐ Close friends
- c. ☐ Colleagues/acquaintances
- d. ☐ Housemates
- e. ☐ Not applicable

Display This Question:

If I personally know people infected with COVID-19 who are my: (select all that apply) = Immediate family members

Or I personally know people infected with COVID-19 who are my: (select all that apply) = Close friends

Or I personally know people infected with COVID-19 who are my: (select all that apply) = Colleagues/acquaintances

Or I personally know people infected with COVID-19 who are my: (select all that apply) = Housemates

19. Have any of these been hospitalised as a result of COVID-19?

- a. Yes
- b. No

Display This Question:

If I personally know people infected with COVID-19 who are my: (select all that apply) = Immediate family members

Or I personally know people infected with COVID-19 who are my: (select all that apply) = Close friends

Or I personally know people infected with COVID-19 who are my: (select all that apply) = Colleagues/acquaintances

Or I personally know people infected with COVID-19 who are my: (select all that apply) = Housemates

20. Have any of these died as a result of COVID-19?

- a. Yes
- b. No

21. To date how many residents with confirmed COVID-19 have you personally attended to?

- a. None
- b. 1-10
- c. 11-20
- d. 21-40
- e. >40

d. WHO Well-being Index

We'd like to ask some questions about how you have been feeling recently.

Choose the options that best describe you.

Please indicate for the five statements beneath, which is closest to how you have been feeling over the past two weeks.

22. I have felt active and vigorous

- a. At no time
- b. Some of the time
- c. Less than half the time

- d. More than half the time
- e. Most of the time
- f. All of the time

23. I have felt calm and relaxed

- a. At no time
- b. Some of the time
- c. Less than half the time
- d. More than half the time
- e. Most of the time
- f. All of the time

24. I have felt cheerful and in good spirits.

- a. At no time
- b. Some of the time
- c. Less than half the time
- d. More than half the time
- e. Most of the time
- f. All of the time

25. I woke up feeling fresh and rested

- a. At no time
- b. Some of the time
- c. Less than half the time
- d. More than half the time
- e. Most of the time
- f. All of the time

26. My daily life has been filled with things that interest me.

- a. At no time
- b. Some of the time
- c. Less than half the time

- d. More than half the time
- e. Most of the time
- f. All of the time

e. Work Ability

How would you describe your current work-ability* compared with your lifetime best? Assume that your work ability at its best has a value of 10 points and that 0 means that you cannot work at all. Please select a value.

*Work ability - Described as the balance of a worker's resources and work demands. For example, think about any job you ever had (not necessarily medical) where you felt really on top of things, were enjoying your work immensely and learning new things. This would give you a value of 10.

27. Select from 0-10 and then click the right arrow at the bottom to continue

0 1 2 3 4 5 6 7 8 9 10

f. IES-R

We'd like to ask some questions about how the COVID-19 outbreak itself has affected your mental health. Choose the options that best describe you. Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to the COVID-19 outbreak. How much were you distressed or bothered by these difficulties?

28. Any reminder brought back feelings about it.

- a. Not at all
- b. A little bit
- c. Moderately

- d. Quite a bit
- e. Extremely

29. I had trouble staying asleep.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

30. Other things kept making me think about it.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

31. I felt irritable and angry.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

32. I avoided letting myself get upset when I thought about it or was reminded of it.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

33. I thought about it when I didn't mean to.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

34. I felt as if it hadn't happened or wasn't real.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

35. I stayed away from reminders of it.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

36. Pictures about it popped into my mind.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

37. I was jumpy and easily startled.

- a. Not at all

- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

38. I tried not to think about it.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

39. I was aware that I still had a lot of feelings about it, but I didn't deal with them.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

40. My feelings about it were kind of numb.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

41. I had some thoughts about wanting to end my life.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit

- e. Extremely

42. I thought about developing a plan to end my life.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

43. I found myself acting or feeling like I was back at that time.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

44. I had trouble falling asleep.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

45. I had waves of strong feelings about it.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

46. I tried to remove it from my memory.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

47. I had trouble concentrating.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

48. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea or a pounding heart.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

49. I had dreams about it.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

50. I felt watchful and on-guard.

- a. Not at all
- b. A little bit
- c. Moderately

- d. Quite a bit
- e. Extremely

51. I tried not to talk about it.

- a. Not at all
- b. A little bit
- c. Moderately
- d. Quite a bit
- e. Extremely

g. Moral Injury Events Scale

Please indicate how much you agree/disagree with each of the following statements regarding your experience at any time during the COVID-19 outbreak.

52. I saw things that were morally wrong.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

53. I am troubled by having witnessed others' immoral acts.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree

- f. Strongly agree

54. I acted in ways that violated my own moral codes or values.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

55. I am troubled by having acted in ways that violated my morals or values.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

56. I violated my own morals by failing to do something I felt I should have done.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

57. I am troubled because I violated my morals by failing to do something I felt I should have done.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree

- e. Agree
- f. Strongly agree

58. I feel betrayed by leaders at work who I once trusted.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

59. I feel betrayed by fellow healthcare workers who I once trusted.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

60. I feel betrayed by others outside the hospital who I once trusted.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

h. Perceptions of the COVID-19 pandemic

Below is a list of thoughts you may have had about your COVID-19 outbreak experience.

Please read each item, and then indicate how much you agree/disagree with it.

61. I have been afraid of falling ill with COVID-19

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

62. Emotional support is available at work for those who need help.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

63. I have been most concerned about passing COVID-19 onto my family members.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

64. People close to me have been worried about my health.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree Chapter 0

65. I think that there is more conflict amongst colleagues at work.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

66. I believe that face masks are useful in protecting myself against COVID-19 at work.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

67. I believe that there was adequate training provided to me at work in the use of personal protective equipment (PPE)

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

68. I have personally coped with the COVID-19 situation by avoiding colleagues who may be exposed

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

69. I believe that regular hand washing is useful in protecting myself against COVID-19.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

70. I think that people have avoided me because of my job.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

71. I have had to do work that I don't usually do.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

72. I feel that personal protective measures at work are generally effective.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

73. I have avoided telling other people about the nature of my job.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

74. Because I wanted to help COVID-19 patients, I was willing to accept the risks involved

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

75. I believe that disposable eye shields or goggles are useful in protecting myself from COVID-19

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree

- e. Agree
- f. Strongly agree

76. I think that I have had an increase in my workload.

- a. Strongly disagree
- b. Disagree
- c. Not sure but probably disagree
- d. Not sure but probably agree
- e. Agree
- f. Strongly agree

i. Coping with the COVID-19 outbreak

We'd like to ask some questions about how you have been coping dealing with the COVID-19 outbreak. Choose the options that best describe you. The following items deal with ways in which you have been coping with stress in your life during the COVID-19 outbreak. Using the 4 point scale, indicate the extent to which you have been doing what the item says. Please do not answer on the basis of whether it seems to be working or not - just whether you are doing it.

77. I've been turning to work or other activities to take my mind off things.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

78. I've been concentrating my efforts on doing something about the situation I'm in.

- a. I haven't been doing this at all

- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

79. I've been saying to myself 'this isn't real'

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

80. I've been using alcohol or drugs to make myself feel better.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

81. I've been getting emotional support from others.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

82. I've been giving up trying to deal with it.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

83. I've been taking action to try make the situation better.

- a. I haven't been doing this at all
- b. I've been doing this a little bit

- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

84. I've been refusing to believe that it has happened.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

85. I've been saying things to let my unpleasant feelings escape.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

86. I've been getting help and advice from other people.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

87. I've been using alcohol or other drugs to help me get through it.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

88. I've been trying to see it in a different light, to make it seem more positive.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.

- d. I've been doing this a lot.

89. I've been criticising myself.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

90. I've been trying to come up with a strategy about what to do.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

91. I've been getting comfort and understanding from someone.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

92. I've been giving up the attempt to cope.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

93. I've been looking for something good in what is happening.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

94. I've been making jokes about it.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

95. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping or shopping

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

96. I've been accepting the reality of the fact that it has happened.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

97. I've been expressing my negative feelings.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

98. I've been trying to find comfort in my religion or in my spiritual beliefs.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

99. I've been trying to get advice or help from other people about what to do

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

100. I've been learning to live with it.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

101. I've been thinking hard about what steps to take.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

102. I've been blaming myself for things that happened.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

103. I've been praying or meditating.

- a. I haven't been doing this at all
- b. I've been doing this a little bit
- c. I've been doing this a medium amount.
- d. I've been doing this a lot.

104. I've been making fun of the situation.
- a. I haven't been doing this at all
 - b. I've been doing this a little bit
 - c. I've been doing this a medium amount.
 - d. I've been doing this a lot.

Additional Comments

PLEASE NOTE: Your survey has not been submitted yet. If you do not wish to enter any comments, please click next to continue. You will need to go to the next page to submit your survey.

105. We encourage you to use the space below to add any comments you may have about any aspect of your wellbeing, mental health, stress, measures to prevent stress, access to supports, how the COVID-19 outbreak has affected you and any other issues you believe are relevant to this study. We would ask that you not reveal any potentially identifying information about yourself or others in your responses. By submitting an open text response in the below box, you are providing consent to quotation/publication of extracts from my open-ended responses.

We plan to repeat this survey in 6 months to see how your concerns are changing over time. You may like to be able to link your anonymous information provided today to this future second survey, which will also be anonymous. To link today's survey to the second survey, you can create your own self-generated unique identification number which can be re-created and used by yourself at a later date.

If you do not wish to create a self-generated identification number, please ignore the following questions and click the arrow below to submit your answers.

- 106. How many living siblings do you have? (0-20)
- 107. Where do you come in your family? (First born, second, third, etc)
- 108. How many pet dogs and cats do you have where you live now? (e.g. 0-20)
- 109. Enter the last two numbers in your year of birth (e.g. 1962)
- 110. Enter the last two numbers in the year you finished secondary school: (e.g. 1980)
- 111. Enter the last two numbers in your mobile phone number: (e.g. 087 36709**04**)

Appendix IV: Signposting to psychological supports

Helpful, user-friendly, information about managing your mental health and wellbeing can be found at Healthy Ireland (<https://www.gov.ie/en/campaigns/healthy-ireland/?referrer=http://www.gov.ie/en/campaigns/together/>).

Through participation in this survey study, you may recognise that you have been experiencing difficulties during the COVID-19 outbreak. Mental health supports and services will be available through:

- your own General Practitioner (GP)
- the Occupational Health service where you work
- a wide range of online, phone, text and email supports and services can be found at Mental health supports during COVID-19 (<https://www2.hse.ie/services/mental-health-supports-and-services-during-coronavirus/#online-supports> [link now defunct]).

Information on post-traumatic stress disorder is available here

(<https://www.rcpsych.ac.uk/mental-health/problems-disorders/post-traumatic-stress-disorder>).

Appendix V: Appearance of survey on desktop and mobile

a. Desktop appearance



We'd like to start by asking some questions about you and your current job. Choose the options that best describe you.

What age are you now?

25 or under

☐

26-30

☐

31-40

☐

41-50

☐

51-60

☐

60+

☐

b. Mobile appearance

12:29



We'd like to start by asking some questions about you and your current job. Choose the options that best describe you.

What age are you now?

25 or under

☐

26-30

☐

31-40

☐

41-50

☐

Appendix VI: St Patrick's Mental Health Services Research Ethics Committee approval letter

www.stpatricks.ie

St Patrick's
Mental Health Services



PRIVATE & CONFIDENTIAL

November 18, 2020

Dr Conan Brady
Clinical Research Fellow
St Patrick's Mental Health Services

Re: COWORKER Nursing Home Study: Effects of COVID-19 on the mental health of nursing home workers in Ireland (Protocol 16/20)

Dear Dr Brady,

Thank you for your application to the St Patrick's Mental Health Services Research Ethics Committee, which I received on November 7, 2020.

Your study has been assigned the **Protocol Number 16/20** and we would ask you to include this reference on all future correspondence related to this study.

At your request, due to the urgent nature of your study, a subcommittee of the Research Ethics Committee reviewed your application and I am pleased to inform you that **your application was granted chair approval** to commence.

Approval was granted subject to the following standard conditions:

1. You must adhere fully to the terms and conditions set out in your research protocol.
2. All persons involved in this research who are not employees of St Patrick's Mental Health Services are required to obtain an honorary contract from the hospital. This process should be initiated by the study supervisor. It will be your responsibility to ensure that these contracts are renewed and kept up-to-date as necessary throughout the duration of your study.
3. If there are any material changes to be made to Protocol 16/20 in the next 12 months, you must contact the Research Ethics Committee for approval.
4. You must report back to the Research Ethics Committee no later than 12 months subsequent to this approval letter (November 18, 2021), with a summary report on the progress of this research. This report can be downloaded from the hospital website. Failure to complete this report may result in ethical approval being withdrawn for your research.
5. The committee encourages all researchers to publish the results of their study once it is completed, whether these appear to be positive or negative. We expect to receive copies of your publication(s), presentations and posters that are presented by you and your team.

