Psychological distress during the acceleration phase of the COVID-19 pandemic: a survey of doctors practising in Emergency Medicine, Anaesthesia and Intensive Care Medicine in the United Kingdom and Republic of Ireland

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ABSTRACT

Objective

To quantify psychological distress experienced by emergency, anaesthetic and intensive care doctors during the acceleration phase of COVID-19 in the UK and Republic of Ireland.

Methods

Initial cross-sectional electronic survey distributed during acceleration phase of the first pandemic wave of COVID-19 in the UK and Republic of Ireland (United Kingdom: 18/03/2020 – 26/03/2020 and Ireland: 25/03/2020 – 02/04/2020). Surveys were distributed via established specialty research networks, within a three-part longitudinal study. Participants were Doctors working in emergency, anaesthetic and intensive medicine during the first pandemic wave of COVID-19 in acute hospitals across the United Kingdom and Republic of Ireland. Primary outcome measures were the General Health Questionnaire-12 (GHQ-12). Additional questions examined personal and professional characteristics, experiences of COVID-19 to date, risk to self and others, and self-reported perceptions of health and wellbeing.

Results 5440 responses were obtained, 54.3%, (n=2955) from Emergency Medicine and 36.9% (n=2005) from Anaesthetics. All levels of doctor seniority were represented. For the primary outcome of GHQ-12 score, 44.2% (n=2405) of respondents scored >3, meeting the criteria for psychological distress. 57.3% (n=3045) had never previously provided clinical care during an infectious disease outbreak but over half of respondents felt somewhat prepared (48.6%, n=2653) or very prepared (7.6%, n=416) to provide clinical care to COVID-19 patients. However, 81.1% (n=4414) either agreed (31.1%, n=2709) or strongly agreed (31.1%, n=1705) that their personal health was at risk due to their clinical role.

Conclusions Findings indicate that during the acceleration phase of the COVID-19 pandemic almost half of front-line doctors working in acute care reported psychological distress as measured by the GHQ-12. Findings from this study should inform strategies to optimise preparedness and explore modifiable factors associated with increased psychological distress in the short and long-term.

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KEY SUMMARY

What is known already?

- The COVID-19 outbreak has already placed exceptional demand on healthcare systems globally and is likely to continue to do so for the foreseeable future.
- Emergency and critical care doctors are responsible for the management of severely unwell COVID-19 patients. These doctors may be vulnerable to suffering recognised negative psychological effects associated with infectious disease outbreaks, including absenteeism, impaired occupational performance and long-term health conditions.

What does this paper add?

- This paper presents key findings from the first phase of a cross-sectional longitudinal survey of practising emergency, anaesthetic and intensive care doctors in UK and Republic of Ireland during the acceleration phase of the first wave of the COVID-19 pandemic.
- The findings report a rate of psychological distress in responders of 44.2%. This work clarifies the extent and severity of cross specialty psychological impact during the early phase of a pandemic.
- These results could be used as a comparison for other studies analysing the psychological impact of infectious disease outbreaks at different timepoints or different regions.

Introduction

On January 30th, 2020, the World Health Organisation (WHO) declared Coronavirus Infectious Disease 2019 (COVID-19) a Public Health Emergency of International Concern. Following subsequent acknowledgment of disease severity, COVID-19 was declared a global pandemic on March 11th 2020. [1] Clinical studies have consistently demonstrated high acuity amongst hospitalised patients, with approximately 17% requiring intensive care. [2] In addition, high infection rates have been registered in frontline clinicians, with over 106 fatalities reported in UK NHS healthcare workers by the 12th of April 2020 [3] and over 550,000 global deaths reported by July 2020. [4]

The rapidity, scale and severity of the pandemic has placed exceptional demands on acute care globally, and this workforce has faced unprecedented burden in workload intensity and personal health risk. Such demands are likely to impact upon psychological wellbeing, including an increased risk of traumatic stress in both the acute phase and at long term follow up. [5–8] Elevated psychological distress has significant consequences for health workers; increased sickness rates, absenteeism, impaired performance at work and the development of physical health problems are common examples. [9–11] However, studies to date that have focused on the disaster or infectious disease setting have been conducted during peak or following the occurrence of infectious outbreaks, making meaningful comparison with pre-peak incidence very difficult. In the wider literature the reported prevalence of distress during pre-COVID-19 times, has been reported as 28.5% in ICU doctors (n=627) and 44.4% Emergency Medicine Consultants (n=350). [12,13]

