

Abstract

Background: Throughout the COVID-19 pandemic, health and social care workers have faced unprecedented professional demands, all of which are likely to have placed considerable strain on their psychological wellbeing.

Aims: To measure the national prevalence of mental health symptoms within healthcare staff, and identify individual and organisational predictors of wellbeing.

Method: The COVID-19 Staff Wellbeing Survey is a longitudinal online survey of psychological wellbeing amongst health and social care staff in Northern Ireland. The survey included four time points separated by three month intervals; time 1 (November 2020; n = 3,834) and time 2 (February 2021; n =2,898) results are presented here. At Time 2, 84% of respondents had received at least one dose of a COVID-19 vaccine. The survey included four validated psychological wellbeing questionnaires (depression, anxiety, post-traumatic stress, and insomnia), as well as demographic and organisational measures.

Results: At time 1 and 2, a high proportion of staff reported moderate to severe symptoms of depression (30-36%), anxiety (26-27%), post-traumatic stress (30-32%), and insomnia (27-28%); overall, significance tests and effect size data suggested psychological wellbeing was generally stable between November 2020 and February 2021 for health and social care staff. Multiple linear regression models indicated that perceptions of less effective communication within their organisation predicted greater levels of anxiety, depression, post-traumatic stress and insomnia.

Conclusions: This study highlights the need to offer psychological supports to all health and social care staff, and to communicate with staff regularly, frequently and clearly regarding COVID-19 to help protect staff psychological wellbeing.

The COVID-19 Staff Wellbeing Survey: a longitudinal survey of psychological wellbeing amongst health and social care staff in Northern Ireland during the COVID-19 pandemic

Background

The COVID-19 pandemic represents one of the most significant global threats to societal, physical, and mental health in over a generation. Evidence from representative community studies indicate that the general population in the UK have experienced clinical levels of a range of psychological symptoms, including anxiety (22%), depression (22%), and post-traumatic stress (17%)¹. Unsurprisingly, these figures are elevated for UK healthcare workers due to the considerable professional demands placed on them over a long-term period, with estimates of caseness (i.e. moderate to severe symptoms) at 27% for depression, 23% for general anxiety, and 30% for post-traumatic stress symptoms² throughout the early stages of the pandemic. During the same time period, lower caseness estimates for depression (15%) and anxiety (12%), but higher rates of post-traumatic stress (35%) were reported amongst medical and nursing staff in China. Exposure to unique stressors and wider organisational strain, including “moral injury” a source of psychological distress related to clinical pressures and decision-making that violates a staff member’s moral or ethical code³ may partially account for these enhanced mental health difficulties in healthcare staff.²

Data from previous outbreaks and the current COVID-19 crisis suggest that both organisational and individual factors can mitigate the psychological impact of the pandemic on health workers. Mental health burden can be offset by workplace measures such as clear communication; supportive team networks; access to adequate personal protection equipment (PPE); provision of relevant training for job role; and access to appropriate psychological support.^{4,5} Healthcare staff in front line positions involving direct contact with COVID-19

patients are also at higher risk of psychopathology.⁶ Moreover, such organisational variables are likely to interact with personal factors such as age; professional experience; personal coping styles; family exposure to COVID; and pre-existing psychological difficulties to influence vulnerability to distress.^{5,7}

Despite the rapidly evolving literature base on COVID-19-related mental health difficulties within healthcare staff, there remain a number of gaps in empirical understanding. Several prominent studies have focussed on a restricted number of healthcare professions (e.g., medics and nurses)⁸ as opposed to representative samples of the entire healthcare workforce, including neglected subgroups such as domestic and support services. There is also a widely-acknowledged need to move away from stand-alone cross-sectional studies and towards longitudinal methodologies examining the mechanism and course of mental health symptoms in staff over time.² Moreover, risk factors and protective buffers within healthcare staff and their parent organisations need to be identified and tracked in order to ensure the development of timely, nuanced staff-wellbeing support strategies.

Aims

A key aim of the present exploratory study was to examine the impact of organisational, demographic, and profession-specific factors on mental health. Online survey methodology was used to measure the national prevalence of mental health symptoms within health and social care staff as well as other relevant individual and organisational factors. It provides findings from the first two time points (3 months' apart) of a larger longitudinal study examining change in staff wellbeing during and after the second wave of the COVID-19 pandemic.