St Patrick's Mental Health Services – Research Ethics Committee

Please reply to: James Braddock, Research Ethics Committee Administrator, St Patrick's Mental Health Services
P.O. Box 136, James's Street, Dublin 8 (Tel: (01) 2493345; email: jbraddock@stpatsmail.com)

St Patrick's Mental Health Services is an independent not-for-profit charitable trust. Registered in Ireland CHY209



6. The Irish Data Protection Act 2018 gives further effect under national law to the GDPR regulations that became enforceable on the 25th May 2018. Subsequently, the Health Research Regulations were incorporated into the Irish Data Protection Act 2018 under Section 36(2) and came into force on August 8th, 2018. You are encouraged to review the information available on the Health Research Board website: <http://www.hrb.ie/funding/gdpr-guidance-for-researchers/>. Your submission has been reviewed by the Research Ethics Committee from an ethical perspective only and this approval is not, and should not be, regarded as evidence of compliance with the above legislation. Please note it is the responsibility of the researchers, specifically the data controller and the principal investigator, to ensure and monitor compliance with the relevant data protection legislation.
7. Please complete the attached form and send it via email to regionallibrary@hse.ie. The Directorate of Clinical and Quality Care in the HSE have requested that details of all research projects in Ireland be pooled together in one location, namely, www.lenus.ie, for the purpose of promoting a culture of research and in order to deliver evidence based clinical care. The HSE hope to gain a complete picture of the quality and quantity of healthcare and healthcare-related research in Ireland, and St. Patrick's Mental Health Services have agreed to cooperate with this process. This repository of research activity is managed by Health Librarians based in Dr Steevens' Hospital, and we thank you in advance for emailing this relatively simple form to them at your convenience.

We also wish to notify you that there is an effort to create a national repository of all research relating to COVID-19. Please find attached a letter and template from the National Research Ethics Committee for COVID-19 studies, inviting you to submit details of your study to this repository. The St Patrick's Mental Health Services Research Ethics Committee support this initiative and encourage you to contribute towards it.

In addition, the Committee noted the following typographical error:

- In the Patient Information Leaflet, 'your computer ID address will not be recorded' should read 'your computer **IP** address will not be recorded'.

The full Research Ethics Committee will review the application at their next meeting and if any further comments are made, you will be informed of these. Notwithstanding this, approval is granted to start your research immediately.

Thank you for your cooperation and we wish you well in your research.

With very best wishes.

Yours sincerely,

James Braddock
Research Ethics Committee Administrator
St Patrick's Mental Health Services Research Ethics Committee

cc. *Prof. Declan McLoughlin, Principal Investigator*

Encl.

a. Survey 1



COWORKER
Nursing Home

COWORKER Nursing Home: Effects of COVID-19 on the mental health of nursing home staff in Ireland – a national survey

We are conducting research into the wellbeing of nursing home staff in Ireland during the global pandemic of COVID-19.

We are inviting **ALL STAFF** in nursing homes in Ireland affiliated with Nursing Homes Ireland to complete a short survey.

The survey takes only 10-15 minutes to complete and is completely anonymous. We believe this study is very important as it will help to support staff for the remainder of the pandemic and during any similar incidents in the future.

For more details and to join in see coworkersurvey.org/nursinghomes

Or simply scan this QR code with your phone camera:



If you would like to take part or have any questions, please contact the research team at COWORKER@tcd.ie

“The overall level of upset suffered by...staff connected with these nursing homes cannot be overstated”
- COVID-19 Nursing Homes Expert Panel Report, August 2020

 Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

 **nhi**

 St Patrick's
Mental Health Services

 **RCSI**
RÉPUBLIQUE D'IRLANDE
ROYAL COLLEGE OF PHYSICIANS
HOSPITAL MEDICAL SOCIETY OF IRELAND

 **UCD**
University College Dublin
Ireland's Global University

COWORKER NURSING HOME SURVEY

TELL THE WORLD HOW YOU'RE FEELING

*We are conducting research into the wellbeing of **ALL** nursing home staff in Ireland during the pandemic.*

Scan with your camera



NOW OPEN TO ALL STAFF INCLUDING
THOSE WHO COMPLETED PHASE 1
15-20 MINUTE SURVEY
EMAIL COWORKER@TCD.IE
COWORKERSURVEY.ORG/NURSINGHOMES

Appendix VIII: Publication: Nursing home staff mental health during the COVID-19 pandemic in the Republic of Ireland



Received: 13 May 2021 | Accepted: 31 October 2021
DOI: 10.1002/gps.5648

RESEARCH ARTICLE

International Journal of
Geriatric Psychiatry WILEY

Nursing home staff mental health during the Covid-19 pandemic in the Republic of Ireland

Conan Brady¹ | Caoimhe Fenton¹ | Orlaith Loughran¹ | Blánaid Hayes² |
Martina Hennessy³ | Agnes Higgins⁴ | Iracema Leroi⁵ | Deirdre Shanagher⁶ |
Declan M. McLoughlin¹

¹Department of Psychiatry and Trinity College
Institute of Neuroscience, Trinity College
Dublin, St Patrick's University Hospital, Dublin,
Ireland

²Beaumont Hospital, Royal College of
Surgeons, Dublin, Ireland

³WellcomeTrust/Health Research Board
Clinical Research Facility, Trinity College
Dublin, St James's Hospital, Dublin, Ireland

⁴School of Nursing and Midwifery, Trinity
College Dublin, Dublin, Ireland

⁵Global Brain Health Institute, Trinity College
Institute of Neuroscience, Trinity College
Dublin, Dublin, Ireland

⁶Nursing Homes Ireland, Dublin, Ireland

Correspondence

Declan M. McLoughlin, Department of
Psychiatry, Trinity College Dublin, St Patrick's
University Hospital, Dublin 8, Ireland.
Email: d.mcloughlin@tcd.ie

Abstract

Background: Nursing homes for older adults have been disproportionately affected by the Covid-19 pandemic with increased mortality of residents and staff distress.

Objective: To quantify the mental health of nursing home staff during the Covid-19 pandemic in the Republic of Ireland.

Design/Methods: Cross-sectional anonymous study of Republic of Ireland nursing home staff ($n = 390$) during the third wave of the Covid-19 pandemic. Online survey collecting demographic information, Covid-19 exposure history and mental health measures.

Results: There were significant differences between nurses, healthcare assistants (HCA) and non-clinical staff history in age, ethnicity, years' experience, history of Covid-19 infection and contact with Covid-19 positive acquaintances. Moderate-severe post-traumatic stress disorder symptoms were found in 45.1% (95% confidence interval [CI] 40.2%–50.1%) of all staff. A World Health Organisation-5 (WHO-5) wellbeing index score ≤ 32 , indicating low mood, was reported by 38.7% (95% CI, 33.9%–43.5%) of staff; significantly more nurses reported low mood. Suicidal ideation and suicide planning were reported, respectively, by 13.8% (95% CI, 10.4%–17.3%) and 9.2% (95% CI, 6.4%–12.1%) of participants with no between-group differences. HCAs reported a significantly higher degree of moral injury than non-clinical staff. Nurses were more likely to use approach coping styles than non-clinical staff. Work ability was insufficient in 24.6% (95% CI 20.3%–28.9%) of staff.

Conclusion: Nursing home staff report high levels of post-traumatic stress, mood disturbance and moral injury during the Covid-19 pandemic. Differences in degree of moral injury, wellbeing and coping styles were found between staff groups, which need to be incorporated into planning supports for this neglected workforce.

KEYWORDS

Covid-19, mental health, moral injury, nursing homes, post-traumatic stress

Key points

- There are high prevalences of post-traumatic stress symptoms and low mood and a high degree of moral injury in Irish nursing home staff during the Covid-19 pandemic

- High prevalences of suicidal ideation (13.8%) and planning (9.2%) were reported during the previous week
- Significantly, more nurses than other staff groups reported poor wellbeing but nurses were more likely to use adaptive coping styles than non-clinical staff
- Healthcare assistants reported significantly higher levels of moral injury than non-clinical staff

1 | INTRODUCTION

Nursing homes for older adults have been disproportionately affected by the Covid-19 pandemic.¹ In Western Europe and the United States, the deleterious impact on nursing homes became evident during the pandemic's first wave. By the end of the first wave, in mid-2020, nursing home residents accounted for 40% of Covid-19 deaths in the United States, 56% in Ireland, 47% in the United Kingdom and 40% in Italy.²⁻⁴ Nursing home residents are at higher risk of severe infection and mortality due to older age, common comorbidities, and the tendency towards high transmission rate of infectious diseases in congregate settings.^{7,8} Consequently, significant changes in care and practice have been introduced in nursing homes, for example, banning group activities, visiting restrictions and increased use of personal protective equipment.⁴

The combined stresses of witnessing deaths of residents in a rapidly changing work environment, while living in a heavily restricted society, could adversely affect nursing home staff mental health.⁴ Qualitative studies have revealed high degrees of perceived distress.⁹⁻¹¹ However, to our knowledge, there has to date been only one quantitative study of nursing home staff, from Italy following the pandemic's first wave.¹² This study ($n = 1069$) focused on symptoms of generalised anxiety disorder and post-traumatic stress disorder (PTSD) and estimated the prevalence of moderate-to-severe symptoms of either disorder at 43% (95% confidence interval [CI], 37%-49%).¹² Outside of nursing homes, much of the research to date has focused on hospital workers. A recent meta-analysis of studies in hospital healthcare workers (HCWs) during the Covid-19 pandemic found that the estimated pooled prevalence of PTSD symptoms was 21.5% (95% CI, 11.2%-31.8%), raising the possibility that nursing home staff may be even more distressed than hospital staff.^{12,13}

Of increasing interest is moral injury in HCWs, that is, distress experienced when an individual witnesses or engages in acts that contradict their moral and ethical beliefs.¹⁴ This has traditionally been studied in military populations exposed to combat but severe difficulties in providing optimal care during a pandemic could provoke similar reactions in HCWs.^{15,16} Surveys of US hospital workers have demonstrated high levels of moral injury over the course of the Covid-19 pandemic.^{16,17}

Considering these international findings, we aimed to estimate the levels of post-traumatic stress and wellbeing in nursing home staff in the Republic of Ireland during the Covid-19 pandemic. We also appraised self-rated suicidal ideation and planning, moral injury, coping styles, perceptions about the pandemic and work ability.

Finally, we explored if there were differences in these problems between different types of staff.

2 | METHODS

2.1 | Study design and setting

This cross-sectional, online, anonymous survey was approved by St. Patrick's Mental Health Services Research Ethics Committee. There are 578 nursing homes in the Republic of Ireland; the majority are in the private sector.¹⁸ The nursing homes selected were those long-term residential care facilities for older adults with onsite nursing support affiliated with Nursing Homes Ireland (NHI, www.nhi.ie), the national representative body for the private and voluntary nursing home sector, representing 90% of such nursing homes in the state. All nursing homes on the NHI mailing list were contacted ($n = 394$). Convenience sampling was used with staff self-selecting for participation. Information directing participants towards psychological supports was provided.

2.2 | Recruitment and data collection

Nursing homes were recruited from across the Republic of Ireland for six weeks from 20 November 2020 to 4 January 2021 during the third wave of Covid-19 in Ireland.¹⁹ Persons-in-charge (PICs) in all 394 NHI-affiliated nursing homes were contacted via email, telephone and post and asked to inform their staff about the survey. The survey was also advertised on NHI's social media accounts.

Data were collected online using Qualtrics Core XM (Qualtrics). Participation was voluntary. Participant information was provided and consent obtained at the survey beginning. PICs who agreed to participate were also asked to complete an online anonymous form on Google Forms (Google) giving a simple breakdown of staff numbers in their nursing home by role. This also provided information on the number of nursing homes where the survey was promoted by PICs.

2.3 | Measures

Basic demographic information was recorded along with profession, regional work location, years of experience, living arrangements, pre-

existing medical and psychiatric conditions, extent of exposure to Covid-19, quarantine experience and history of contact with Covid-19-positive acquaintances.

The 22-item Impact of Event Scale-Revised (IES-R) was used to assess post-traumatic stress symptoms over the previous seven days with subscales corresponding to the three symptom domains of PTSD (hyperarousal, intrusion and avoidance); a cut-off of ≥ 26 indicated the presence of moderate-severe symptoms.²⁰ Staff wellbeing was assessed with the World Health Organisation's Well-Being Index (WHO-5), a five-item self-rated measure that asks staff to report how they have been feeling over the past 2 weeks; a score of 21–32 indicates low mood and a score ≤ 20 indicates likely depression.²¹ Suicidal ideation and planning over the previous 7 days were appraised using two Likert scale items derived from the Columbia Suicide Severity Rating Scale (C-SSRS); responses were dichotomised based on presence/absence of suicidal ideation or planning.²² Moral injury was assessed using the Moral Injury Events Scale (MIES), adapted for healthcare staff during the Covid-19 pandemic; this nine-item scale was originally developed to assess moral injury in combat veterans.¹⁴ Staff were asked if they agreed with statements relating to moral injury over the course of the Covid-19 outbreak. The scale has three subdomains: 'Perceived transgressions by self' (i.e., where staff felt they had violated their own moral code), 'Perceived transgressions by others' (i.e., where staff believed they had witnessed others act in a way that violated their moral beliefs) and 'Betrayal' (i.e., perceived betrayal by previously trusted leadership). The Brief Coping Orientation to Problems Experienced (Brief-COPE) Scale was used to survey staff adaptive (approach; range 12–48) and maladaptive (avoidance; range 12–48) coping responses; staff were asked to identify which coping styles they had used over the course of the pandemic.²³ This scale also includes items for humour and religion.