Establishing the prevalence of psychological distress, and the associated personal and professional factors, is essential to ensure adequate provision of support and mitigation of adverse effects. Several factors may be associated with poorer psychological outcomes, but these need to be established as relevant in the context of the COVID-19 pandemic. [5,14–17] Prospective longitudinal studies are needed to more fully assess the definitive impact of this major outbreak upon psychological wellbeing. [18]

The COVID-19 Emergency Response Assessment (CERA) study is a 3-part longitudinal study, designed to enhance our understanding of the impact of such events on the workforce, and underpin the development of policy and interventions to meet the needs of those affected. [19] The primary aim of this CERA phase one study is to quantify the degree of psychological distress in emergency medicine (EM), anaesthesia and intensive care medicine (ICM) doctors in the acceleration phase of the first wave of the COVID-19 pandemic in the UK and Republic of Ireland. The secondary aim is to provide a

descriptive synthesis of baseline personal and professional characteristics commonly associated with poorer outcomes related to psychological distress and trauma.

Materials and methods

A quantitative online cross-sectional survey of acute care doctors practising EM, anaesthesia or ICM in the UK and Republic of Ireland. This was the first part of a longitudinal survey to be distributed at pre-planned phases aligned to the Centre for Disease Control and Prevention (CDC) pandemic model: (i) the acceleration phase, (ii) the pandemic peak, and (iii) the deceleration/ recovery phase of the initial COVID-19 pandemic wave in the UK and Ireland. [20] Data were gathered in the acceleration phase between the 18th - 28th March 2020 in the UK, and 25th March - 4th April 2020 in the Republic of Ireland. Results are presented in accordance with the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). [21] The protocol for the full three phase longitudinal study is published and available from (http://dx.doi.org/10.1136/bmjopen-2020-039851). [22] The study was prospectively registered on an open access platform, ISCTRN registry number 10666798 (https://doi.org/10.1186/ISRCTN10666798).

Participants and procedure

Doctors of all grades working in EM, anaesthesia or ICM were invited to participate in the study. Responses excluded from analysis included those from other healthcare professional groups and doctors working outside of EM, anaesthesia and ICM, and doctors working in hospitals based outside of the UK or Republic of Ireland. Participants were invited through a multispecialty collaboration of established UK and Irish acute care research networks, led by the Trainee Emergency Research Network (TERN). These include Research and Audit Federation of Trainees (RAFT), Paediatric Emergency Research in the UK and Ireland (PERUKI, Trainee Research in Intensive Care (TRIC), Irish Trainee Emergency Research Network (I-TERN) and Irish Specialist Anaesthesiology Trainee Audit & Research Network (SATARN). The survey participation link was not shared on wider social media platforms in order to mitigate against duplicate completion and completion by respondents not meeting pre-specified inclusion criteria. Access to the survey link was distributed directly to individual participants in each department or hospital by members of the above research networks working within the same department or hospital. This was achieved using established communication links within departments and hospital. To supplement this strategy RAFT emailed members directly. All participants provided informed electronic consent prior to beginning the survey.

The survey was administered via the Research Electronic Data Capture (REDCap) online platform. [23,24] REDCap is fully compliant with Good Clinical Practice, GDPR and 20 ISO 27001. Data was held securely on secure online server hosted by the University Hospitals Bristol and Weston NHS Foundation Trust, UK. Participants were identifiable through their email address, but this data was only available to the Chief Investigator (TR) and data extracted for analysis was anonymised. Participants could exit the survey at any time if they no longer wished to participate. In this event, data from questions already completed were included for analysis, in line with consent. The recruitment process is detailed further in the protocol. [22]

Measures

The General Health Questionnaire-12 (GHQ-12) is a brief, 12 item self-report measure devised to screen for psychological distress in the general population. [25] It has high specificity and sensitivity, with reliability demonstrated across a range of cultures and populations, [26,27] and has been used in similar studies measuring psychological impact of infectious outbreaks. The GHQ-12 was chosen due to its brevity and suitability for time-poor medical staff. [5,14] The measure assesses current state (rather than long-standing attributes) and asks participants to compare to their own baseline.

Data were also collected on personal and professional factors commonly associated with psychological distress in medical or disaster settings, [5,14–17] derived from a literature review and iterative discussion within the study steering group. Items were included where relevance has previously been established and replicated (for example, factors commonly associated with psychological distress) or where relevance was justified in the context of the current pandemic. Final inclusion was by consensus, underpinned by a requirement for the survey to be sufficiently brief to encourage full and repeated completion (see online supplementary material for a full report of included items, minus the GHQ-12, which has been removed for copyright reasons).

