

# COVID-19-related occupational stress in staff in an acute paediatric teaching hospital in Ireland

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## ABSTRACT

**Background** The COVID-19 pandemic has resulted in major strains for healthcare staff.

**Objectives** This study aims to assess prevalence of occupational burnout (BO) during COVID-19 in staff working in an acute paediatric hospital setting.

**Participants** One hundred and thirty-three staff, out of 1900 eligible staff (9.6% response rate), completed an online or paper and pencil survey.

**Methods** The Copenhagen Burnout Inventory was used as the main outcome measure. Additional questions examined the impact of COVID-19 and restrictions on work setting and personal health.

**Results** The majority of respondents reported moderate or higher levels of BO for personal (n=93; 70%) and work domains (n=83; 62%). Rates of patient-related BO were lower (n=18; 13%). Higher rates of BO were found in staff with self-rated COVID-19 adverse effects on physical (n=50, 38%) and mental health (n=88, 66%) (F (2, 13.019)=16.019, p<0.001). The majority of staff had no stress reduction training at any stage in their career, either professional (60%), on the job (62%) or postpandemic (59%) work. Although most (82%) were aware of occupational health supports, few (30%) reported an intention to access these if needed; 65% (n=86) of the respondents seriously considered changing jobs in the last 6–12 months.

**Conclusion** High level of occupational stress among hospital staff during COVID-19, in the absence of stress reduction training is a risk factor for BO. Interventions, acceptable to the employee, are urgently needed given the likelihood of additional work demands as COVID-19 continues.

## INTRODUCTION

The COVID-19 pandemic, declared by WHO in March 2020, continues to evolve and present new challenges. While initial fears that the pandemic would overwhelm our healthcare system did not materialise, the impact on frontline workers by virtue of increased and novel demands remains a concern. Scarcity of material and manpower resources, including intensive care unit beds, ventilators, access to personal protective equipment (PPE), led to long working hours, redeployment of staff and heightened emotional environments. Initial stay at home requests led to a

## What is known about the subject?

- ▶ Burnout (BO) can have a major organisational effect in terms of reduced staff productivity, increased staff turnover with poor retention of staff.
- ▶ Occupational stress during the pandemic is increasingly becoming an important deterrent to safe and effective healthcare delivery and employee well-being.
- ▶ Previous pandemics have drawn attention to increased stress and poorer psychological functioning among healthcare workers.

## What this study adds?

- ▶ Our study highlights high rates of BO and turnover intention, coupled with a low intention of occupational support use
- ▶ Our study suggests that COVID-19 had a negative impact on paediatric healthcare workers' mental and physical health.

reduction in hospital attendances, a pause in scheduled clinical services and shift to digital delivery where possible. The longstanding nature of COVID-19 forced a re-opening and reorganisation of services to tackle the long waiting lists, increased demand and ensure timely access to care.

Previous pandemics have drawn attention to increased stress and poorer psychological functioning among healthcare workers.<sup>1</sup> Studies already conducted during the earlier phases of COVID-19, predominantly from Asia and Americas, suggested high levels of stress, anxiety and depression.<sup>2</sup> High health worker stress, combined with increased clinical demands alongside shrinking resources, creates a breeding ground for occupational stress and burnout (BO), with resultant medical errors. However, concerns regarding caring for sick and contagious patients, as well as worries about their own health and that of their family have been identified as specific to this pandemic. BO in a paediatric setting



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may represent unique challenges, but is less well studied.<sup>3</sup> To the authors' knowledge, there have been no studies conducted of paediatric healthcare workers stress levels in Ireland.

Children's Hospital Ireland (CHI), Crumlin was used to access healthcare workers. This is Ireland's largest paediatric teaching hospital employing approximately 1900 whole time equivalent staff. It is responsible nationally for the provision of the majority of quaternary and tertiary healthcare services for children.<sup>4</sup> As such, it might be expected that staff would be involved in providing care for children with COVID-19. At the time of the survey, and consistent with experience in other countries, prevalence of COVID-19 among children in the Republic of Ireland was low, accounting for 15.5% of total cases.<sup>5</sup> Early contingency plans in the hospital included preparing staff for deployment to adult services, alternative paediatric care, assist in community vaccination programmes, contact tracing and assist with other administrative roles as became necessary. A shift to telemedicine where possible was also encouraged and clinical teams encouraged to work in pods.<sup>6</sup> Given high rates of public adherence with restrictions, recognised to be among the more severe in the European Union,<sup>7</sup> the health services equipped itself well, and few of these contingency plans were enforced.