We included a 15-item questionnaire adapted from a study assessing HCW perceptions of the Severe Acute Respiratory Syndrome (SARS) outbreak.²⁴ This comprised three Likert scale items for each of the following groups of perceptions: health fear, social isolation, doubts about protective equipment, adequacy of training and support and job stress.²⁵ Items were rated 1–6; higher scores indicated higher levels of dissatisfaction with each statement. We included an additional Likert scale item assessing altruistic acceptance of risk; this was rated 1–6 with higher scores indicating higher degrees of altruism. A sense of altruism has been reported to mediate the psychological impact of infectious disease outbreaks on HCWs.²⁶

We assessed staff perceptions of work ability using the Work Ability Score (WAS), derived from the Work Ability Index (WAI), an occupational health instrument for identifying staff in need of supportive measures.²⁷ This asks participants to rate their current ability to cope with work demands compared to their lifetime best on a scale of 1–10, with 10 being their lifetime best; a score ≤ 5 indicates insufficient perceived work ability. A free text response box was provided at the end of the survey; analysis of these qualitative data will be separately reported.

2.4 | Statistical analysis

Data were analysed in Excel (Microsoft) and SPSS 26 (IBM). Using a 95% CI with a 5% margin of error, our minimum sample size was determined to be 360 based on previous literature demonstrating that 39% of nursing home staff scored ≥ 26 on the IES-R during the Covid-19 pandemic.¹² We examined demographic characteristics of the sample divided into three groups: nurses, healthcare assistants (HCA) and non-clinical staff. These groups were further categorised based on cut-off scores for the WHO-5, IES-R and WAS and the presence/absence of suicidal ideation or planning. Chi-square tests were used to analyse categorical variables and one-way ANOVAs for means. Post-hoc analyses were performed for significant between-group differences. Significance level was set at 0.05. We did not adjust for multiple testing but regression analysis was performed using a generalised linear model to adjust for significant differences in demographic features (i.e., age, years of experience, ethnicity), personal Covid-19 infection history and exposure to Covid-19-infected acquaintances. Data are reported as means (standard deviation) and proportions (percentages) as appropriate.

3 | RESULTS

3.1 | Study participants

PICs from 64 (16.5%) of 394 relevant nursing homes provided information on staff ($n = 3816$) breakdown (Table 1). The total number of survey participants was 390 (10.2%), comprising 120 nurses, 172 HCAs and 98 non-clinical staff, representing 16.2%, 8.9% and 8.5% of each occupational group, respectively. The geographical distribution of survey participants corresponding to regional populations is shown in Table 1.

Demographic characteristics of survey participants are summarised in Table 2. Most nursing home staff were female (86.4%), lived with their family (80%) and were of white Irish/British origin (83.3%). The majority of staff had no pre-existing physical illness (67.4%) or mental illness (77.9%). There were significant differences between nurses, HCAs and non-clinical staff in age ($p < 0.001$), ethnicity ($p < 0.001$) and years' experience ($p < 0.001$). HCAs were proportionally the youngest group. There were significantly more HCAs aged ≤ 30 ($z = 4.6$; Table S1) and significantly fewer HCAs aged ≥ 51 ($z = -4.4$). Significantly fewer nurses were of white ethnicity ($z = -3.5$) and non-clinical staff were more likely to be of white ethnicity ($z = 4.5$). Nurses were less likely to report < 5 years' experience ($z = -6.1$) and more likely to report ≥ 10 years' experience ($z = 5.4$).

3.2 | Exposure to Covid-19

Nursing home staff experience of exposure to Covid-19 is presented in Table 3. Almost one-third of staff reported having quarantined

TABLE 1 Number of staff in participating nursing homes, survey participants and location of participants' nursing homes in the Republic of Ireland, by role

	Total	Nurses	HcAs	Non-clinical
Total number of staff in the 64 participating nursing homes, n (%)	3816 (100%)	741 (19.4%)	1931 (50.6%)	1144 (30.0%)
Mean number of staff in each nursing home, Mean (SD)	59.6 (33.9)	11.6 (6.7)	30.2 (17.9)	17.9 (11.0)
Survey participants, n (% of total number of participants)	390 (100%)	120 (30.8%)	172 (44.1%)	98 (25.1%)
Participants' nursing home location by province*, n (%)				
Connacht (11.7%)	70 (17.9%)	23 (19.2%)	29 (16.9%)	18 (18.4%)
Leinster (56.0%)	173 (44.4%)	53 (44.2%)	78 (45.3%)	42 (42.9%)
Munster (27.3%)	131 (33.6%)	38 (31.7%)	57 (33.1%)	36 (36.7%)
Ulster (5.0%)	16 (4.1%)	6 (5.0%)	8 (4.7%)	2 (2.0%)

Abbreviations: HCAs, healthcare assistants; SD, standard deviation.

*Populations of provinces given as percentage of total population of the Republic of Ireland (4.9 million).

(31.3%). A majority reported no history of Covid-19 infection (80.3%). Of those who had contracted Covid-19, only 4.8% reported having symptoms for ≥ 9 weeks but 33.8% reported not having fully recovered. Most nursing home staff reported no history of caring for residents with Covid-19 (63.9%), although 67% reported contact with Covid-19-infected acquaintances. There were significant differences between groups in their history of Covid-19 infection ($p = 0.001$) and contact with Covid-19-positive acquaintances ($p = 0.001$). Nursing staff were more likely ($z = 3.9$; Table S2) and HCAs were less likely ($z = -2.4$) to have had exposure to Covid-19-positive acquaintances. Significantly fewer non-clinical staff had contracted Covid-19 ($z = -3.6$).

3.3 | Mental health measures

Mental health outcomes are summarised in Table 4. The prevalence of all staff meeting the threshold for moderate-severe PTSD symptoms was 45% (95% CI 40%–50%) with no significant differences between groups for total or subdomain IES-R scores.

The number of staff reporting a WHO-5 score ≤ 32 , indicating poor wellbeing, was 38.7% (95% CI 33.9%–43.6%). Significant differences between groups were noted ($p = 0.015$), with more nurses reporting poor wellbeing ($z = 2.6$; Table S3) and more HCAs reporting normal wellbeing ($z = 3.1$). Scores consistent with likely major depression (WHO-5 ≤ 20) were reported by 20% (95% CI 16%–24%) with no differences between groups.

Thoughts of suicide were reported by 13.8% (95% CI 10%–17%) of staff over the past 7 days and 9% (95% CI 6%–12%) reported at least some planning to end their lives, with no differences between groups. With regards to the severity of suicidal ideation and planning, 10 staff (2.5%) reported having suicidal ideation 'Quite a bit' or 'Extremely'; 8 staff (2.1%) reported having similar levels of suicidal planning (see Figures S1 and S2). There were no significant differences between groups by role in terms of the severity of suicidal ideation or planning.

Moral Injury Events Scale (MIES) mean score for the total group was 20.8 (9.1); of the subdomains, the mean 'Transgression by others'

score was 5.9 (3.0); 'Transgression by self' mean was 7.9 (4.8); and the 'Betrayal' mean was 7.4 (4.0). There were significant differences between groups on the MIES total score ($p = 0.027$, adjusted $p = 0.038$) and the MIES 'Transgression by others' subscale ($p = 0.030$, adjusted $p = 0.048$). HCAs reported a significantly higher degree of moral injury than non-clinical staff (mean difference [MD] = 3.3, standard error [SE] = 1.2; Table S4) and a significantly higher 'Transgression by others' score than non-clinical staff (MD = 1.0, SE = 0.381). A difference between groups was noted on the MIES betrayal subscale; however, this did not survive adjustment.

The groups differed in use of approach (adaptive) coping style ($p = 0.001$, adjusted $p = 0.045$), with nurses using an approach (adaptive) coping style more than non-clinical staff (MD = 4.2, SE = 1.09; Table S5). There was a significant difference for use of religion as a coping mechanism but this did not survive adjustment ($p = 0.049$, adjusted $p = 0.116$). There were no differences noted for using avoidant (maladaptive) coping styles or humour.

On average, staff broadly agreed with statements regarding fear of contracting Covid-19 and job-related stress (Table 4). To a slightly lesser extent, they also agreed with statements indicating a degree of concern about social stigma and social isolation in relation to work. They expressed less concern about nursing home systems and processes in place in relation to the pandemic and infection protection measures (i.e., face masks, eye shields and handwashing). They agreed with an altruistic statement about accepting risks involved in caring for residents with Covid-19. There were no significant differences between groups regarding these perceptions.

Work ability, as self-rated by the Work Ability Score, was deemed insufficient by 24.6% (95% CI 20.3%–28.9%) of staff, with no differences between groups.

4 | DISCUSSION

This is the first systematically conducted study of Republic of Ireland nursing home staff experience during the Covid-19 pandemic and only the second such report internationally despite

TABLE 2 Demographic characteristics of nursing home staff, by role

	Total n (%)	Nurses n (%)	HCAs n (%)	Nonclinical n (%)	Chi square	
					χ^2	p value
Total	390 (100%)	120 (30.8%)	172 (44.1%)	98 (25.1%)		
Age (years)						
≤30	85 (21.8%)	13 (10.8%)	56 (32.6%)	16 (16.3%)		
31–50	187 (47.9%)	59 (49.2%)	84 (48.8%)	44 (44.9%)		
≥51	118 (30.3%)	48 (40%)	32 (18.6%)	38 (38.8%)	31.192	<0.001
Gender						
Female	337 (86.4%)	106 (88.3%)	148 (86.0%)	83 (84.7%)		
Male	50 (12.8%)	14 (11.7%)	22 (12.8%)	14 (14.3%)		
Prefer not to say	3 (0.8%)	0 (0.0%)	2 (1.2%)	1 (1.0%)	1.757 ^a	0.836
Living arrangements						
Alone	24 (6.2%)	11 (9.2%)	8 (4.7%)	5 (5.1%)		
With family	312 (80.0%)	89 (74.2%)	144 (83.7%)	79 (80.6%)		
With roommates	21 (3.6%)	7 (5.8%)	12 (7.0%)	2 (2.0%)		
Other	33 (8.5%)	13 (10.8%)	8 (4.7%)	12 (12.2%)	11.686	0.069
Ethnicity						
Asian/Asian Irish	21 (5.4%)	19 (15.8%)	2 (1.2%)	0 (0.0%)		
Black/Black Irish	12 (3.1%)	1 (0.8%)	11 (6.4%)	0 (0.0%)		
Mixed race	2 (0.5%)	1 (0.8%)	1 (0.6%)	0 (0.0%)		
Other	6 (1.5%)	2 (1.7%)	4 (2.3%)	0 (0.0%)		
SE Asian/SE Asian Irish	17 (4.4%)	8 (6.7%)	7 (4.1%)	2 (2.0%)		
White—Irish/British/Other	325 (83.3%)	88 (73.3%)	141 (82.0%)	96 (98.0%)		
Prefer not to say	7 (1.8%)	1 (0.8%)	6 (3.5%)	0 (0.0%)	23.962 ^c	<0.001
Years of experience						
<5 years	164 (42.1%)	23 (19.2%)	98 (57.0%)	43 (43.9%)		
5–10 years	76 (19.5%)	27 (22.5%)	26 (15.1%)	23 (23.5%)		
>10 years	150 (38.5%)	70 (58.3%)	48 (27.9%)	32 (32.7%)	45.339	<0.001
Physical illness—pre-existing ^b						
Cancer	3 (0.8%)	2 (1.7%)	0 (0.0%)	1 (1.0%)		
Cardiovascular disease	42 (10.8%)	18 (15.0%)	15 (8.7%)	9 (9.2%)		
Immunosuppression	3 (0.8%)	1 (0.8%)	1 (0.6%)	1 (1.0%)		
Metabolic disease	31 (7.9%)	13 (10.8%)	14 (8.1%)	4 (4.1%)		
Respiratory disease	38 (9.7%)	14 (11.7%)	18 (10.5%)	6 (6.1%)		
Other	33 (8.5%)	12 (10.0%)	10 (5.8%)	11 (11.2%)		
None	263 (67.4%)	71 (59.2%)	121 (70.3%)	71 (72.4%)	5.523 ^d	0.063
Mental illness—pre-existing ^b						
Anxiety disorder	62 (15.9%)	9 (7.5%)	38 (22.1%)	15 (15.3%)		
Mood disorder	47 (12.1%)	12 (10.0%)	26 (15.1%)	9 (9.2%)		

(Continues)

TABLE 2 (Continued)

	Total n (%)	Nurses n (%)	HCA's n (%)	Nonclinical n (%)	Chi square	
					χ^2	p value
Other	8 (2.1%)	4 (3.3%)	2 (1.2%)	2 (2.0%)		
None	304 (77.9%)	100 (83.3%)	127 (73.8%)	77 (78.6%)	3.738 ^d	0.154

Abbreviations: HCAs, Healthcare Assistants; SE Asian, Southeast Asian.

^aFisher's exact test.

^bRespondents could pick multiple answers.

^cDichotomised for analysis ('White' and 'Non-White').

^dDichotomised for analysis (presence or absence of a pre-existing condition).