Method

Participants and design

The COVID-19 Staff Wellbeing Survey was open to all Health and Social Care (HSC) staff working in Northern Ireland. In Northern Ireland, both health and social care are provided by one organisation (HSC), in contrast to England where health care services are provided by the National Health Service and social care by local councils. The design incorporated both cross-sectional and longitudinal elements and spans four time points: Time 1 (November 2020), Time 2 (February 2021), Time 3 (May 2021) and Time 4 (August 2021). The time point spacing was designed to cover anticipated phases of the pandemic (e.g. COVID-19 wave peaks, pre & post vaccine), minimise survey fatigue effects, and allow for service development in response to findings between time points. Two time points have been completed thus far with data collection taking place during November 9th-22nd 2020 (Time 1) and February 8th-28th 2021 (Time 2). Staff were recruited via a broad range of methods including broadcast emails to all staff; emails to staff who left an email address at Time 1; posts on staff twitter and facebook; laminated posters in staff areas; and screensaver messaging. At the time of data collection, approximately 78,000 staff⁹ were employed in health and social care (HSC) roles in Northern Ireland, and were therefore eligible to take part. Of these staff, the cross-sectional sample sizes were 3,834 at Time 1 (response rate 4.9%) and 2,898 at Time 2 (response rate 3.7%). At Time 1, a total of 5,385 staff started to complete the survey with 71% of these completing it – further examination highlighted that respondents gradually dropped out throughout the survey and no specific question was particularly associated with dropout. Staff were given the option of leaving their email address at each time point to enable their responses to be linked over time; a longitudinal

dataset was created comprising the 632 staff who submitted their email address at Times 1 and 2.

Measures.

The COVID-19 Staff Wellbeing Survey collected a broad range of data including demographics; caring responsibilities; job satisfaction; psychological wellbeing; redeployment experiences; COVID-19 risk factors and exposure; environmental needs; communication; accessed mental healthcare services; and future psychological needs. The focus of this report is on the four psychological wellbeing outcome measures. The constructs measured included anxiety (Generalised Anxiety Disorder-7; GAD-7)¹⁰, depression (Patient Health Questionnaire-9; PHQ-9),¹¹ post-traumatic stress (Impact of Event Scale-Revised; IES-R),¹² and insomnia (Insomnia Severity Index; ISI).¹³ Established cut-off scores were used to designate symptoms as moderate-severe on these measures: ≥ 10 for GAD-7 and PHQ-9; ≥ 26 for IES-R; and ≥ 15 for ISI.^{6,10,11,13,14} The participants were instructed to complete the IES-R with 'respect to the COVID-19 outbreak'. The following variables were used as predictor variables of psychological wellbeing in the regression analyses: occupation, gender, age, COVID-19 exposure; if they managed patients with COVID-19; if they have one or more risk factors for COVID-19 (e.g. diabetes); perceived effectiveness of communication by their organisation on COVID-19 related matters, if they were asked to consider a redeployment opportunity; and if vaccinated (Time 2 only). All binary predictors were coded as follows: 0=no, 1=yes. Further details on the psychological wellbeing outcome and predictor variables are included in Supplementary Table 1.

Procedure

Respondents voluntarily completed the survey online via the Survey Mechanics platform. At Time 2 they were instructed that they could take part even if they had not participated at Time 1. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures involving human subjects/patients were approved by West of Scotland Research Ethics Service (REC reference 20/WS/0122). Participants indicated their consent to participate by clicking to start the questionnaire after reading the online information sheet. Participants were free to withdraw from the study at any stage while completing the questionnaire up until they clicked 'submit' at the end of the questionnaire. Both the information sheet and the final page of the questionnaire provided details of individuals they could contact regarding psychological wellbeing support.

Statistical analysis

All analyses were conducted using IBM SPSS Statistics version 26 for Windows. The demographic profiles of the Time 1 and 2 cross-sectional samples were compared using the χ^2 -test for categorical variables and independent t-tests for continuous variables. T-tests were used on the cross-sectional (Independent t-tests) and longitudinal (Paired t-tests) samples to examine change over time on total scores of the psychological wellbeing measures. Chi-square (cross-sectional samples) and McNemar (longitudinal sample) tests provided an assessment of change over time in the proportion of HSC staff reporting moderate to severe depression, anxiety, post-traumatic stress and insomnia symptoms. The purpose of the longitudinal analysis was to check if changes in the cross-sectional sample were replicable or likely due to differences in the composition of the samples at the two time

points. Multiple linear regression models with simultaneous entry were then used to examine predictors of psychological wellbeing for the Time 1 and 2 cross-sectional samples.