Ethical and regulatory approvals

Ethical approval was provided by the University of Bath (UK), and Children's Health Ireland at Crumlin (Ireland). Regulatory approval was provided by the UK Health Research Authority (ref 218944).

Analysis

Individual study records were checked and validated by the study chief investigator (TR) and statistician (WH) at survey completion; data was excluded in the event of duplicate entry (by email address), absence of consent or non-completion of a predetermined minimum required dataset for

analysis (completion of GHQ-12, grade, department, and hospital). Descriptive statistics relating to personal and professional characteristics are presented overall, and by department and geographic region.

GHQ-12 scores will be presented using two validated methods. [26] The first (bi-modal) method is used to identify a clinical cut off for psychological distress; the second method (Likert-type) is more sensitive to change in psychological distress over time and is most suitable for comparison between different time points. In the bi-modal method, item responses are assigned to the values 0, 0, 1, 1 (from the most positive to the most negative sentiment) and summed to form an aggregate score from zero (least distressed) to 12 (most distressed). A score of more than 3 is indicative of psychological distress. [26] The Likert-type 0-1-2-3 method is also presented. This forms an aggregate score from zero (least distressed) to 36 (most distressed). This method is more sensitive to changes within individuals over time and was included for consistency with subsequent longitudinal analyses using survey data from phases 2 and 3. Distribution of GHQ-12 aggregate scores were described using quartiles, and comparisons between different personal and professional characteristics were made. A descriptive synthesis was used to summarise key findings in relation to the personal and professional characteristics.

All analyses and statistical outputs were produced using the statistical programming language R v3.6.3. [28] Analysis scripts for this study are available on a GitHub repository: https://github.com/wjchulme/TERN-CERA-study

Patient and Public Involvement

The research team is primarily made up of frontline doctors from all represented specialties who undertook clinical work throughout the first wave of the COVID-19 pandemic on the frontline.

Results

Enrolment is summarised in figure 1. The online survey link was accessed 8111 times, of which 5440 (67%) were suitable for analysis. This represents 15.9% of an estimated 34,188 doctors working across EM (11,843), Anaesthetics (20,556) and ICU (1789) in the UK and Ireland (data as per a freedom of information request to the General Medical Council UK and declared numbers by Ireland site leads). The GHQ-12 completion rate was 95.9% (n=5218 / 5440) of participants eligible for analysis. Online supplementary material outlines the adherence to the CHERRIES checklist.

Sample characteristics

Demographics of the study population are summarised in Table 1 and were similar across all specialties. The median age was 31-35, 50.4% (n=2648) were male, and 37.4% (n= 2033) identified as a Junior Doctor grade.

Table 1 *Demographic characteristics*

	All (N=5440)	**Anaesthetics (N=2005)**	**Emergency Medicine (N=2955)**	**Intensive Care (N=920)**
Age				
20-25	204 (3.8%)	5 (0.2%)	182 (6.2%)	17 (1.9%)
26-30	1373 (25.3%)	355 (17.7%)	882 (29.9%)	221 (24.1%)
31-35	1313 (24.2%)	477 (23.8%)	702 (23.8%)	258 (28.1%)
36-40	865 (15.9%)	331 (16.5%)	458 (15.5%)	154 (16.8%)
41-45	659 (12.1%)	277 (13.8%)	337 (11.4%)	85 (9.3%)
46-50	447 (8.2%)	219 (10.9%)	203 (6.9%)	82 (8.9%)
51-55	315 (5.8%)	182 (9.1%)	108 (3.7%)	55 (6.0%)
56-60	174 (3.2%)	102 (5.1%)	56 (1.9%)	31 (3.4%)
61-65	72 (1.3%)	48 (2.4%)	20 (0.7%)	11 (1.2%)
66-70	8 (0.1%)	6 (0.3%)	1 (0.0%)	3 (0.3%)
>70	3 (0.1%)	1 (0.0%)	2 (0.1%)	0 (0.0%)
Missing	7	2	4	3
Gender				
Male	2648 (50.4%)	986 (50.8%)	1421 (49.8%)	490 (55.2%)
Female	2601 (49.5%)	953 (49.1%)	1427 (50.0%)	396 (44.6%)
Other	9 (0.2%)	2 (0.1%)	6 (0.2%)	1 (0.1%)
Missing	182	64	101	33
Seniority				
Junior Doctor	2033 (37.4%)	515 (25.7%)	1308 (44.3%)	327 (35.5%)
Middle Grade Doctor	1254 (23.1%)	463 (23.1%)	658 (22.3%)	248 (27.0%)
Senior Doctor (Consultant Grade)	1694 (31.1%)	892 (44.5%)	676 (22.9%)	284 (30.9%)
Other Senior Doctor	459 (8.4%)	135 (6.7%)	313 (10.6%)	61 (6.6%)
Nation				
England	4310 (79.2%)	1593 (79.5%)	2313 (78.3%)	738 (80.2%)
Northern Ireland	167 (3.1%)	83 (4.1%)	64 (2.2%)	39 (4.2%)
Republic of Ireland	416 (7.6%)	85 (4.2%)	317 (10.7%)	55 (6.0%)
Scotland	367 (6.7%)	120 (6.0%)	228 (7.7%)	47 (5.1%)
Wales	180 (3.3%)	124 (6.2%)	33 (1.1%)	41 (4.5%)
Geographical Region (England)				
East Midlands	303 (5.6%)	138 (6.9%)	133 (4.5%)	47 (5.1%)
East of England	327 (6.0%)	123 (6.1%)	179 (6.1%)	54 (5.9%)