TABLE 3 Nursing home staff exposure to Covid-19, by role

	Total n (%)	Nurses n (%)	HCA's n (%)	Nonclinical n (%)	Chi-square	
					χ^2	p value
Total	390 (100%)	120 (30.8%)	172 (44.1%)	98 (25.1%)		
Number of Covid-19 positive residents personally attended to						
None	249 (63.8%)	68 (56.7%)	106 (61.6%)	75 (76.5%)		
1-10	67 (17.2%)	27 (22.5%)	28 (16.3%)	12 (12.2%)		
11-20	35 (9.0%)	10 (8.3%)	21 (12.2%)	4 (4.1%)		
21-40	34 (8.7%)	12 (10.0%)	16 (9.3%)	6 (6.1%)		
>40	5 (1.3%)	3 (2.5%)	1 (0.6%)	1 (1.0%)	14.458 ^a	0.055
Previously self-quarantined, n (%)	122 (31.3%)	44 (36.7%)	54 (31.4%)	24 (24.5%)	3.723	0.155
Previous Covid-19 infection, n (%)	77 (19.7%)	31 (25.8%)	39 (22.7%)	7 (7.1%)	13.561	0.001
Symptom severity (n = 77)						
No symptoms	14 (18.2%)	5 (16.1%)	8 (20.5%)	1 (14.3%)		
Mild/Moderate	59 (76.6%)	24 (77.4%)	29 (74.4%)	6 (85.7%)		
Severe illness	4 (5.2%)	2 (6.5%)	2 (5.1%)	0 (0.0%)	3.401 ^a	0.782
Symptom duration (weeks; n = 63)						
≤4	50 (79.4%)	22 (84.6%)	23 (74.2%)	5 (83.3%)		
5-8	10 (15.9%)	3 (11.5%)	6 (19.4%)	1 (16.7%)		
≥9	3 (4.8%)	1 (3.8%)	2 (6.5%)	0 (0.0%)	1.463 ^a	0.902
Fully recovered, n (%) (n = 77)	51 (66.2%)	21 (67.7%)	26 (66.7%)	4 (57.1%)	0.445 ^a	0.877
Exposure to Covid-19 positive acquaintances ^{b,c}						
Colleagues/Acquaintances	203 (52.1%)	71 (59.2%)	82 (47.7%)	50 (51.0%)		
Close friends	76 (19.5%)	33 (27.5%)	31 (18.0%)	12 (12.2%)		
Housemates	3 (0.8%)	1 (0.8%)	0 (0.0%)	2 (2.0%)		
Immediate family	68 (17.4%)	26 (21.7%)	28 (16.3%)	14 (14.3%)		
No contact	127 (32.6%)	23 (19.2%)	67 (39.0%)	37 (37.8%)	15.168 ^a	0.001
Acquaintances hospitalised, n (%) (n = 261 ^d)	88 (33.7%)	33 (34.0%)	41 (39.4%)	14 (23.3%)	4.414	0.110
Acquaintances died, n (%) (n = 261 ^d)	49 (18.8%)	15 (15.5%)	25 (24.0%)	9 (15.0%)	3.147	0.207

Abbreviation: HCAs, Healthcare Assistants.

^aFisher's exact test.

^bParticipants could select multiple answers.

^cDichotomised to contact and non-contact for analysis.

^dTwo participants did not answer.

TABLE 4 Nursing home staff mental health outcomes, by role

	Total n = 390	Nurses n = 120	HCA's n = 172	Nonclinical n = 98	Chi-square		
					χ^2	p	p (adj.) ^c
IES-R 22, moderate/severe symptoms, % (95% CI) ^a	45 (40–50)	48 (39–57)	42 (35–50)	46 (36–56)	1.02	0.599	0.579
WHO-5 ^a							
Poor wellbeing, % (95% CI)	39 (34–44)	52 (43–61)	70 (63–77)	58 (48–68)	12.38	0.015	0.005
Likely major depression, % (95% CI)	20 (16–24)	23 (16–31)	15 (9–20)	26 (17–34)	5.904	0.052	0.069
Suicidal ideation, % (95% CI) ^b	14 (10–17)	13 (7–19)	15 (9–20)	13 (7–20)	0.12	0.941	0.764
Suicidal planning, % (95% CI) ^b	9 (6–12)	7 (2–11)	11 (6–16)	9 (3–15)	1.60	0.445	0.972
WAS, insufficient, % (95% CI) ^a	25 (20–29)	27 (19–35)	26 (19–33)	20 (12–28)	1.29	0.524	0.444
					One-way ANOVA		
					F	p	p (adj.) ^c
IES-R, Mean (SD)							
Total	25.9 (17.6)	27.8 (16.5)	25.1 (18.0)	18.3 (1.8)	1.00	0.369	0.522
Avoidance	9.7 (6.8)	9.9 (6.4)	9.5 (6.9)	9.6 (7.2)	0.12	0.890	0.619
Hyperarousal	5.5 (4.7)	5.9 (4.4)	5.3 (4.9)	5.3 (4.5)	0.67	0.369	0.503
Intrusion	9.6 (6.8)	10.8 (6.6)	9.1 (6.8)	9.0 (7.0)	2.46	0.087	0.345
MIES, Mean (SD)							
Total	20.8 (9.1)	22.5 (10.5)	22.5 (10.5)	19.1 (9.3)	3.66	0.027	0.038
Transgression - others	5.9 (3.0)	5.7 (3.0)	6.3 (3.1)	5.4 (3.0)	3.53	0.030	0.048
Transgression - self	7.9 (4.8)	7.5 (4.3)	8.4 (5.0)	7.4 (4.8)	1.93	0.146	0.066
Betrayal	7.4 (4.0)	7.6 (4.1)	7.8 (4.2)	6.4 (3.4)	3.69	0.026	0.078
Brief-COPE, Mean (SD)							
Avoidant	20.8 (6.3)	21.3 (6.1)	20.9 (6.2)	20.2 (6.6)	0.82	0.442	0.463
Approach	28.8 (8.1)	30.7 (8.0)	28.8 (8.0)	26.5 (7.9)	7.50	0.001	0.045
Religion	3.7 (2.0)	4.0 (2.1)	3.8 (2.1)	3.3 (1.7)	3.04	0.049	0.116
Humour	3.4 (1.8)	3.3 (1.6)	3.4 (1.8)	3.3 (1.8)	0.05	0.949	0.612
Covid-19 perceptions, Mean (SD)							
Health fear	4.5 (1.2)	4.4 (1.3)	4.6 (1.2)	4.5 (1.3)	0.99	0.371	0.634
Social isolation/avoidance	3.5 (1.2)	3.4 (1.2)	3.5 (1.1)	3.5 (1.2)	0.69	0.500	0.052
Job stress	4.2 (1.2)	4.2 (1.1)	4.1 (1.2)	4.3 (1.2)	0.53	0.591	0.766
Doubts about protection	1.8 (0.8)	1.7 (0.8)	1.8 (0.8)	1.7 (0.7)	0.49	0.615	0.977
Dissatisfaction with system/processes	2.2 (0.9)	2.2 (1.0)	2.2 (0.9)	2.3 (0.9)	0.32	0.730	0.061
Altruism perception, Mean (SD)	4.8 (1.3)	4.7 (1.4)	4.9 (1.3)	4.8 (1.4)	0.91	0.405	0.840

Note: WHO-5, World Health Organisation-Five Wellbeing Index: maximum of 100; score of 33 or more indicates normal wellbeing over the past 2 weeks; 20 or less indicates likely major depression over the past 2 weeks. IES-R: Impact of events scale revised (22 items); cut-off of 26 or more indicates moderate to severe symptoms of post-traumatic stress over the past 7 days. Work Ability Score: maximum of 10; cut-off of 6 or more indicates current sufficient perceived work ability. MIES: Moral Injury Events Scale. Higher scores denote higher intensity of moral injury over the course of the Covid-19 outbreak. Brief-COPE: abbreviated version of the COPE (Coping Orientation to Problems Experienced) Inventory. Higher scores indicate higher reliance on this coping style over the course of the pandemic. Perceptions of health fear, social isolation and avoidance, job stress, dissatisfaction with system/processes, doubts about protection and altruism: Higher scores indicate increased identification with each domain over the course of the Covid-19 outbreak.

Abbreviations: 95% CI, 95% confidence interval; HCAs, healthcare assistants; SD, standard deviation.

^aItem dichotomised for analysis using cut-off score.

^bItems are dichotomised for analysis (any suicidal ideation/planning vs. none).

^cFollowing regression analysis adjusting for age, ethnicity, years' experience, personal Covid-19 contact history and history of Covid-19 infection.

the well-documented impact of the pandemic on nursing homes. In line with qualitative studies, there was a high level of stress in this somewhat neglected population exposed to significant workplace hazards.^{9–11}

We found the 1-week prevalence of moderate-severe symptoms of PTSD in nursing home staff in the Republic of Ireland (45%, 95% CI 40%–50%) was numerically higher than seen in nursing homes in Italy (39, 95% CI 33%–46%). This figure is also higher than the estimated prevalence of PTSD symptoms in hospital-based HCWs internationally during the Covid-19 pandemic (20.7%, 95% CI 10%–33%) with non-overlapping confidence intervals.^{12,13} The possibly higher degree of such symptoms in staff in nursing homes than in hospitals may be due to several reasons. As experienced globally, some Irish nursing homes had high mortality levels. Staff, who typically form close bonds with residents, may have been forced to regularly witness their deaths first hand.^{2–4,28} Personal protective equipment has been reported to be scarce in nursing homes at the beginning of the pandemic compared to general hospital settings.²⁹ There are limited data on psychosocial and occupational health supports for nursing home staff but these may be less available than in hospital settings.^{28,30} Interestingly, we did not find differences in levels of post-traumatic stress symptoms or symptom clusters between nursing home staff groups based on their role.

The WHO-5 has utility in screening for depression during the previous 2 weeks.²¹ We found that 39% reported scores corresponding with depressive symptoms. This figure lies at the higher end of the range for prevalence globally of depressive symptoms in the general population during the Covid-19 pandemic (14.6%–48.3%).³¹ Of note, 20% of staff were below threshold for a possible diagnosis of major depression. Possible causes could be work-related stigma^{32,33} and job stress¹² in addition to the typical stresses experienced by all members of society during Ireland's comparatively stringent pandemic-related restrictions.³⁴

The proportions of staff reporting suicidal ideation and planning in the past week are concerning at 13.8% and 9%, respectively.³⁵ These prevalences are higher than those reported in hospital workers during the pandemic. Several studies in US and Chinese hospital workers have reported on suicidal ideation and planning as a combined item. Estimates range from 5.4% to 12% for suicidal ideation and planning in these workers over the past fortnight.^{36–40} There is only one study to date which has appraised suicidal planning in hospital workers during the pandemic. This Spanish study found that the 30-day prevalence of suicidal planning was 2.7%.⁴¹ However, this study does not provide information on suicidal planning. It should be noted that these issues are not solely in healthcare workers; the 1-week prevalence of suicidal ideation in the UK general population during the pandemic is also remarkably high at 9.8% (8.7%–10.9%).⁴² Nonetheless, the reasons for these higher prevalences of suicidal ideation and planning in Irish nursing home staff are unclear; further studies are required to clarify if these issues persist.

Also of concern is the high level of moral injury experienced by nursing home staff. The mean score for nursing home staff in Ireland (20.8 SD 9.1) was significantly higher than that of US hospital staff at

the beginning of the pandemic (16.15 SD 7.8; $p < 0.0001$).¹⁴ HCAs reported a significantly higher degree of moral injury than non-clinical staff. While HCAs were the youngest group, this difference remained significant even after controlling for age and years of experience. HCAs may have found implementing restrictions and dealing with increased mortality more difficult due to their close relationships with residents.

Perhaps not surprisingly, given the above findings, a large proportion of staff reported insufficient work ability. There are no previous comparison data for nursing home staff but similar levels of insufficient work ability have been recorded in Irish doctors before the pandemic and was associated with burnout in doctors.⁴³ Regarding perceptions of the experience of the Covid-19 outbreak, views were similar to those reported by hospital workers during the SARS outbreak²⁴ with a noteworthy sense of altruism. While nursing staff reported higher utilisation of adaptive coping styles than non-clinical staff, this does not seem to have protected them from similarly high levels of post-traumatic stress and depression symptoms.

4.1 | Limitations

One limitation of this cross-sectional study is that it is difficult to state with certainty that any identified distress was due to the pandemic or a result of pre-existing issues, for example, organisational problems, support deficits. To address this, we plan to perform a follow-up survey when nursing home conditions have moved closer to pre-pandemic life. Ideally, this will be when 90% or more of the adult Irish population is vaccinated, restrictions have eased significantly and the pandemic has moved past its emergency phase in Ireland. Secondly, the sample size is relatively small compared to the estimated number of nursing home staff in Ireland and only 16% of nursing homes approached agreed to distribute the survey. While participants are broadly representative of nursing home staff nationally, staff response rates were low and thus may not reflect their true experience. As a result, selection bias could explain the high prevalences of mental health conditions and these results should be interpreted with caution. However, given that the prevalence for post-traumatic stress symptoms is similar to that found in the Italian care home study in which the staff response rate was 53%, it seems that high rates of distress in this population may be a common experience.¹² Consequently, it seems reasonable to believe that our sample may be representative. Thirdly, we were unable to determine if survey participants were ethnically representative as there are no ethnicity data available for Irish nursing home staff. However, figures from Ireland's regulatory body for nurses, the Nursing and Midwifery Board of Ireland, indicate that the proportions of nurses' country of registration corresponds to the ethnicity of survey participants.⁴⁴ Another limitation perhaps is that working hours per week were not measured and this might have been a mitigating factor for negative wellbeing or stress, for example, if one was working part time.⁴⁵

4.2 | Conclusions

In this national survey, the prevalence of moderate-severe PTSD symptoms and the degree of moral injury in nursing home staff was significantly higher than that of international hospital staff during the Covid-19 pandemic. Distress levels were high overall in both clinical and non-clinical staff but differences exist between professional groups in the intensity of moral injury and coping styles. These factors need to be accounted for when tailoring pandemic supports for nursing home staff.

ACKNOWLEDGEMENT

We thank nursing home staff in the Republic of Ireland for taking the time to complete this survey and Nursing Homes Ireland for their support.

CONFLICT OF INTEREST

Declan M. McLoughlin has received speaker's honoraria from MECTA and Otsuka and an honorarium from Janssen for participating in an esketamine advisory board meeting. The other authors report no conflicts of interest.