All survey questions were mandatory (except email address); hence there were no missing values on any of the variables reported here, except for age where a small number of impossible values were recorded (Time 1, 0.3%; Time, 2 0.3%). In the regression models which included age as a covariate, listwise deletion was used.

Results

Sample characteristics

Participant characteristics at Time 1 (n=3,834) and 2 (n=2,898) for the cross-sectional samples are presented in Table 1. Statistical analyses indicated that the profiles of the cross-sectional samples were comparable for the two time points. The average age of both samples was 44 years, and at both time points the vast majority of respondents were female (82-83%). This pattern is in keeping with the HSC Staff census data¹⁵ which shows that females comprise four fifths (79%) of the workforce. The age profile of the Time 1 sample and the HSC staff profile is reasonably similar (34 years and under, Time 1 = 23%, population data = 28%; 35 -44 years, Time 1 = 28%, population data = 26%; 45 -54 years, Time 1 = 33%, population data = 27%; 55 years plus, Time 1 = 16%, population data = 19%). The samples at both time points were highly educated, with three quarters (74-75%) reporting being educated to level four (e.g. university degree) or above.

A large proportion of the participants worked in *administrative and clerical* (28%), *nursing and midwifery* (24%), and *professional and technical* (20-21%) roles. Compared to occupational distribution data for HSC staff¹⁵ (figures exclude care home and senior executives) the achieved sample has good representation from most sectors. Groups of staff

with more desk-based roles such as administrative and clerical (Time 1 28% vs population data 19%) and professional and technical (Time 1 20% vs population data 15%) who would have had greater access to computers, unsurprisingly tended to be over-represented in the survey while those with greater patient contact (e.g. nursing and midwifery (Time 1 24% vs population data 33%) were under-represented. Support services/user experience were the most under-represented in the present sample; this sector typically comprises approximately 10% of the health and social care workforce, five times the proportion achieved in Time 1 of the COVID-19 Wellbeing survey. At Time 2, 84% of respondents reported that they had received at least one dose of a COVID-19 vaccine. Generally speaking the longitudinal sample had a similar demographic profile to the cross-sectional sample (see Supplementary Table 2). However, with the longitudinal sample the over-representation of administrative and clerical and *professional and technical* staff was greater, as was the under-representation of *nursing and midwifery staff*.

<insert Table 1 about here>

Psychological wellbeing of staff at Time 1 and 2.

A high proportion of staff reported moderate to severe symptoms of depression, anxiety, PTSD, and insomnia in the Time 1 (26 - 30%) and 2 (27 - 36%) cross-sectional samples (Figure 1).

<insert Figure 1 about here>

Comparisons of the cross sectional samples (Supplementary Tables 3 and 4) revealed a significantly higher proportion of respondents reporting moderate to severe depression at Time 2 than Time 1 ($\chi^2 = 22.51$, $df = 1$, $p < .001$, $d = .12$); no significant difference was

evident for anxiety ($\chi^2 = 1.15$, $df = 1$, $p = .284$, $d = .03$), post-traumatic stress ($\chi^2 = 2.65$, $df = 1$, $p = .104$, $d = .04$), or insomnia ($\chi^2 = 1.01$, $df = 1$, $p = .315$, $d = .02$). The Time 1 and 2 samples were also compared using the total scores on the four psychological wellbeing measures; significantly poorer wellbeing was evident in the Time 2 sample compared to the Time 1 sample for depression ($t(6123.28) = -4.84$, $p < .001$, $d = .12$), distress ($t(6127.42) = -2.42$, $p = .016$, $d = .06$), and insomnia ($t(6730) = -2.06$, $p = .039$, $d = .05$), but not for anxiety ($t(6730) = -1.01$, $p = .312$, $d = .02$). All comparisons between the cross-sectional samples yielded small effect sizes.

Comparable analyses were performed using the longitudinal sample (see Supplementary Tables 3 and 4). In keeping with the cross-sectional results, descriptive data for the longitudinal samples follow the trend of poorer wellbeing at Time 2 compared to Time 1. However, statistical analyses using McNemar tests showed no significant difference over time in the proportion reporting moderate to severe symptoms for depression ($p = .071$), anxiety ($p = .694$), distress ($p = .863$) or insomnia ($p = .395$) in the subsample for whom we had longitudinal data for. Paired t tests showed no significant change over time for depression ($t(631) = -1.94$, $p < .053$, $d = .08$), post-traumatic stress ($t(631) = -.45$, $p = .656$, $d = .02$), or anxiety ($t(631) = .01$, $p = .992$, $d = .00$); a small but significant increase in insomnia symptoms was observed ($t(631) = -2.34$, $p = .020$, $d = .09$).