London	818 (15.0%)	201 (10.0%)	560 (19.0%)	88 (9.6%)
North East	210 (3.9%)	73 (3.6%)	112 (3.8%)	47 (5.1%)
North West	596 (11.0%)	246 (12.3%)	270 (9.1%)	128 (13.9%)
South East	629 (11.6%)	196 (9.8%)	402 (13.6%)	84 (9.1%)
South West	686 (12.6%)	279 (13.9%)	318 (10.8%)	126 (13.7%)
West Midlands	340 (6.2%)	146 (7.3%)	161 (5.4%)	78 (8.5%)
Yorkshire and the Humber	401 (7.4%)	191 (9.5%)	178 (6.0%)	86 (9.3%)
Geographical Region (Republic of Ireland)				
Dublin	221 (4.1%)	37 (1.8%)	173 (5.9%)	27 (2.9%)
Rest of Ireland	195 (3.6%)	48 (2.4%)	144 (4.9%)	28 (3.0%)
Redeployed				
No	4920 (90.7%)	1628 (81.4%)	2830 (96.1%)	865 (94.2%)
Yes	506 (9.3%)	373 (18.6%)	116 (3.9%)	53 (5.8%)
Missing	14	4	9	2
GHQ12 (0-1-2-3)				
Median (Q1-Q3)	13 (10-17)	14 (11-18)	13 (10-16)	14 (11-17)
Mean	14.0	14.7	13.5	14.2
Missing	222	86	114	37
GHQ12 (0-0-1-1)				
≤3	2813 (53.9%)	913 (47.6%)	1663 (58.5%)	439 (49.7%)
>3	2405 (46.1%)	1006 (52.4%)	1178 (41.5%)	444 (50.3%)
Missing	222	86	114	37

Prevalence of psychological distress

Analysis of GHQ-12 data indicated that 44.2% (n=2405) of respondents reached study threshold for psychological distress (>3 using 0-0-1-1 method) (figure 2). This was higher in both Anaesthetics (52.5%, n=1006) and ICM (50.3%, n=444) when compared to EM (41.5%, n=1178). The median aggregate GHQ-12 score (using the 0-1-2-3 method) was 13 (Q1-Q3: 10-17) (figure 3). Collated results to the individual GHQ-12 questions items are displayed in figure 4. From this visual representation, the domains of concentration, sleep, being under strain and day to day enjoyment of activities were negatively affected. The highest median GHQ-12 score by grade and department was 15 (Q1-Q3: 11-18) in 'other senior doctors' working in Anaesthetics, compared to the lowest median score of 13 (Q1-Q3: 10-16) found in all four grade cohorts working in EM (figure 5). The GHQ-12 was found to have good internal consistency in this population (Cronbach's alpha=0.846 (95% CI = 0.838–0.853). GHQ-12 bar charts are available for all items in online supplementary material.