ETHICS STATEMENT

This study received ethical approval from the St Patrick's Mental Health Services Research Ethics Committee on 18 November 2020.

DATA AVAILABILITY STATEMENT

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

ORCID

Conan Brady  <https://orcid.org/0000-0002-4110-8566>

Iracema Leroi  <https://orcid.org/0000-0003-1822-3643>

Declan M. McLoughlin  <https://orcid.org/0000-0003-4574-2799>

REFERENCES

- Comas-Herrera AZJ, Lemmon E, Henderson D, et al. Mortality Associated with COVID-19 in Care Homes: International Evidence. International Long-Term Care Policy Network, CPEC-LSE; 2020. Accessed 2 March 2021.
- Ioannidis JPA, Axfors C, Contopoulos-Ioannidis DG. Second versus first wave of COVID-19 deaths: shifts in age distribution and in nursing home fatalities. *Environ Res*. 2021;195:110856.
- Chen MK, Chevalier JA, Long EF. Nursing home staff networks and COVID-19. *Proc Natl Acad Sci U S A*. 2021;118(1).
- Department of Health. COVID-19 Nursing Homes Expert Panel: Final Report. Department of Health; 2020. Accessed 11 February 2021. <https://www.gov.ie/en/publication/3af5a-covid-19-nursing-homes-expert-panel-final-report/>
- Burton JK, Bayne G, Evans C, et al. Evolution and effects of COVID-19 outbreaks in care homes: a population analysis in 189 care homes in one geographical region of the UK. *Lancet Healthy Longev*. 2020;1(1):e21-e31.
- Istituto Superiore di Sanità. National Survey on COVID-19 Contagion in Residential and Social-Health Structures (Third Report). Istituto Superiore di Sanità; 2020. Accessed 11 February 2021. <https://www.epicentro.iss.it/coronavirus/pdf/sars-cov-2-survey-rsa-rapporto-3.pdf>
- España PP, Bilbao A, García-Gutiérrez S, et al. Predictors of mortality of COVID-19 in the general population and nursing homes. *Intern Emerg Med*. 2021;1-10.
- Yanes-Lane M, Winters N, Fregonese F, et al. Proportion of asymptomatic infection among COVID-19 positive persons and their transmission potential: a systematic review and meta-analysis. *PLoS One*. 2020;15(11):e0241536.
- White EM, Wetle TF, Reddy A, Baier RR. Front-line nursing home staff experiences during the COVID-19 pandemic. *J Am Med Dir Assoc*. 2021;22(1):199-203.
- Miller VJ, Fields NL, Anderson KA, Kusmaul N, Maxwell C. Nursing home social workers perceptions of preparedness and coping for COVID-19. *J Gerontol Ser B*. 2020;76(4):e219-e224.
- Sarabia-Cobo C, Pérez V, de Lorena P, et al. Experiences of geriatric nurses in nursing home settings across four countries in the face of the COVID-19 pandemic. *J Adv Nurs*. 2021;77(2):869-878.
- Riello M, Purgato M, Bove C, MacTaggart D, Rusconi E. Prevalence of post-traumatic symptomatology and anxiety among residential nursing and care home workers following the first COVID-19 outbreak in Northern Italy. *R Soc Open Sci*. 2020;7(9):200880.
- Marvaldi M, Mallet J, Dubertret C, Moro MR, Guessoum SB. Anxiety, depression, trauma-related, and sleep disorders among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. *Neurosci Biobehav Rev*. 2021.
- Nash WP, Marino Carper TL, Mills MA, Au T, Goldsmith A, Litz BT. Psychometric evaluation of the Moral Injury Events Scale. *Mil Med*. 2013;178(6):646-652.
- Wisco BE, Marx BP, May CL, et al. Moral injury in U.S. combat veterans: results from the national health and resilience in veterans study. *Depress Anxiety*. 2017.
- Hines SE, Chin KH, Levine AR, Wickwire EM. Initiation of a survey of healthcare worker distress and moral injury at the onset of the COVID-19 surge. *Am J Ind Med*. 2020;63(9):830-833.
- Hines SE, Chin KH, Glick DR, Wickwire EM. Trends in moral injury, distress, and resilience factors among healthcare workers at the beginning of the COVID-19 pandemic. *Int J Environ Res Public Health*. 2021;18(2):488.
- Health Service Executive. List of Nursing Homes in Ireland. 2017.
- Lima V. The pandemic one year on: trends and statistics between three waves of the COVID-19 pandemic in Ireland. *Publicpolicy.ie*. 2021.
- Creamer M, Bell R, Failla S. Psychometric properties of the Impact of Event Scale - Revised. *Behav Res Ther*. 2003;41(12):1489-1496.
- Topp CW, Østergaard SD, Sandergaard S, Bech P. The WHO-5 Well-Being Index: a systematic review of the literature. *Psychother Psychosom*. 2015;84(3):167-176.
- Posner K, Brown GK, Stanley B, et al. The Columbia-Suicide Severity Rating Scale: initial validity and internal consistency findings from three multisite studies with adolescents and adults. *Am J Psychiatry*. 2011;168(12):1266-1277.
- Carver CS. You want to measure coping but your protocol's too long: consider the brief COPE. *Int J Behav Med*. 1997;4(1):92-100.
- Maunder RG, Lancee WJ, Rourke S, et al. Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. *Psychosom Med*. 2004;66(6):938-942.
- Lancee WJ, Maunder RG, Goldbloom DS. Prevalence of psychiatric disorders among Toronto hospital workers one to two years after the SARS outbreak. *Psychiatr Serv*. 2008;59(1):91-95.
- Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry*. 2009;54(5):302-311.

27. Ruitenburg MM, Frings-Dresen MH, Sluiter JK. The prevalence of common mental disorders among hospital physicians and their association with self-reported work ability: a cross-sectional study. *BMC Health Serv Res*. 2012;12:292-298.
28. Gordon AL, Goodman C, Achterberg W, et al. Commentary: COVID in care homes—challenges and dilemmas in healthcare delivery. *Age Ageing*. 2020;49(5):701-705.
29. McGarry BE, Grabowski DC, Barnett ML. Severe staffing and personal protective equipment shortages faced by nursing homes during the COVID-19 pandemic. *Health Aff*. 2020;39(10):1812-1821.
30. Health Service Executive. *HSE Psychosocial Response to the Covid-19 Pandemic*. 2020.
31. Xiong J, Lipsitz O, Nasri F, et al. Impact of COVID-19 pandemic on mental health in the general population: a systematic review. *J Affect Disord*. 2020;277:55-64.
32. YaMei B, Chao-Cheng L, Chih-Yuan L, Jen-Yeu C, Ching-Mo C, Pesus C. Survey of stress reactions among health care workers involved with the SARS outbreak. *Psychiatr Serv*. 2004;55(9):1055-1057.
33. Maunder R, Hunter J, Vincent L, et al. The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *CMAJ*. 2003;168(10):1245-1251.
34. Blavatnik School of Government. *Coronavirus Government Response Tracker*. University of Oxford; 2020. Accessed 11 February 2021. <https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker>
35. Borges G, Nock MK, Haro Abad JM, et al. Twelve-month prevalence of and risk factors for suicide attempts in the World Health Organization World Mental health surveys. *J Clin Psychiatry*. 2010;71(12):1617-1628.
36. Cai Q, Feng H, Huang J, et al. The mental health of frontline and non-frontline medical workers during the coronavirus disease 2019 (COVID-19) outbreak in China: a case-control study. *J Affect Disord*. 2020;275:210-215.
37. Xiaoming X, Ming A, Su H, et al. The psychological status of 8817 hospital workers during COVID-19 epidemic: a cross-sectional study in Chongqing. *J Affect Disord*. 2020;276:555-561.
38. Hong S, Ai M, Xu X, et al. Immediate psychological impact on nurses working at 42 government-designated hospitals during COVID-19 outbreak in China: a cross-sectional study. *Nurs Outlook*. 2021; 69(1):6-12.
39. Young KP, Kolcz DL, O'Sullivan DM, Ferrand J, Fried J, Robinson K. Health care workers' mental health and quality of life during COVID-19: results from a mid-pandemic, national survey. *Psychiatr Serv*. 2020;72(2):122-128.
40. Xu X, Wang W, Chen J, et al. Suicidal and self-harm ideation among Chinese hospital staff during the COVID-19 pandemic: prevalence and correlates. *Psychiatry Res*. 2021;296:113654.
41. Mortier P, Vilagut G, Ferrer M, et al. Thirty-day suicidal thoughts and behaviors among hospital workers during the first wave of the Spain COVID-19 outbreak. *Depress Anxiety*. 2021;38(5):528-544.
42. O'Connor RC, Wetherall K, Cleare S, et al. Mental health and well-being during the COVID-19 pandemic: longitudinal analyses of adults in the UK COVID-19 Mental Health & Wellbeing study. *Br J Psychiatry*. 2021;218(6):326-333.
43. Hayes B, Prihodova L, Walsh G, Doyle F, Doherty S. Doctors don't do little: a national cross-sectional study of workplace well-being of hospital doctors in Ireland. *BMJ Open*. 2019;9(3):e025433.
44. Nursing and Midwifery Board of Ireland. *The NMBI Register of Nurses and Midwives*; 2019.
45. Hayes B, Prihodova L, Walsh G, Doyle F, Doherty S. What's up doc? A national cross-sectional study of psychological wellbeing of hospital doctors in Ireland. *BMJ Open*. 2017;7(10):e018023.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

How to cite this article: Brady C, Fenton C, Loughran O, et al. Nursing home staff mental health during the Covid-19 pandemic in the Republic of Ireland. *Int J Geriatr Psychiatry*. 2021;1-10. <https://doi.org/10.1002/gps.5648>

Appendix IX: Related publication: Dublin hospital workers' mental health during the peak of Ireland's COVID-19 pandemic

Irish Journal of Medical Science (1971 -)
<https://doi.org/10.1007/s11845-022-03056-0>

ORIGINAL ARTICLE



Dublin hospital workers' mental health during the peak of Ireland's COVID-19 pandemic

Conan Brady¹ · Caoimhe Fenton¹ · Orlaith Loughran¹ · Blánaid Hayes² · Martina Hennessy³ · Agnes Higgins⁴ · Declan M. McLoughlin¹

Received: 13 November 2021 / Accepted: 7 June 2022
© The Author(s) 2022

Abstract

Background Hospital-based healthcare workers have experienced significant psychological stressors during the COVID-19 pandemic.

Aim To evaluate the mental health of hospital workers during the third wave of the COVID-19 pandemic in Dublin, Ireland. **Methods** Cross-sectional anonymous online survey of hospital workers ($n = 377$; 181 doctors (48.0%), 166 nurses (44.0%), 30 radiographers (8.0%)), collecting demographic information, COVID-19 exposure history and mental health measures.

Results There were significant differences between profession groups in gender, experience, COVID-19 infection history, exposure to COVID-19 positive acquaintances, and work areas. Moderate-severe post-traumatic stress disorder (PTSD) symptoms were found in 45.1% (95% CI 40.1–50.1%) of all participants; significantly fewer doctors reported moderate-severe PTSD symptoms (26%; 95% CI 22–36%). A World Health Organisation-5 Wellbeing Index (WHO-5) score ≤ 32 , indicating low mood, was reported by 52% (95% CI 47–57%) of participants; significantly fewer doctors reported low mood (46%; 95% CI 39–53%). One-week suicidal ideation and planning were reported respectively by 13% (95% CI 10–16%) and 5% (95% CI 3–7%) of participants with no between-group differences. Doctors reported significantly less moral injury than other groups. There were no significant between-group differences regarding coping styles. Work ability was insufficient in 39% (95% CI 34–44%) of staff; no between-group differences.

Conclusions Dublin hospital workers reported high levels of PTSD symptoms, mood disturbance, and moral injury during the COVID-19 pandemic. Concerning levels of suicidal ideation and planning existed in this cohort. Differences in degrees of post-traumatic stress, moral injury, and wellbeing were found between profession groups, which should be considered when planning any supports.

Keywords COVID-19 · Hospital staff · Mental health · Moral injury · Post-traumatic stress

Introduction

Hospital-based healthcare workers (HCWs) across the world have been severely tested during the COVID-19 pandemic. In addition to the typical stresses and restrictions experienced by society during the crisis, HCWs have had to contend with occupational hazards such as heightened rates of infection among healthcare staff, cancellation of elective procedures, potential redeployment, severe staffing shortages due to illness and quarantine, and essential resource shortages, e.g. personal protective equipment (PPE), ventilators, and intensive care beds [1–5]. All of this has occurred in the context of significant discontent in Irish healthcare staff even before the outbreak. Pre-pandemic, only 50.5% of Irish doctors reported positive subjective well-being and over a third (35%) reported

✉ Declan M. McLoughlin
d.mcloughlin@tcd.ie

¹ Dept. of Psychiatry and Trinity College Institute of Neuroscience, Trinity College Dublin, St Patrick's University Hospital, Dublin 8, Ireland

² Beaumont Hospital, Dublin 9, Royal College of Surgeons, Dublin 2, Ireland

³ WellcomeTrust/Health Research Board Clinical Research Facility, Trinity College Dublin, St James's Hospital, Dublin 8, Ireland

⁴ School of Nursing and Midwifery, Trinity College Dublin, Dublin, Ireland

psychological distress in a recent study [6]. Several cross-sectional studies have demonstrated high levels of stress and burnout in other Irish healthcare professionals, including nurses and radiographers [7–9]. It seems plausible that the pandemic could worsen preexisting low mood and depression. In addition, the common scenario of hospital staff struggling to work in facilities overwhelmed by COVID-19 is one that may provide fertile ground for the development of symptoms of post-traumatic stress disorder (PTSD). There have been two prior coronavirus outbreaks in the twenty-first century: the severe acute respiratory syndrome (SARS) outbreak in 2002–2004 and the Middle East respiratory syndrome (MERS) outbreak since 2012 [10]. Both have been shown to be associated with higher levels of post-traumatic stress symptoms in hospital workers [11, 12]. With respect to Irish studies during the pandemic, one cross-sectional study in the south-east of Ireland early in the pandemic found a prevalence of 41.3% of hospital staff reporting concerning levels of PTSD symptoms [13]. Another study focusing on Irish radiographers found that 40% reported symptoms of burnout [14].