Predictors of psychological wellbeing

Predictors of psychological wellbeing were considered at Time 1 (Supplementary Table 5) and 2 (Table 2). Both sets of analyses considered identical predictors, except that the Time 2 models also included if the participant had been vaccinated against COVID-19. All occupations were compared against those in *nursing and midwifery* roles, as this was one of the largest occupational groups in the sample and many of these staff would have been in

frontline roles during the COVID-19 pandemic. The general pattern across the psychological wellbeing measures at Times 1 and 2, indicated that *nursing and midwifery* staff have similar psychological wellbeing symptoms to *ambulance, carehome, estates, dental, senior executive, and social services* staff. *Nursing and midwifery* staff tended to have poorer psychological wellbeing compared to *medical* and *professional and technical* staff, but better psychological wellbeing than *support services* staff. At Time 1 only, *administrative and clerical* staff had greater anxiety, depression and post traumatic stress than nursing and midwifery staff.

At both time points, a significant relationship was evident between at least two of the four psychological wellbeing measures and the organisational/risk factor variables. Specifically, poorer psychological wellbeing was associated with managing COVID-19 patients, having had higher exposure to COVID-19, having at least one COVID-19 risk factor, perceiving the communication from their organisation to have low effectiveness, and being asked to consider a redeployment opportunity. Across both time and psychological wellbeing measures, the perceived effectiveness of communication by their organisation on COVID-19 related matters was the strongest predictor of wellbeing ($\beta = -.19$ -.25).

<insert Table 2 about here>

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Discussion

Main findings and comparison with findings from other studies

This study, a sample including all statutory health and social care organisations in a whole nation of the UK (Northern Ireland), has found high rates of depression, anxiety, post-traumatic stress, and insomnia. It is the first study on health care staff to report longitudinal findings before and after staff have received their first vaccination. Across the two time points many staff reported moderate to severe levels of depression on the PHQ-9 (Time 1 = 30%, Time 2 = 36%), anxiety on the GAD-7 (Time 1 = 26%, Time 2 = 27%), PTSD on the IES-R (Time 1 = 30%, Time 2 = 32%), and of insomnia on the ISI (Time 1 = 27%, Time 2 = 28%). The results of cross-sectional analysis were broadly mirrored in the longitudinal analyses in that the psychological distress levels remained consistently high across the time points; where significant differences did occur the effect sizes were very small.

The rates reported here appear higher than those in the general UK and Irish populations during the first year of the pandemic.^{1,16} Shevlin et al¹ report rates of moderate to severe depression on the PHQ-9 of 22%, that of anxiety on the GAD-7 of 22% and that of post-traumatic stress on the International Trauma Questionnaire of 17%. Our results are broadly in keeping with the higher end of estimates of caseness amongst health care workers elsewhere during the COVID-19 pandemic. Worldwide studies have demonstrated very significant levels of anxiety, depression, insomnia, and post-traumatic stress in health care workers with estimates of caseness ranging from 15- 27% for depression, 12-23% for general anxiety, and 30-35% for post-traumatic stress symptoms.^{2,6} However, we do note a recent review of populations affected by COVID¹⁷ that found no significant differences between healthcare workers and other populations affected by COVID-19 on measures of depression,

anxiety and PTSD but twice the levels of insomnia – all groups in their analysis suffered much higher rates than would be expected.

In terms of predictors of distress, in keeping with previous literature,¹⁸⁻²⁰ we found a range of individual and organisational variables have a role in predicting distress at both time points. Importantly, a strength of our sample was that it included all roles and jobs within the health and social care system in Northern Ireland. An important finding was that at Time 1, administrative and clerical staff and support services staff (e.g. cooks, cleaners, porters) had greater anxiety, depression and post-traumatic stress than nursing and midwifery staff. At both time points, we found a significant association between at least two of the four psychological wellbeing measures and the organisational/risk factor variables. Across both time and psychological wellbeing measures, the perceived effectiveness of communication by their organisation on COVID-19 related matters was the strongest predictor of wellbeing. Vaccination uptake at Time 2 did not predict wellbeing. It should be noted that the predictive models explained 10-12% of the variation in the four psychological wellbeing measures, meaning other factors not tapped by the models clearly contribute to staff wellbeing as well.