Professional Characteristics

Professional characteristics are summarised in Table 2, with data on all items provided in the online supplementary material. Over half (57.3%, n=3045) reported no prior experience of providing care during infectious disease outbreaks. Although 39.5% (n=2073) reported having no education regarding the clinical care of patients with suspected COVID-19, 48.6% (n= 2643) felt 'somewhat prepared' to do so. A total of 56.2% (n=3058) of respondents reported zero (21%) or low (1-5 cases; 35.2%) direct clinical contact with suspected COVID-19 cases. Only 9.3% (n=506) of participants were redeployed to

other clinical areas, 73.7% (n=373) of those redeployed were from Anaesthetics and the majority of all those redeployed (70.9% (n= 359)) were redeployed to ICM. For those doctors redeployed to another clinical area, the median GHQ-12 was 14 (Q1-Q3: 11-18) compared to 13 (Q1-Q3: 10-17) in those not redeployed (figure 6). The location of redeployment did not make a substantial difference to median GHQ-12 scores (online supplementary material).

Table 2 *Professional Factors*

Training and experience			
Have you previously provided direct clinical care to any patients affected by these infectious diseases?*	n	% of total	% of non-missing
None of the below	3045	57.3	48.3
Ebola virus	166	3.1	2.6
MERS-CoV	323	6.1	5.1
SARS	279	5.2	4.4
Chikungunya	152	2.9	2.4
Cholera	160	3.0	2.5
Influenza (swine, avian, zoonotic)	1996	37.5	31.6
Zika virus	80	1.5	1.3
Other	107	2.0	1.7
(Missing)	122	2.2	-
How many suspected cases of Covid-19 have you had direct clinical contact with since March 1st 2020?	n	% of total	% of non-missing
0	1144	21.0	22.0
1-5	1914	35.2	36.8
6-10	879	16.2	16.9
11-15	465	8.5	8.9
16-20	325	6.0	6.2
21-25	139	2.6	2.7
26-30	102	1.9	2.0
31-35	25	0.5	0.5
> 36	212	3.9	4.1
(Missing)	235	4.3	-
How confident do you feel in the infection control training that has been provided to you?	**n**	**% of total**	**% of non-missing**
Not confident at all	461	8.5	8.9
Somewhat not confident	1193	21.9	23.0
Neither not confident or confident	1118	20.6	21.5
Somewhat confident	2150	39.5	41.4
Very confident	274	5.0	5.3
(Missing)	244	4.5	-
How prepared do you feel to provide direct care to suspected cases?	n	% of total	% of non-missing
Completely unprepared	195	3.6	3.8
Somewhat unprepared	1365	25.1	26.3
Neither unprepared or prepared	577	10.6	11.1
Somewhat prepared	2643	48.6	50.9
Very prepared	416	7.6	8.0

(Missing)	244	4.5	-
How do you feel the care received by patients who are NOT presenting with either symptoms or a diagnosis of COVID-19 is?	**n**	**% of total**	**% of** non-missing
Significantly worse than before Covid-19	623	11.5	12.0
Slightly worse than before Covid-19	2018	37.1	38.9
The same as before Covid-19	2145	39.4	41.3
Slightly better than before Covid-19	345	6.3	6.6
Significantly better than before Covid-19	59	1.1	1.1
(Missing)	250	4.6	-

*= participants could select more than one option

Provision of training for the *use of personal and protective equipment* (PPE) was variable (Table 3). 8.2% (n=433) did not receive training in donning and doffing, 17.1% (n=903) had not received formal fit testing for masks and 22.1% (n=1163) had not received PPE training for aerosol generating procedure. The modality of training was variable, with local departmental guidance the most common form of training. In relation to confidence in infection control, 30.4% reported feeling somewhat not confident (21.9%. n=1193) or not confident at all (8.5%, n=461) in their infection control training.

Table 3 *PPE Training*

What training have you received in regard to personal protective equipment (PPE) since the COVID-19 outbreak was declared? (select all that apply)

	No training	Formal instructional video	Written instruction	Simulation training	Departmental guidance	Other	Missing
Donning and doffing (gloves, gown, facemask, eye protection)	8.2% (n=433)	45.8% (n=2421)	42.9% (n=2267)	45.8% (n=2420)	57.8% (3145)	2.1% (n=109)	2.8% (n=155)
Formal fit testing for mask	17.1% (n=903)	14.1% (n=742)	11.3% (n=596)	38.7% (n=2038)	45.9% (n=2499)	9.9% (n=523)	3.2% (n=172)
PPE training for exposure to aerosol generating procedure (e.g. intubation)	22.1% (n=1163)	27.5% (n=1443)	35.0% (n=1838)	38.4% (n=2019)	46.3% (n=2519)	1.8% (n=97)	3.4% (n=185)

% = percentage of total**. Note =** Participants could select multiple options

Participants reported highly variable use of information sources for COVID-19 related policy and clinical updates (figure 7). Government and institutional guidelines were the medium most frequently checked on a daily basis (online supplementary material). Social media was checked hourly by 16.3% (n=885) of respondents, whilst 12.8% (n=699) did not access this at all; no other source was characterised by interaction of this frequency. Online blogs and podcasts were checked less frequently; 17.7% (n=962) checked these daily, and 21.8% (n=1186) never used these sources.