Of increasing interest is a moral injury in HCWs, which is the distress experienced when an individual witness or engages in acts that contradict their moral and ethical beliefs [15]. This concept originates from studies in military populations, but the severe difficulties in providing optimal care during a pandemic have been theorised to provoke similar reactions in HCWs [16, 17]. Surveys of USA hospital workers have demonstrated high levels of moral injury over the course of the COVID-19 pandemic, as has a large study in the UK's National Health Service (NHS) [16, 18].

The effects of the COVID-19 pandemic on hospital workers have been widely studied. A recent systematic review showed estimated pooled prevalence of 31.1% (95% CI 25.7–36.8%) for depression, 56.5% (95% CI 30.6–80.5%) for acute stress, and 20.2% (95% CI 9.9–33.0%) for post-traumatic stress [19].

Considering these international findings, we aimed to estimate the levels of post-traumatic stress symptoms and well-being in hospital staff (namely doctors, nurses, radiographers, and healthcare assistants (HCAs)) in Dublin, Ireland, during the COVID-19 pandemic. We also appraised self-rated suicidal ideation and planning, moral injury, coping styles, perceptions about the pandemic, and work ability. Finally, we explored if there were differences in these measures between different clinical professional groups.

Methods

Study design and setting

This was a cross-sectional, online, anonymous survey. Ethical approval was granted by the St James's Hospital and

Tallaght University Hospital Joint Research Ethics Committee and the Beaumont Hospital Ethics (Medical Research) Committee. Data were collected online using Qualtrics Core XM (Qualtrics, USA).

Recruitment targeted doctors, nurses, radiographers, and healthcare assistants working in three large Dublin teaching hospitals (St James's Hospital, Tallaght University Hospital, and Beaumont Hospital). These are three of the largest hospitals in the Republic of Ireland, treating patients in diverse areas of Dublin, the city that has experienced the highest case numbers in the state [20]. The survey was open for a 6-week period from the 29th of January to the 16th of March 2021, coinciding with the third wave of Ireland's COVID-19 outbreak. Per capita case numbers during the survey period were among the global highest in the pandemic at that time [21]. The survey also coincided with the rollout of the national vaccination programme, which initially targeted hospital workers and residents of long-term care [22]. Participating hospitals were asked to provide information on the number of staff working in each discipline so that a survey response rate could be determined.

Staff were recruited via internal email distribution, hospital intranet advertisements, poster advertisements, social media channels, snowballing, and direct liaison with department heads. Convenience sampling was used, with staff self-selecting for participation. Participation was voluntary, with participant information provided and consent obtained at the beginning of the survey. Information directing participants towards psychological support was provided beforehand and following the survey exit.

Measures

We recorded basic demographic information along with profession, living arrangements, and preexisting physical and mental health conditions. Years of experience were recorded, and staff were assigned to a "junior/intermediate" group (which included all non-consultant hospital doctors and all other staff groups with less than 10 years of experience) and a "senior" group (which included all medical consultants and those in other roles with 10 years or more of experience). Questions were included to assess the extent of exposure to COVID-19, such as areas of work, self-quarantine experience, COVID-19 infection history, and history of contact with COVID-19-positive acquaintances.

The Impact of Event Scale-Revised (IES-R), a 22-item scale, was used to assess symptoms of post-traumatic stress disorder over the past week with subdomains corresponding to the three symptom clusters of PTSD (hyperarousal, intrusion, and avoidance); a score ≥ 26 indicated moderate-severe symptoms [23]. The World Health Organisation's Well-Being Index (WHO-5), a five-item measure, was used to assess staff wellbeing [24]. Staff

was asked to rate how they have been feeling over the past 2 weeks; scoring 21–32 indicates likely low mood and a score ≤ 20 indicates likely depression. Two Likert scale items from the Columbia Suicide Severity Rating Scale (C-SSRS) were used to assess suicidal ideation and planning over the previous seven days; responses were dichotomised based on the presence/absence of suicidal ideation or planning [25]. Staff perceptions of work ability were assessed using the Work Ability Score (WAS) derived from the Work Ability Index (WAI), an occupational health instrument for identifying those in need of support. Participants were asked to score their current ability to manage work demands compared to their lifetime best on a scale of 1–10 [26]. A score ≤ 5 corresponds with insufficient perceived work ability. The moral injury was measured using the Moral Injury Events Scale (MIES) adapted for healthcare staff during the COVID-19 pandemic [15]. This 9-item scale was originally developed to assess moral injury in combat veterans. Staff was asked if they agreed with statements relating to moral injury over the course of the COVID-19 outbreak. This measure has three subscales: “perceived transgressions by others” (where staff believed they had witnessed others act in a way that violated their moral beliefs), “perceived transgressions by self” (where staff felt they had violated their own moral code), and “betrayal” (assessing perceived betrayal by previously trusted leadership). Validated cut-off scores have yet to be developed for this instrument.

The Brief Coping Orientation to Problems Experienced (Brief-COPE) Scale was used to appraise the staff’s adaptive (“approach”; range 12–48) and maladaptive (“avoidance”; range 12–48) coping responses; staff were asked to identify which coping styles they had used over the course of the pandemic [27]. This scale also includes items for humour and religion.

A 15-item survey adapted from a study assessing HCW perceptions of the severe acute respiratory syndrome (SARS) outbreak was adapted for the COVID-19 pandemic [28]. This comprised three Likert scale items for each of the following groups of perceptions: health fear, social isolation, doubts about protective equipment, adequacy of training, and support and job stress. Items were rated 1 to 6; higher scores indicated higher levels of dissatisfaction with each domain. An additional Likert scale item assessing altruistic acceptance of risk was included; this was rated 1 to 6 with higher scores indicating higher degrees of altruism. Altruism has been reported to mediate the psychological impact of viral disease outbreaks on HCWs [29].

A free-text response box was provided at the end of the survey; analyses of these qualitative data will be separately reported.

Statistical analysis

Data were analysed in Excel (Microsoft, USA) and SPSS 26 (IBM, USA). Using a 95% confidence interval with a 5% margin of error, our minimum sample size was determined to be 318 based on previous literature demonstrating that 71% of hospital staff scored ≥ 26 on the IES-R during the COVID-19 pandemic [30]. We examined the demographic characteristics of the sample divided into three groups: doctors, nurses, and radiographers. Healthcare assistants were not included due to low response rates. These groups were further categorised based on cut-off scores for the WHO-5, IES-R, and WAS and the presence/absence of suicidal ideation or planning. Chi-square tests were used to analyse categorical variables and one-way ANOVAs for means. Post hoc analyses were performed for significant between-group differences. The significance level was set at 0.05. We did not adjust for multiple testing, but regression analysis was performed using a generalised linear model to adjust for significant differences in demographic features (i.e. gender and level of seniority), exposure to COVID-19-infected acquaintances, and areas of work (emergency department work or non-COVID-19 treatment area). Data are reported as means (standard deviation) and proportions (percentages) as appropriate. Significant pairwise differences in post hoc analyses are reported as mean differences (MD) with standard errors (SE).

Results

In total, there were 390 respondents. Due to the low HCA response rate ($n=13$), they were excluded for analysis, leaving 377 participants, comprising 181 doctors (48.0%), 166 nurses (44.0%), and 30 radiographers (8.0%). The participating hospitals’ staff censuses differed substantially with respect to their methodology in categorising staff. This made calculating an accurate response rate impossible, but we attempted to extrapolate an approximate response rate based on the provided figures. This extrapolation estimated a response rate of 6%.

Demographics

The demographic characteristics of survey participants are summarised in Table 1. Most staff were female (76.7%), lived with family (76.1%), were of white ethnicity (90.5%), and reported a senior level of experience (65.3%). The majority of staff reported no preexisting physical or mental illness. There were significant differences between doctors, nurses, and radiographers in gender ($p < 0.01$) and experience ($p < 0.01$). Doctors were more likely to be male ($z=7.8$; see Supplementary Table S1). More nurses reported a senior level of experience ($z=5.4$).

Table 1 Demographic characteristics of healthcare workers by role

	Total <i>n</i> (%)	Doctors <i>n</i> (%)	Nurses <i>n</i> (%)	Radiographers <i>n</i> (%)	Chi-square	
					χ^2	<i>P</i> -value
Total	377 (100%)	181 (48.0%)	166 (44.0%)	30 (8.0%)		
Age (years)						
≤ 30	91 (24.1%)	43 (23.8%)	37 (22.3%)	11 (36.7%)		
31–50	200 (53.1%)	94 (51.9%)	88 (53.0%)	18 (60.0%)		
≥ 51	86 (22.8%)	44 (24.3%)	41 (24.7%)	1 (3.3%)	9.34	0.05 ^a
Gender						
Male	84 (22.3%)	72 (39.8%)	10 (6.0%)	2 (6.7%)		
Female	289 (76.7%)	107 (59.1%)	154 (92.8%)	28 (93.3%)		
Non-binary	2 (0.5%)	2 (1.1%)	0 (0.0%)	0 (0.0%)		
Prefer not to say	2 (0.5%)	0 (0.0%)	2 (1.2%)	0 (0.0%)	69.21	< 0.01 ^a
Living arrangements						
Alone	39 (10.3%)	15 (8.3%)	23 (13.9%)	1 (3.3%)		
With family	287 (76.1%)	140 (77.3%)	129 (77.7%)	18 (60.0%)		
With roommates	51 (13.5%)	26 (14.4%)	14 (8.4%)	11 (36.7%)	17.08	0.10 ^a
Ethnicity						
Asian/Asian Irish	19 (5.0%)	7 (3.9%)	12 (7.2%)	0 (0.0%)		
Black/Black Irish	3 (0.8%)	2 (1.1%)	1 (0.6%)	0 (0.0%)		
Middle Eastern/ME Irish	3 (0.8%)	3 (1.7%)	0 (0.0%)	0 (0.0%)		
Mixed race	1 (0.3%)	0 (0.0%)	1 (0.6%)	0 (0.0%)		
Other	1 (0.3%)	0 (0.0%)	1 (0.6%)	0 (0.0%)		
SE Asian/SE Asian Irish	6 (1.6%)	2 (1.1%)	4 (2.4%)	0 (0.0%)		
White—Irish/British/other	341 (90.5%)	164 (90.6%)	147 (88.6%)	30 (100%)		
Prefer not to say	3 (0.8%)	3 (1.7%)	0 (0.0%)	0 (0.0%)	4.05	0.13 ^d
Level of experience						
Junior/Intermediate	131 (34.7%)	85 (47.0%)	33 (19.9%)	13 (43.3%)		
Senior	246 (65.3%)	96 (53.0%)	133 (80.1%)	17 (56.7%)	29.07	< 0.01
Physical illness—Preexisting ^b						
Cancer	1 (0.3%)	1 (0.6%)	0 (0.0%)	0 (0.0%)		
Cardiovascular disease	24 (6.4%)	10 (5.5%)	14 (8.4%)	0 (0.0%)		
Immunosuppression	8 (2.1%)	4 (2.2%)	2 (1.2%)	2 (6.7%)		
Metabolic disease	28 (7.4%)	8 (4.4%)	17 (10.2%)	3 (10.0%)		
Respiratory disease	36 (9.5%)	15 (8.3%)	18 (10.8%)	3 (10.0%)		
Other	35 (9.3%)	18 (9.9%)	17 (10.2%)	0 (0.0%)		
None	265 (70.3%)	131 (72.4%)	111 (66.9%)	23 (76.7%)	1.90	0.39 ^c
Mental illness—Preexisting ^b						
Anxiety disorder	25 (6.6%)	7 (4.2%)	17 (10.2%)	1 (3.3%)		
Mood disorder	25 (6.6%)	16 (9.6%)	8 (4.8%)	1 (3.3%)		
Other	5 (1.3%)	1 (0.6%)	3 (1.8%)	1 (3.3%)		
None	331 (87.8%)	161 (89.0%)	143 (86.1%)	27 (90.0%)	0.78	0.68 ^c

ME, Middle Eastern; SE, Asian: Southeast Asian

^aFisher's exact test^brespondents could pick multiple answers^cdichotomised for analysis (presence or absence of a preexisting condition)^ddichotomised for analysis ("White" and "Non-White")

Exposure to COVID-19

HCW exposure to COVID-19 is presented in Table 2. Significant differences were found in the number of staff working in the emergency department ($p < 0.01$) and non-COVID-19 designated areas ($p < 0.01$). Fewer nurses reported working in the emergency department ($z = -6.7$; see Supplementary Table S2). Fewer radiographers reported working in designated COVID-19-free areas ($z = -5.0$).