## METHODOLOGY

A study-specific questionnaire was designed, using both an existing validated stress questionnaire and additional questions specifically designed for this study.

Following ethical permission (CHI, Crumlin 20 October 2020), and with the support of the hospital's communication department, a link to an online questionnaire was sent to all staff, with paper and pen surveys left in each department. Posters/Flyers were posted/placed on notice boards explaining the study and providing a link to the survey. An information leaflet and consent was attached to the questionnaire. In order to optimise study awareness, each department head was contacted by the lead researcher (JM) and given additional hard copies of questionnaires and these were returned by internal post. Additionally, a second recruitment drive via email, across non-consultant hospital doctors was conducted via the Lead NCHD in the hospital to capture new entrants into the hospital.

Sociodemographic details including age range, gender, years spent working in the organisation and employment background were included. To measure the level of BO, the 19-item version of the Copenhagen Burnout Inventory (CBI) was used.<sup>8</sup> CBI incorporates three subscales: personal BO (six questions), work-related BO (seven questions) and patient-related BO (six questions). All questions used Likert scales, with five possible answers and each answer is assigned value of 0, 24, 50, 75 or 100. The CBI allows data to be presented as a mean score for each of the three domains, with maximum scores of 24

for both personal and patient-related BO, and 28 for work-related BO. Higher scores indicate higher levels of BO. In addition, data may be presented in categories, with frequency counts of those scoring in the low (<50), moderate (50–74) or high levels of BO (75–100).<sup>9</sup> Both mean scores and cut-offs are used in this study to allow comparisons with other cohorts. Additional questions were asked of the respondent on changes in work environment during COVID-19, access to PPE and awareness of occupational health supports. Information on COVID-19-related adverse effects on personal and family health, leave opportunities and stress reduction training were also collected.

## Patient and public involvement

Although there was no direct involvement of patients or the public, the CBI assisted in the design and delivery of the study. They also sent the questionnaire directly to participants, collected and anonymised the responses, ensuring data privacy.

## RESULTS

### Statistical analysis

For the purpose of analysis, Likert scales were considered as interval data. Descriptive statistics are presented as counts and proportions for categorical data, and as means and SD for continuous data. For bivariate comparisons, because the subscales CBI personal and CBI patient were not normally distributed, non-parametric tests were used (Mann-Whitney U test or Kruskal-Wallis test). Relationships between the subscales were evaluated using correlation coefficients. Finally, a multivariable analysis was used with dependent variables; the three subscales of CBI, with demographics (age, gender), intention to change or not job (binary response), clinical or non-clinical work (binary response) and access to PPE as independent variables. Given that the sample was small, the variables in the model were limited, and those chosen used to reflect demographics, work-related and COVID-19-related variables. All statistics were conducted using SPSS V.24.

### Sample profile

Out of 1900 eligible members of staff, 183 staff members accessed the questionnaire online or via their department head, thus the response rate was 9.6%. From those 183, 133 had completed data, giving a completion rate of 73% and represent the sample analysed.

A hundred and nineteen (n=119, 86%) respondents self-identified as involved in clinical work, 12 (9%) in secretarial/administrative role and 7 (5%) employed in support services. The majority were female respondents (n=119, 89%), aged between 18 and 34 years (n=40, 30%) or 35 and 44 years (n=51, 38%) and 72 (54%) had been working for >5 years in the service.

### Burnout

CBI data are presented both as a mean score for each of the three domains, in addition to frequency counts

**Table 1** Scores and cut-offs of the Copenhagen Burnout Inventory (CBI)

CBI	M (SD)	Prevalence cut-off: n (%)		
		No/Low (<50)	Moderate (50–74)	High/Severe (75–100)
Work-related burnout (n=133)	55.6 (19.7)	50 (37.6)	59 (44.4)	24 (18)
Personal burnout (n=133)	56.9 (22.5)	40 (30.1)	61 (45.9)	32 (24.1)
Patient-related burnout (n=133)	28.1 (17.5)	115 (86.5)	18 (13.3)	0 (0)

for those scoring in the low (<50) moderate (50–74) or high levels of BO (75–100) using prior established cut-offs.<sup>8,9</sup> The mean score for personal BO was 56.9 (SD 22.5), work-related 55.6 (SD 19.7) and patient-related BO 28.1 (SD 17.5) (table 1). The majority of responders scored in the moderate or higher category for personal (70%) and work-related (62%) BO, while fewer scored in this range for patient-related BO (13.5%).