Personal Factors

Personal characteristics are summarised in Table 4, with data on all items provided in the online supplementary material. Of respondents who reported a physical health condition (42.0%, n=2284),

59.4% (n=1357) thought that COVID-19 could worsen their pre-existing condition. Of those with a pre-existing mental health condition (37% n= 2028), 49.0% (n=994) felt the pandemic would exacerbate their symptoms. In the full cohort, 81.1% (n=4414) agreed or strongly agreed that their personal health was at risk during the pandemic due to their clinical role (49.8% and 31.3% respectively). However, the greatest concern was the potential risk to families or loved ones due to their clinical role, with 35.3% (n=1921) "extremely worried" and 43.4% (n=2363) "generally worried".

Personal experience of COVID-19

15.3% (n= 833) needed to self-isolate by the time of this first survey, the most common reasons being personal symptoms (55.4%, n=460), and symptomatic household contacts (35.8%, n=279). Only 5.2% (n= 43) of those who had to self-isolate missed more than 10 clinical shifts.

Table 4 *Personal Factors*

Personal factors			
Are you concerned that the exposure to the COVID-19 outbreak may increase symptoms of any established medical health condition?	n	% of total	% of non-missing
Yes	1357	24.9	26.2
No	927	17.0	17.9
Prefer not to disclose	75	1.4	1.4
I do not have an established medical condition	2826	51.9	54.5
(Missing)	255	4.7	-
Are you concerned that the exposure to the COVID-19 outbreak may increase symptoms of any established mental health conditions?	n	% of total	% of non-missing
Yes	1034	19.0	20.0
No	994	18.3	19.2
Prefer not to disclose	93	1.7	1.8
I do not have an established mental health condition	3054	56.1	59.0
(Missing)	265	4.9	-
I feel that my personal health is at risk during the COVID-19 outbreak due to my clinical role?	n	% of total	% of non-missing
Strongly disagree	93	1.7	1.8
Disagree	216	4.0	4.2
Neither agree nor disagree	450	8.3	8.7
Agree	2709	49.8	52.4
Strongly agree	1705	31.3	33.0
(Missing)	267	4.9	-
How worried are you about the potential risks to your family, loved one or others due to your clinical role in the COVID-19 outbreak?	n	% of total	% of non-missing
Extremely worried	1921	35.3	37.1
Generally worried	2363	43.4	45.6
Neither worried or not worried	392	7.2	7.6
Generally not worried	414	7.6	8.0
Not worried at all	89	1.6	1.7
(Missing)	261	4.8	-
Personal experience of COVID-19			
Have you had to self-isolate?	n	% of total	% of non-missing

Yes	833	15.3	16.1
No	4339	79.8	83.9
(Missing)	268	4.9	-
For what reason did you have to self-isolate?*	n	% of total	% of non-missing
Personal symptoms	460	55.4	47.1
Personal diagnosis of COVID-19	39	4.7	4.0
Symptoms of a member of the household	297	35.8	30.4
Exposure to a positive case of COVID-19 in the work environment	99	11.9	10.1
Exposure to a positive case of COVID-19 in your personal environment	16	1.9	1.6
Other	65	7.8	6.7
(Missing)	3	0.4	-
How many clinical shifts in your rota have you missed due to self-isolation?	n	% of total	% of non-missing
0	81	9.7	9.8
1	77	9.2	9.3
2	119	14.3	14.3
3	131	15.7	15.8
4	124	14.9	14.9
5-7	196	23.5	23.6
8-10	59	7.1	7.1
>10	43	5.2	5.2
(Missing)	3	0.4	-

*= participants could select more than one option

Discussion

In this survey of frontline doctors across the UK and Ireland, over 40% met the criteria for psychological distress, measured by the GHQ-12, during the acceleration phase. These findings are higher than normative data in ICM Doctors and similar to rates found in EM Consultants. [12,13] However, comparison to previous research is limited by sample size, cohort differences and the historical nature of these studies.[29,30]. Figures are from early in the pandemic when clinical exposure and case fatality were low; by the end of the study period there had been 2825 reported COVID-19 cases and 436 reported COVID-19 deaths in the UK [31] and 4014 cases and 131 deaths in Ireland. [32] The data collection period fell during a period of unprecedented and escalating Government restrictions, culminating in a full UK lockdown on 23rd March 2020 and 27th March 2020 in Ireland – the effect of which cannot be fully accounted for in this work.