Implications

The high rates of distress are in keeping with the need to provide interventions and prevention strategies to all types of health care workers both during this pandemic and as health systems are recovering from it. Despite the majority of our sample receiving their first vaccination at Time 2 this did not appear to improve staff mental health. It appears organisations can't rely on a vaccine 'bounce' to improve the wellbeing and mental health of their staff. While the evidence regarding effective staff support interventions is relatively sparse there is a need for intervention strategies to be developed at an individual, team and

organisational level.^{18,21} Examples of interventions include psychological assistance hotlines, online courses, group activities to help with stress.²² Interventions may also include preventative approaches and the provision of timely and accessible individual mental health treatments in cases of emerging mental health problems.²³

This study highlights that the provision of staff support interventions should not just be targeted at staff that are exposed to COVID-19 or that are working with COVID-19 patients. The results demonstrated that administration staff (secretaries and receptionists) as well as staff involved in support services (cooks, cleaners and porters) were at higher risk of distress than other staff groups. An effective health service needs a wide variety of jobs and roles to function effectively. It is imperative support interventions are available and accessible to all.

The findings are entirely consistent with a body of research highlighting the importance of organisational factors to staff wellbeing.^{24,25} This may very well be more important in a pandemic. By its very nature the situation is often entirely new to staff and guidance can change on a daily basis. Several professional bodies in the UK have highlighted the importance of a communication strategy to staff wellbeing and the importance of communicating with staff regularly, frequently and in simple clear ways.²⁶ Muller et al.²¹, in a recent review, do note the frequent mismatch in studies of staff support interventions of the likely organisational sources of distress (communication, lack of PPE, workload) and the frequent focus on relieving distress at an individual level.

Limitations

The starting point of this study was during the second wave of the pandemic (November 2020) and the second time point was February 2021. An obvious limitation is the lack of pre-pandemic baseline of staff mental health. However, as stated earlier we can compare rates to a number of studies of general population in the UK and Ireland during the pandemic.^{1,16} While there have been few psychiatric epidemiological studies in Northern Ireland to compare our rates to, the one exception is rates of PTSD. The Northern Ireland Study of Health and Stress, part of the World Mental Health Survey Initiative previously reported levels of PTSD in Northern Ireland of 5%.²⁷ Our current rates of PTSD, as measured by the IES-R are considerably higher.

It is strength of our study that we included all staff groups. However, there was low uptake from some occupations (e.g., support services) meaning that the rates cannot be used as precise 'prevalence rates' for the whole of the health and social care sector. Rather they provide a general indication of the level of need. In staff surveys in Northern Ireland that were run pre COVID-19, response rates have tended to be lowest in this sector, as they can be particularly hard to reach (i.e. no trust email addresses). Engaging with this group during a pandemic has become even more challenging due to infection control rules (e.g. no postal option possible, strict rules on use of posters). Given that the group who were most underrepresented tended to have poorer mental health, the overall prevalence figure may be an under estimation of levels of distress amongst staff.

A further limitation is that our indicators of mental health are based on survey self-report data rather than diagnosis based on clinical interviews. Of course, we have used instruments with good psychometric properties and our methodology is in keeping with all other studies of staff mental health during the pandemic that we are aware of. It should also be acknowledged that there is a lack of consensus regarding established clinical cut-offs for use with the IES-R; to allow for international comparisons we adopted that used by Lai et al.⁶

Conclusion

This study is one of the first longitudinal studies of staff mental health and wellbeing during the COVID-19 pandemic to report. It strengthens the argument to provide a comprehensive system of staff supports to all health and social care staff during and post this pandemic. This would appear essential if health services begin to recover function following this global pandemic.

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Declaration of Interest

The authors (JAJ, CS, DB, EC, JM, KK, SH, TM, CM, KFWD) are employed by the Health and Social Care Trusts in Northern Ireland (Northern Health and Social Care Trust; Belfast Health and Social Care Trust; Southern Health and Social Care Trust, South Eastern Health and Social Care Trust; Western Health and Social Care Trust) – staff from these organisations took part in the COVID-19 Staff Wellbeing Study

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Author contribution

JAJ, CS, & KD formulated the research questions, secured funding for the study, and led in the drafting of the manuscript. The analyses were undertaken by JAJ. All authors were involved in designing and carrying out the study, interpreting the findings, and drafting the manuscript. The final manuscript was approved by all authors prior to submission.

Data availability

The data that support the findings of this study are available from the corresponding author (CS), upon reasonable request. Demographic data will be aggregated in order to protect the identity of the participants.

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