### Bivariate analysis

In terms of gender, mean personal BO score for males was 33.6 (SD 21.1), and 59.7 (SD 21.1) for females. Mean work-related BO score for males was 37.8 (SD 17.5) and females 57.7 (SD 18.9). Mean patient-related BO score for males was 23.8 (SD 16.9) and female mean personal BO of 28.6 (SD 17.6). Thus, females had higher scores in the three subscales of CBI. However, this difference was significant only for the personal and work-related subscales of CBI (Mann-Whitney U test=324.5,  $z=3.74$ ,  $p<0.001$ ; Mann-Whitney U test=348.5,  $z=3.56$ ,  $p<0.001$ , respectively).

There was a strong positive correlation between all CBI subscales, strongest for work-related and personal BO,  $r=0.873$ ,  $n=133$ ,  $p<0.001$ , and moderately strong for work-related and patient-related BO,  $r=0.480$ ,  $n=133$ ,  $p<0.001$ , and for personal and patient-related BO;  $r=0.433$ ,  $n=133$ ,  $p<0.001$ . There was a small negative correlation between age-related and patient-related CBI ( $r=-0.197$ ,  $n=133$ ,  $p=0.023$ ) with younger aged employees having higher patient-related stress.

In terms of clinical to non-clinical work, Mann-Whitney U test revealed no significant differences between those who were doing clinical work versus those who were not, in the personal and work-related CBI. However respondents engaged in clinical work had significantly higher levels of patient-related BO compared with those with non-clinical roles, such as administrative or support duties (Mann-Whitney U test=716.0,  $z=2.37$ ,  $p=0.018$ ).

Finally, regarding the intention to change job, those who intended to change had significant higher BO scores in all three subscales of CBI (Mann-Whitney U test=939.5,  $z=5.04$ ,  $p<0.001$ ; Mann-Whitney U test=869.0,  $z=5.37$ ,  $p<0.001$ ; Mann-Whitney U test=1367.0,  $z=3.1$ ,  $p=0.003$ ).

### Multivariable analysis

After controlling for other variables, age did not have any significant effect on any scale of BO. Male gender is significantly associated with lower personal and work-related BO compared with female gender. Those who

expressed an intention to change job had significantly higher BO rates in the three scales (personal, work and patient related) compared with those who intended to stay in the same job. Easy access to PPE was significantly associated with lower personal and work-related BO compared with those who did not. Finally, those in clinical work have higher patient-related BO compared with those in non-clinical work. The significant results of this analysis are presented in table 2.

### COVID-19 work environment

Eighty-one participants ( $n=81$ , 61%) expressed the view that a significant amount of time (moderate or a lot) was spent on activities outside of their responsibility (table 3). The majority of staff ( $n=84$ , 63%) felt that workload had increased during COVID-19, while at the same time staffing levels had reduced ( $n=87$ , 65%). One-third ( $n=44$ , 33%) perceived an increase in patient referrals, while perceiving both clinical ( $n=50$ , 37%) and administrative ( $n=50$ , 37%) staffing to have reduced. Job satisfaction was reported to have decreased in over half of respondents ( $n=68$ , 51%), with more than half ( $n=75$ , 57%) feeling not valued ( $n=47$ , 35.3%) or being unsure ( $n=28$ , 21%). Almost two-thirds of staff ( $n=87$ , 68%) had given serious thought to changing job in the preceding 6–12 months.

Only six respondents ( $n=6$ , 4%) had contracted COVID-19, despite the majority ( $n=71$ , 53%) coming into contact with patients with COVID-19. Fifteen per cent ( $n=20$ ) had a family member that had tested positive for COVID-19. Respondents felt that working during COVID-19 had an adverse effect on their physical ( $n=49$ , 37%) and mental ( $n=88$ , 66%) health, and both of these correlated with higher BO levels. Physical health: CBI personal  $\rho=0.435$ ,  $p<0.001$ ; CBI work  $\rho=0.380$ ,  $p<0.001$ ; CBI patient,  $\rho=0.316$ ,  $p<0.001$ . Mental health: CBI personal  $\rho=0.488$ ,  $p<0.001$ ; CBI work  $\rho=0.457$ ,  $p<0.001$ ; CBI patient,  $\rho=0.363$ ,  $p=0.002$ .

A Kruskal-Wallis test examined the relationship between COVID-19-related effects on physical and mental health (taken as separate variables) and BO subscales.