Despite efforts to ensure methodological rigour, typical limitations in keeping with survey studies will apply to this study such as response bias and social desirability bias. Whilst data have broadly been captured during the acceleration phase, substantial regional variation in COVID-19 activity was experienced during the survey period, meaning that participants' clinical experience is likely to vary by region. Future phases will attempt to account for this regional variation

As data has been collected during the acceleration phase of the pandemic, this data cannot be considered a true baseline. However, our data does provide findings from an early timepoint in an infection pandemic, which will inform longitudinal studies assessing the significance of psychological impact during peak and deceleration phases. These findings broadly support the role of several previously identified key (and potentially modifiable) stressors during pandemic medicine, including lack of preparedness and training with PPE; elevated concern in relation to risk to self and others, from provision of clinical care to patients with suspected infectious illness; the potential of moral injury through perceptions of worse care provision to other disease states; access to information and communication. [5,14–17]

This study highlights a large increase in rates of distress within the ICM cohort when compared to previous work. [12] Whereas in EM, the rates of distress are similar to a cohort of Consultants previously studied. [13] The comparisons to this research, conducted in 2002, may be limited by the significant changes of service design, delivery and pressures in the intervening years. However, with such a stark difference between the groups the reasons underlying this should be a priority for further research.

Findings are consistent with existing research in the field of infectious diseases and COVID-19. [33–37] Despite fairly low rates of exposure and self-isolation due to physical symptoms, between half and two-thirds of respondents expressed concern that exposure to COVID-19 would worsen their pre-existing physical and mental health conditions. This is unsurprising, given the prominently reported death rates of those with existing medical conditions. [38] Concern regarding infection of family and loved ones was highly prevalent and reported by over 80% of respondents, mirroring findings from a recent interview study examining the content of concerns in frontline healthcare workers. [39] Further research has also indicated that having a family member with COVID-19 may be a predisposing factor to psychological distress for healthcare workers themselves. [5] While concern for others and exposure to COVID-19 is unavoidable in frontline clinicians, the distress associated with it is not; psychological wellbeing warrants careful monitoring and intervention, in line with recommendations by the British Medical Association and British Psychological Society. [40,41]

During this survey, doctors expressed concern that the care of patients without COVID-19 would be negatively impacted. Such concerns have been realised in the literature, with reported increases in out of hospital cardiac arrest rates and anecdotal publications on reduced and increasingly late presentations of reversible disease. [42–44] This has also been observed in previous disease outbreaks, such as Ebola. [45,46] The emotional impact of this is likely to result in feelings such as

guilt, shame, and moral injury, [47] factors commonly associated with poorer psychological outcomes in the context of trauma [15] and worthy of further research in this context.

Availability of PPE to front-line clinicians during the COVID-19 outbreak has been a prominent concern internationally. [48,49] However even where PPE is available, a key driver for related psychological impact is the training, confidence and preparedness in its use. The majority of respondents received some form of training with regards to PPE at an early stage of the pandemic, but this was highly variable, and sometimes entirely documentary rather than practical. Given previous literature suggests poorer psychological outcomes with limited preparedness and confidence, [5] it is of note that the percentage of those respondents receiving no training for different PPE procedures, ranged from less than 10% to 22.1%.

Previous research has indicated that accessing social media as a primary source of information can be problematic and associated with acute and post-traumatic stress, particularly when information is conflicting. [35,50] Whilst it was beyond the scope of this analysis to evaluate any such causal impact, further research should seek to assess the relative impact of social media usage in this context. Findings from any research of this nature would be of potential benefit in informing guidance on content and delivery, and end-user insight, to benefit the psychological wellbeing of clinicians using this source of information.

Current research in the general population reflects our findings of increased distress in doctors. A UK study of 17,452 adults in April 2020, found the prevalence of significant distress (defined by a GHQ-12 of >4) to be 27.3 % (95% CI 26.4-28.2%). [51] This had increased from 18.8% (95% CI 17.8-20.0%) in the 2018-2019 cohort. Whilst comparison to our data is limited by the higher threshold for distress, the trends identified by Pierce *et al* place our results in the context of increased distress in the general population.