The proportion of staff reporting a history of self-quarantining was 45.9%, with no significant difference between clinical groups. Overall, 31.8% of staff reporting having contracted COVID-19; radiographers were significantly more likely to report a positive history (60.5%, $p = 0.02$; $z = 4.0$; see Supplementary Table S3). Of these, most reported full recovery from COVID-19 (78%) and there were no significant differences between groups in terms of COVID-19 symptom severity, duration, and recovery. With respect to

exposure via contacts, most had been exposed to COVID-19 via colleagues or acquaintances (87.4%) with no significant differences between groups. Of the 366 respondents who reported contact with COVID-19 positive acquaintances, significantly more nurses reported having contact with those who had been hospitalised due to COVID-19 ($z = 6.7$). As this question was relevant to only a subset of all participants, this variable was not included for regression analysis.

Mental health measures

Mental health outcomes are presented in Table 3. The proportion of all staff meeting the criterion for moderate-severe symptoms of PTSD was 45.1% (95% CI 40.1–50.1%). Significantly fewer doctors reported moderate-severe symptoms (29.3%; $p < 0.01$; $z = -5.9$, see Supplementary Table S4). Radiographers were numerically more likely to meet this cut-off (73.3%), but this was not significantly higher than

Table 2 Healthcare worker exposure to COVID-19 by role

	Total <i>n</i> (%)	Doctors <i>n</i> (%)	Nurses <i>n</i> (%)	Radiographers <i>n</i> (%)	Chi-square	
					χ^2	<i>P</i> -value
Total	377 (100%)	181 (48.0%)	166 (44.0%)	30 (7.9%)		
Work area ^a						
Emergency department	78 (20.7%)	51 (28.2%)	8 (4.8%)	19 (63.3%)	64.91	< 0.01
COVID-19 treatment area	128 (34.0%)	64 (35.4%)	49 (29.5%)	15 (50.0%)	5.49	0.06
Non-Covid 19 treatment area	339 (89.9%)	172 (95.0%)	137 (82.5%)	30 (100.0%)	26.34	< 0.01
Previously self-quarantined	173 (45.9%)	84 (46.4%)	73 (44.0%)	16 (53.3%)	0.93	0.63
Previous COVID-19 infection	120 (31.8%)	51 (28.2%)	53 (31.9%)	16 (53.3%)	7.51	0.02
Symptom severity (<i>n</i> = 120)						
No symptoms	19 (15.8%)	6 (11.8%)	8 (15.1%)	5 (31.3%)		
Mild	51 (42.5%)	26 (51.0%)	20 (37.7%)	5 (31.3%)		
Moderate	47 (39.2%)	19 (37.3%)	22 (41.5%)	6 (37.5%)		
Severe	3 (2.5%)	0 (0.0%)	3 (5.7%)	0 (0.0%)	7.15	0.27 ^a
Symptom duration (weeks; <i>n</i> = 120)						
≤ 4	86 (71.7%)	40 (78.4%)	35 (66.0%)	11 (68.8%)		
5–8	27 (22.5%)	9 (17.6%)	13 (24.5%)	5 (31.3%)		
≥ 9	7 (5.8%)	2 (3.9%)	5 (9.4%)	0 (0.0%)	3.56	0.45 ^a
Fully recovered, <i>n</i> (%) (<i>n</i> = 120)	94 (78.3%)	42 (82.4%)	38 (71.7%)	14 (87.5%)	2.39	0.34 ^a
Exposure to COVID-19 positive acquaintances						
Colleagues/acquaintances	341 (87.4%)	166 (91.7%)	146 (88.0%)	29 (96.7%)		
Close friends	215 (55.1%)	102 (56.4%)	94 (56.6%)	19 (63.3%)		
Housemates	22 (5.6%)	15 (8.3%)	6 (3.6%)	1 (3.3%)		
Immediate family	97 (24.9%)	44 (24.3%)	47 (28.3%)	6 (20.0%)		
No contact	11 (2.8%)	7 (3.9%)	4 (2.4%)	0 (0.0%)	0.92	0.56 ^a
Acquaintances hospitalised, <i>n</i> (%) (<i>n</i> = 365 ^c)	150 (41.1%)	68 (39.1%)	75 (46.6%)	7 (23.3%)	6.21	0.045
Acquaintances died, <i>n</i> (%) (<i>n</i> = 366)	44 (12.0%)	22 (12.6%)	20 (12.3%)	2 (6.7%)	0.66	0.76 ^a

^aFisher's exact test^bparticipants could select multiple answers^cone participant did not answer^ddichotomised to contact and noncontact for analysis

Table 3 Healthcare worker mental health outcomes by role

	Total <i>n</i> = 377	Doctors <i>n</i> = 181	Nurses <i>n</i> = 166	Radiographers <i>n</i> = 30	Chi-square		
					χ^2	<i>P</i>	<i>P</i> (adj.) ^d
IES-R 22, moderate/severe symptoms, % (95% CI) ^a	45 (40–50)	29 (22–36)	57 (49–65)	73 (57–89)	37.81	<0.01	<0.01
WHO-5 ^a							
Poor wellbeing, % (95% CI)	52 (47–57)	46 (39–53)	55 (47–63)	70 (54–86)	7.15	0.03	0.07
Likely major depression, % (95% CI)	28 (23–33)	26 (20–32)	30 (23–37)	37 (20–54)	1.72	0.43	0.69
Suicidal ideation, % (95% CI) ^b	13 (10–16)	15 (10–20)	11 (6–16)	7 (0–16)	2.09	0.38 ^c	0.64
Suicidal planning, % (95% CI) ^b	5 (3–7)	6 (3–9)	4 (1–7)	0 (0–0)	2.04	0.31 ^c	0.46
WAS, Insufficient, % (95% CI) ^a	39 (34–44)	34 (27–41)	46 (38–54)	37 (20–54)	5.62	0.06	0.27
One-way ANOVA							
					<i>F</i>	<i>P</i>	<i>P</i> (adj.) ^d
IES-R, mean (SD)							
Total	25.0 (16.1)	19.7 (15.3)	29.2 (15.3)	33.1 (14.9)	21.29	<0.01	<0.01
Avoidance	9.2 (6.6)	7.3 (6.5)	10.6 (6.3)	12.9 (5.4)	17.16	<0.01	<0.01
Hyperarousal	6.2 (4.6)	4.9 (4.2)	7.3 (4.7)	7.8 (4.3)	14.47	<0.01	<0.01
Intrusion	9.6 (6.5)	7.6 (6.2)	11.4 (6.2)	12.4 (6.2)	19.73	<0.01	<0.01
MIES, mean (SD)							
Total	22.3 (9.8)	20.4 (9.6)	23.8 (9.8)	25.7 (9.5)	7.46	<0.01	<0.01
Transgression—others	6 (3.1)	5.6 (3.0)	6.4 (3.2)	6.7 (2.9)	3.94	0.02	<0.01
Transgression—self	7.9 (4.5)	7.3 (4.3)	8.4 (4.7)	8.1 (3.7)	2.63	0.07	<0.01
Betrayal	8.4 (4.3)	7.5 (4.0)	9 (4.3)	10.9 (4.8)	11.44	<0.01	<0.01
Brief-COPE, mean (SD)							
Avoidant	21.8 (5.3)	21.2 (5.4)	22.4 (5.1)	22.4 (5.7)	2.31	0.10	<0.01
Approach	29.4 (6.6)	29.2 (6.4)	29.5 (6.7)	30.2 (6.5)	0.38	0.68	0.64
Religion	3.3 (1.7)	3.1 (1.5)	3.6 (1.9)	3.1 (1.2)	4.88	<0.01	0.03
Humour	4.3 (1.9)	4.5 (2.0)	4.1 (1.9)	4.1 (1.8)	1.89	0.15	0.52
COVID-19 perceptions, mean (SD)							
Doubts about protection	1.7 (0.7)	1.7 (0.7)	1.6 (0.8)	1.4 (0.5)	2.64	0.07	0.18
Doubts about systems/processes	2.5 (1.0)	2.6 (0.9)	2.4 (1.0)	2.8 (1.0)	3.97	0.02	0.06
Health fear	4.8 (1.0)	4.5 (1.1)	4.9 (1.0)	5.3 (0.7)	12.85	<0.01	<0.01
Job stress	4.4 (1.1)	4.1 (1.1)	4.6 (1.0)	4.8 (0.9)	13.82	<0.01	<0.01
Social isolation and avoidance	3.4 (1.1)	3.1 (1.0)	3.6 (1.2)	3.4 (1.1)	12.69	<0.01	<0.01
Altruism perception, mean (SD)	4.9 (1.1)	4.9 (1.0)	4.8 (1.2)	5.1 (0.7)	1.42	0.24	0.75

SD, standard deviation; 95% CI, 95% confidence interval; WHO-5, World Health Organisation-Five Wellbeing Index: maximum of 100; score of 33 or more indicates normal wellbeing over the past 2 weeks; 20 or less indicates likely depression over the past 2 weeks. IES-R, impact of events scale revised (22 items); cut-off of 26 or more indicates moderate-to-severe symptoms of post-traumatic stress over the past 7 days. Work ability score: maximum of 10; cut-off of 5 or less indicates insufficient perceived work ability. MIES, Moral Injury Events Scale. Higher scores denote higher intensity of moral injury over the course of the COVID-19 outbreak. Brief-COPE: abbreviated version of the COPE (Coping Orientation to Problems Experienced) Inventory. Scores range from 12 to 48 for avoidant/approach scales. Higher scores indicate greater reliance on this coping style over the course of the pandemic. Perceptions of health fear, social isolation and avoidance, job stress, dissatisfaction with systems/processes, doubts about protection, and altruism. Higher scores indicate increased identification with each domain over the course of the COVID-19 outbreak

^aItem dichotomised for analysis using cut-off score

^bItems are dichotomised for analysis (any suicidal ideation/planning and none)

^cFisher's exact test

^dFollowing regression analysis adjusting for gender, seniority, history of COVID-19 infection, and areas of work

the number of nursing staff reporting moderate-severe symptoms (57.2%). There were also significant differences between the groups on the three subdomains of PTSD, with

doctors reporting significantly lower scores on the avoidance ($p < 0.01$), hyperarousal ($p < 0.01$), and intrusion ($p < 0.01$) symptom domains than both nurses and radiographers (see

Supplementary Table S5). These differences remained significant following regression analysis for significant demographic and infection exposure variables (adjusted $p < 0.01$).

The whole cohort WHO-5 mean was 38.0 (21.6). Of all staff, 52% (95% CI 47–57%) met the criterion for low mood on the WHO-5, with 28% (95% CI 23–33%) reporting scores consistent with likely depression. A significant difference was present between professions reporting low mood ($p = 0.03$), with doctors being less likely to meet this criterion ($z = -2.2$) and radiographers being more likely ($z = 2.1$); these differences did not survive regression analysis, however ($p = 0.07$). There was no significant difference between groups for those below the “likely depression” cut-off. Suicidal ideation was reported by 13% (95% CI 10–16%) of all staff, and 5% (95% CI 3–7%) of staff reported at least some plans to end their life, with no significant differences between groups on either measure.

The whole cohort WAS mean was 5.9 (2.1). Insufficient work ability was reported by 39% (95% CI 34–44%) of staff with no differences between groups.

The mean MIES score was 22.3 (9.8). There were significant differences between groups on the total score ($p < 0.01$) and all three MIES subscales; these differences survived regression analysis ($p < 0.01$). Doctors reported significantly lower total MIES scores than both nurses (MD -3.5 , SE 1.0) and radiographers (MD -5.3 , SE 1.9; see Supplementary Table S6). Doctors also reported a significantly lower score on the “perceived transgressions by others” subscale than nurses (MD -0.8 , SE 0.3) and a significantly lower score on the “Perceived betrayal” subscale than both nurses (MD -1.5 , SE 0.45) and radiographers (MD -3.4 , SE 0.8). Post hoc analysis of the “Transgressions by self” subscale did not reveal significant differences between groups in pairwise comparisons.

There were no significant differences between groups in their use of avoidant (maladaptive) and approach (adaptive) coping strategies prior to regression analysis; however, a significant difference was noted between groups on the avoidant scale following regression analysis ($p < 0.01$), which arose due to significant differences between gender groups ($p < 0.01$) and level of experience ($p < 0.01$; see Supplementary Table S7). Males were less likely to use avoidant coping strategies than females; junior staff was more likely to use avoidant coping strategies than senior staff. There were no differences between professions in their use of humour as a coping mechanism. Nurses were significantly more likely to use religion as a coping strategy than doctors (MD 0.54, SE 0.2, $p < 0.01$, adjusted $p = 0.03$; see Supplementary Table S8).

Staff tended to agree with statements regarding their fear of contracting COVID-19 and job stress. To a lesser extent, they also agreed with statements indicating a degree of concern about social stigma and social isolation in relation to

work. They tended not to have concerns about personal protective equipment (PPE) or the system and processes established in their workplace. Significant differences were noted with respect to levels of health fear ($p < 0.01$), job stress ($p < 0.01$), and social isolation and avoidance ($p < 0.01$), all of which survived regression analysis. Doctors reported significantly less concern than both nurses and radiographers in all three domains (see Supplementary Table S9). Radiographers reported significantly more concern regarding health fear than nurses (MD 0.4, SE 0.1). Staff broadly agreed with an altruistic statement about accepting risks involved in caring for patients with COVID-19, with no significant differences between groups.

Discussion

This study adds to a growing body of literature demonstrating the significant burden of mental health issues experienced by healthcare professionals globally during the COVID-19 pandemic. The strengths of this study include the use of validated assessment tools used, and the timing of the survey, which occurs at the peak of Ireland’s pandemic to date. COVID-19 hospitalisations peaked in Ireland on January 18th, 2021 at 2020, and the number of ICU patients peaked on January 23rd at 221 [31, 32].