Whilst our findings reflect that many doctors struggled with sleep, concentration and feeling strained, many also reported feeling more useful than usual. General confidence, decision-making and sense of worth were reported by respondents to be either better or the same for the vast majority of respondents during the pandemic acceleration phase. Research examining resilience and post-traumatic growth in disaster settings have reported similar findings, particularly a sense of accomplishment and enhanced self-esteem. [14] Despite unprecedented restrictions on individual liberty and freedom of movement, most respondents reported feeling as happy as usual or more so, all things considered. It is a positive indicator to see this early on in the pandemic. Taken together, the findings reflect what may be reasonably expected at an early point in a developing crisis;

elevated psychological distress with a degree of impact on functioning, however protective factors such as increased feelings of worth and usefulness may mitigate against the full impact of the pandemic on mental health. The extent to which a high level of support from the general public towards healthcare professionals influenced feelings of positivity of resilience is unclear and warrants further investigation.

Conclusions

High levels of psychological distress were present amongst UK and Ireland frontline emergency medicine, anaesthesia and intensive care doctors during the acceleration phase of the initial wave of the COVID-19 pandemic. These frontline staff experienced stress and strain, yet faced this with reasonable levels of confidence in preparedness, mobilisation of skills and increased self-worth. Future work will assess the degree and nature of the relationship between personal and professional factors and psychological distress within a longitudinal framework and consider implications for policy and practice.

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Competing Interests

Many of the authors have been working as frontline clinicians during the COVID-19 pandemic. They have no competing interests to declare.

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E	Grocholski	Northwick Park Hospital, London	H	Murphy	Whittington Hospital, London
K	Kaur	Peterborough City Hospital	H	Edmundson	Whittington Hospital, London
H	Cooper	Peterborough City Hospital	R	Das	Whittington Hospital, London
M	Mohammad	Princess Royal University Hospital, London	c	orjioke	Whittington Hospital, London
L	Harwood	Princess Royal University Hospital, London	D	Worley	Whittington Hospital, London
K	Lines	Queen Alexandra Hospital, Portsmouth	W	Collier	Whittington Hospital, London
C	Thomas	Queen Alexandra Hospital, Portsmouth	J	Everson	Whittington Hospital, London
D	Ranasinghe	Queen Alexandra Hospital, Portsmouth	N	Maleki	Whittington Hospital, London
S	Hall	Queen Elizabeth Hospital	A	Stafford	Whittington Hospital, London
J	Wright	Queen Elizabeth Hospital	S	Gokani	Whittington Hospital, London
S	Hall	Queen Elizabeth Hospital	M	Charalambos	Whittington Hospital, London
N	Ali	Queen Elizabeth Hospital	A	Olajide	Whittington Hospital, London
J	Hunt	Queen Elizabeth Hospital, Birmingham	C	Bi	Whittington Hospital, London
H	Ahmad	Queen Elizabeth Queen's mother hospital Margate	J	Ng	Whittington Hospital, London
C	Ward	Queen Elizabeth University Hospital, Glasgow	S	Naeem	William Harvey Hospital, Kent
M	Khan	Queens Medical Centre, Nottingham	A	Hill	Wythenshawe Hospital, Manchester
K	Holzman	Redhill Hospital, Surrey	C	Boulind	Yeovil District Hospital
J	Ritchie	Rotherham Hospital			

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M	Jee Poh Hock	Galway Hospital, Ireland
J	Lynch	Tallaght University Hospital, Ireland
R	O'Sullivan	Bon Secours Hospital Cork, Ireland
S	Gilmartin	Children's Health Ireland at Crumlin, Ireland
S	Uí Bhroin	Children's Health Ireland at Tallaght, Ireland
P	Fitzpatrick	Children's Health Ireland at Temple Street, Ireland
A	Patton	Cork University Hospital, Ireland
S	Kukaswadia	Mercy University Hospital, Ireland
C	Prendergast	Midlands Regional Hospital Tullamore, Ireland
A	Ahmed	Sligo University Hospital, Ireland
C	Dalla Vecchia	St Vincent's University Hospital, Ireland
M	Grummell	Tallaght University Hospital, Ireland
I	Grossi	University Hospital Limerick, Ireland
B	MacManus	University Hospital Waterford, Ireland

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A	Waite	Royal Liverpool University Hospital
B	Johnston	University of Liverpool
J	Vinagre	Children's Health Ireland at Temple Street
P	Turton	Arrowe Park Hospital, Merseyside
D	George	University Hospital of Wales, Cardiff
C	Battle	Morriston Hospital, Wales
J	Anandarajah	Wrexham Maelor Hospital, Wales