Our estimate for the 1-week prevalence of moderate-severe symptoms of PTSD in Irish hospital workers (45%, 95% CI 40–50%) during the COVID-19 pandemic was higher than the current best estimate for psychotraumatic disorders internationally (31.1%, 95% CI 25.7–36.8%) and the prevalence of probable PTSD in NHS workers in the UK (30.2%, 95% CI 28.1–32.5) [18, 19]. This is an important finding, potentially indicating that Irish hospital workers were at least as distressed—if not more so—than their global peers. However, these international studies are marked by heterogeneity in terms of measures and cut-offs used, making direct comparisons difficult. In addition, as our survey occurred at the peak of Ireland’s pandemic, our findings may reflect acute stress reactions to the events at that time rather than prolonged effects from the initial waves of the pandemic. Rigorous longitudinal studies are required to determine if these issues persist. Of note, professions differ significantly, with radiographers and nurses reporting worse scores than doctors. These factors survived regression analysis, indicating that these issues are role-specific rather than due to other factors.

The prevalence of likely depression in this Irish cohort (28%, 95% CI 28–33%) is similar to the estimated pooled prevalence of depression in a recent meta-analysis of global studies (31.1%, 95% CI 25.7–36.8%) [19]. There are no data on WHO-5 wellbeing scores in Irish nursing staff and radiographers prepandemic. However, the prevalences of low

mood (46.0%, 95% CI 38.7–53.3%) and likely depression (26.0%, 95% CI 22.4–35.6%) for doctors during the pandemic were not significantly different from that reported pre-pandemic (i.e. low mood: 49.5%, 95% CI 47.2–41.8%; likely depression: 22.2%, 95% CI 20.3–24.1%) [6]. It is unclear whether this reflects the reality that doctors' well-being has not changed due to the pandemic or if this is a result of our methodology. One explanation could be that there is a ceiling effect of the WHO-5 wellbeing index in this population. However, given that the mean WHO-5 score in this study is lower than that seen in other studies in various populations, this seems unlikely [24]. Another explanation could be a selection bias favouring doctors who have low moods but, again, this seems unlikely given the similar findings in a pre-pandemic study [6]. This interesting finding warrants further longitudinal studies to clarify if these issues persist in both doctors and other healthcare professionals.

The 1-week prevalences of suicidal ideation and planning concerning at 13 and 5%, respectively. International estimates of suicidal ideation and planning (as a combined prevalence) in hospital workers vary from 5.4 to 12%; however, these are 2-week prevalences [33–37]. Only one study to date has reported suicidal planning as a separate item in hospital workers; this Spanish study found the 30-day prevalence to be 2.7% [38]. These apparently high levels of suicidal thinking in hospital staff warrant further investigation.

Unfortunately, there are no pre-pandemic data available on work ability for Irish radiographers or nurses. The prevalence of doctors reporting insufficient work ability (39%, 95% CI 34–44%) was significantly higher than the pre-pandemic prevalence (29%, 95% CI 27.1–31.3%), indicating that doctors' occupational functioning may have worsened [39]. However, it cannot be said for certain that this is due to the pandemic or to other factors.

Irish hospital workers report comparatively high levels of moral injury. The mean score of 22.3 (9.8) is significantly higher than that of US hospital staff at the beginning of the pandemic (MD 7.8, SE 1.1, $p < 0.0001$), and also significantly higher than that of NHS staff (MD 6.8, SE 0.149, $p < 0.0001$) [16, 18]. Again, doctors reported lower degrees of moral injury than other professions both before and after regression analysis. The largest mean differences were on the "betrayal" subscale; radiographers reported the highest numerical mean on this measure, indicating that they felt significantly higher levels of betrayal by previously trusted authority figures.

Regarding perceptions of the experience of the COVID-19 outbreak, views were similar to those reported by hospital workers during the SARS outbreak [28], with high levels of altruism reported. While professions report similar coping styles, this does not seem to have protected nurses and radiographers from higher levels of post-traumatic stress and moral injury.

Limitations

There are several limitations to this study. Firstly, as this is a cross-sectional study, it is not possible to say that the issues identified across hospital workers are caused by the pandemic or if they simply represent a continuation of longstanding problems. Secondly, individual hospital data censuses of staff and working hours differ substantially in their breakdowns of staff by profession, leaving us unable to perform an accurate analysis of whether our data are representative of all staff. Thirdly, any cross-sectional study is prone to selection bias, and it is possible that participants responded based on the level of their psychological distress. Our extrapolated response is low at 6%, meaning that our findings are prone to selection bias. Unfortunately, this is a common limitation in studies examining HCW mental health; one recent large study in the UK made substantial efforts to avoid this issue and obtained a response rate of 12% [18]. However, the similarly high levels of distress seen in this and other studies would suggest that there is a commonality to the experience of hospital workers during the COVID-19 pandemic.

Conclusions

In this survey performed during the peak of Ireland's COVID-19 pandemic, the prevalence of moderate-severe post-traumatic stress and the degree of moral injury are at least as high as those of hospital workers globally. Significant differences exist between professions in terms of mental health outcomes, highlighting the need for tailored psychological supports to be devised for staff. Robust longitudinal studies are required to assess if these issues persist in easing the pandemic and related social restrictions.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s11845-022-03056-0>.

Acknowledgements We thank the staff of St James's Hospital, Dublin, Beaumont Hospital, Dublin, and Tallaght University Hospital, Dublin, for taking the time to complete this survey.

Funding Open Access funding provided by the IReL Consortium.

Declarations

Ethics approval The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committee on human experimentation with the Helsinki Declaration of 1975, as revised in 2008. The authors assert that ethical approval for the publication of this study has been provided by the ethics committee of each participating institution.

Conflict of Interest DMM has received speaker's honoraria from MECTA and Otsuka and an honorarium from Janssen for participating

in an esketamine advisory board meeting. The other authors report no conflicts of interest.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Gómez-Ochoa SA, Franco OH, Rojas LZ, Raguindin PF, Rodríguez ZM, Wyssmann BM et al (2021) COVID-19 in health-care workers: a living systematic review and meta-analysis of prevalence, risk factors, clinical characteristics, and outcomes. *Am J Epidemiol* 190(1):161–175
- Aguilar E, Roberts NJ, Ulluruk I, Kaminski P, Barlow JW, Zori AG et al (2021) Adaptive staffing can mitigate essential worker disease and absenteeism in an emerging epidemic. *Proc Natl Acad Sci* 118(34):e2105337118
- Emanuel EJ, Persad G, Uphur R, Thome B, Parker M, Glickman A et al (2020) Fair allocation of scarce medical resources in the time of COVID-19. *N Engl J Med* 382(21):2049–2055
- Hennessey O, Fowler AL, Hennessey C, Brinkman D, Hogan A, Nugent E et al (2021) Riding the waves: the ongoing impact of COVID-19 on a national surgical training cohort. *Irish J Med Sci* (1971 -)
- Fawcett WJ, Charlesworth M, Cook TM, Klein AA (2021) Education and scientific dissemination during the COVID-19 pandemic. *Anaesthesia* 76(3):301–304
- Hayes B, Prihodova L, Walsh G, Doyle F, Doherty S (2017) What's up doc? A national cross-sectional study of psychological wellbeing of hospital doctors in Ireland. *BMJ Open* 7:e018023
- Duffy E, Avalos G, Dowling M (2015) Secondary traumatic stress among emergency nurses: a cross-sectional study. *Int Emerg Nurs* 23(2):53–58
- Chernoff P, Adedokun C, O'Sullivan I, McManus J, Payne A (2019) Burnout in the emergency department hospital staff at Cork University Hospital. *Irish J Med Sci* (1971 -) 188(2):667–674
- Sulaiman CFC, Henn P, Smith S, O'Tuathigh CMP (2017) Burnout syndrome among non-consultant hospital doctors in Ireland: relationship with self-reported patient care. *Int J Qual Health Care* 29(5):679–684
- de Wit E, van Doremalen N, Falzarano D, Munster VJ (2016) SARS and MERS: recent insights into emerging coronaviruses. *Nat Rev Microbiol* 14(8):523–534
- Maunder RG, Lancee WJ, Balderson KE, Bennett JP, Borgundvaag B, Evans S et al (2006) Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerging Infectious Disease journal* 12(12):1924
- Lee SM, Kang WS, Cho AR, Kim T, Park JK (2018) Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Compr Psychiatry* 87:123–127
- Ali S, Maguire S, Marks E, Doyle M, Sheehy C (2020) Psychological impact of the COVID-19 pandemic on healthcare workers at acute hospital settings in the South-East of Ireland: an observational cohort multicentre study. *BMJ Open* 10(12):e042930
- Foley SJ, O'Loughlin A, Creedon J (2020) Early experiences of radiographers in Ireland during the COVID-19 crisis. *Insights Imaging* 11(1):104
- Nash WP, Marino Carper TL, Mills MA, Au T, Goldsmith A, Litz BT (2013) Psychometric evaluation of the moral injury events scale. *Mil Med* 178(6):646–652
- Hines SE, Chin KH, Glick DR, Wickwire EM (2021) Trends in moral injury, distress, and resilience factors among healthcare workers at the beginning of the COVID-19 pandemic. *Int J Environ Res Public Health* 9:18(2)
- Wisco BE, Marx BP, May CL, Martini B, Krystal JH, Southwick SM et al (2017) Moral injury in U.S. combat veterans: results from the national health and resilience in veterans study. *Depress Anxiety*
- Lamb D, Gnanapragasam S, Greenberg N, Bhundia R, Carr E, Hotopf M et al (2021) Psychosocial impact of the COVID-19 pandemic on 4378 UK healthcare workers and ancillary staff: initial baseline data from a cohort study collected during the first wave of the pandemic. *Occup Environ Med*
- Marvaldi M, Mallet J, Dubertret C, Moro MR, Guessoum SB (2021) Anxiety, depression, trauma-related, and sleep disorders among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. *Neurosci Biobehav Rev* 126:252–264
- Government of Ireland (2021) Profile of county & LEA statistics
- Ourworldindata.org (2021) Daily new confirmed COVID-19 cases per million people [Confirmed cases, 7-day rolling average, Relative to population]
- Department of Health (2021) High-level task force on COVID-19 Vaccination: meeting note - 1 February 2021. <https://www.gov.ie/en/collection/37249-minutes-and-agendas-from-meetings-of-the-high-level-task-force-on-covid-19-vaccination/>
- Creamer M, Bell R, Failla S (2003) Psychometric properties of the impact of event scale - revised. *Behav Res Ther* 41(12):1489–1496
- Topp CW, Østergaard SD, Søndergaard S, Bech P (2015) The WHO-5 Well-Being Index: a systematic review of the literature. *Psychother Psychosom* 84(3):167–176
- Posner K, Brown GK, Stanley B, Brent DA, Yershova KV, Oquendo MA et al (2011) The Columbia-Suicide Severity Rating Scale: initial validity and internal consistency findings from three multisite studies with adolescents and adults. *Am J Psychiatry* 168(12):1266–1277
- Ruitenburt MM, Frings-Dresen MH, Sluiter JK (2012) The prevalence of common mental disorders among hospital physicians and their association with self-reported work ability: a cross-sectional study. *BMC Health Serv Res* 31(12):292–298
- Carver CS (1997) You want to measure coping but your protocol's too long: consider the brief COPE. *Int J Behav Med* 4(1):92–100
- Maunder RG, Lancee WJ, Rourke S, Hunter JJ, Goldbloom D, Balderson K et al (2004) Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. *Psychosom Med* 66(6):938–942
- Wu P, Fang Y, Guan Z, Fan B, Kong J, Yao Z et al (2009) The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry* 54(5):302–311
- Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N et al (2020) Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open* 3(3):e203976-e
- Ourworldindata.org (2021) Number of COVID-19 patients in intensive care (ICU). Raw figures
- Ourworldindata.org (2021) Number of Covid-19 patients in hospital, Ireland. Raw figures
- Cai Q, Feng H, Huang J, Wang M, Wang Q, Lu X et al (2020) The mental health of frontline and non-frontline medical workers during the coronavirus disease 2019 (COVID-19) outbreak in China: a case-control study. *J Affect Disord* 275:210–215

34. Xiaoming X, Ming A, Su H, Wo W, Jianmei C, Qi Z et al (2020) The psychological status of 8817 hospital workers during COVID-19 Epidemic: a cross-sectional study in Chongqing. *J Affect Disord* 276:555–561
35. Hong S, Ai M, Xu X, Wang W, Chen J, Zhang Q et al (2021) Immediate psychological impact on nurses working at 42 government-designated hospitals during COVID-19 outbreak in China: A cross-sectional study. *Nurs Outlook* 69(1):6–12
36. Young KP, Kolcz DL, O'Sullivan DM, Ferrand J, Fried J, Robinson K (2020) Health care workers' mental health and quality of life during COVID-19: results from a mid-pandemic, national survey. *Psychiatr Serv* 72(2):122–128
37. Xu X, Wang W, Chen J, Ai M, Shi L, Wang L et al (2021) Suicidal and self-harm ideation among Chinese hospital staff during the COVID-19 pandemic: prevalence and correlates. *Psychiatry Res* 296:113654
38. Mortier P, Vilagut G, Ferrer M, Serra C, Molina JD, López-Fresneña N et al (2021) Thirty-day suicidal thoughts and behaviors among hospital workers during the first wave of the Spain COVID-19 outbreak. *Depress Anxiety* 38(5):528–544
39. Hayes B, Prihodova L, Walsh G, Doyle F, Doherty S (2019) Doctors don't Do-little: a national cross-sectional study of workplace well-being of hospital doctors in Ireland. *BMJ Open* 9(3):e025433

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