Physical health changes were significantly related ( $p<0.001$ ) to personal BO (test statistic=25.66, df: 2), to work-related BO (test statistic=19.15, df: 2,  $p<0.001$ ) and to patient-related BO (test statistic=14.2, df: 2,  $p=0.001$ ). Dunn's pairwise tests were carried out for the three pairs of groups (improved, no change, deteriorated). After adjustment using the Bonferroni's correction, differences

**Table 2** Significant variables of multivariable analysis

Dependent variable	Parameter	B	SE	t	P value	95% CI	
						Lower bound	Upper bound
Total CBI personal	Intercept	93.384	12.643	7.387	<0.0001	68.357	118.411
	No intention to change job	-17.649	3.699	-4.772	<b>&lt;0.0001</b>	-24.971	-10.327
	Wants to change job	0*	.	.	.	.	.
	Access to PPE=always	-27.245	11.945	-2.281	<b>0.024</b>	-50.892	-3.598
	Access to PPE=often	-23.894	11.811	-2.023	<b>0.045</b>	-47.274	-0.514
	Access to PPE=sometimes	-21.184	12.045	-1.759	0.081	-45.028	2.661
	Access to PPE=seldom	-35.891	17.726	-2.025	0.045	-70.982	-0.801
	Access to PPE=never	0*	.	.	.	.	.
	Male	-20.757	5.765	-3.600	<b>&lt;0.0001</b>	-32.169	-9.344
Female	0*	.	.	.	.	.	
Total CBI work	Intercept	83.409	11.052	7.547	<0.0001	61.530	105.287
	No intention to change job	-16.393	3.233	-5.070	<0.0001	-22.794	-9.992
	Wants to change job	0*	.	.	.	.	.
	Access to PPE=always	-24.358	10.443	-2.333	<b>0.021</b>	-45.030	-3.686
	Access to PPE=often	-21.123	10.325	-2.046	<b>0.043</b>	-41.562	-0.684
	Access to PPE=sometimes	-15.203	10.530	-1.444	0.151	-36.048	5.642
	Access to PPE=seldom	-26.560	15.496	-1.714	0.089	-57.236	4.116
	Access to PPE=never	0*	.	.	.	.	.
	Male	-13.367	5.040	-2.652	<b>0.009</b>	-23.344	-3.390
Female	0*	.	.	.	.	.	
Total CBI patient	Intercept	27.516	10.461	2.630	0.010	6.808	48.223
	No intention to change job	-7.732	3.060	-2.526	<b>0.013</b>	-13.790	-1.673
	Wants to change job	0*	.	.	.	.	.
	Clinical work	13.107	4.165	3.147	<b>0.002</b>	4.861	21.352
	No clinical work	0	.	.	.	.	.

\* variable is set to zero

CBI, Copenhagen Burnout Inventory; PPE, personal protective equipment.

were found between the groups improved-deteriorated and no change-deteriorated ( $p<0.01$ ) for the personal and work-related BO subscales while for the patient-related subscale the significant difference was only in the pair no change-deteriorated (test statistic=25.69,  $p=0.001$ ).

Similarly, mental health changes were significantly related to personal BO (test statistic=31.51, df: 2,  $p<0.001$ ), to work-related BO (test statistic=27.83, df: 2,  $p<0.001$ ) and to patient-related BO (test statistic=9.71, df: 2,  $p=0.008$ ). Pairwise tests with Bonferroni's correction have shown that for the three subscales of CBI, the

**Table 3** COVID-19 workload

	Significantly increased/Increased	No change	Significantly decreased/Decreased
Change in workload	63% (84)	26% (35)	11% (13)
Change in staffing	8% (11)	26% (35)	66% (87)
Change in clinical support	5% (7)	57% (76)	38% (50)
Change in administrative support	4% (6)	58% (77)	38% (50)
Patient contact/referrals	33% (44)	50% (67)	17% (22)
Satisfaction with work	6% (8)	43% (57)	51% (68)



**Table 4** Personal physical/mental health n (%)

Changes	Significantly improved/increased	No change	Significantly deteriorated/decreased
Physical health	6 (4%)	78 (58%)	49 (38%)
Mental health	4 (3%)	41 (31%)	88 (66%)
Eating habits	13 (10%)	61 (46%)	59 (44%)
Alcohol intake	34 (26%)	75 (56%)	24 (18%)
Sleeping habits	9 (7%)	55 (41%)	69 (52%)
Exercise habits	46 (35%)	38 (28%)	49 (39%)

significant difference ( $p < 0.001$ ) was only between the groups no change-deteriorated.

Specific areas of health deterioration included poorer sleeping (52%), eating (44%), exercise (39%) and alcohol use (26%) (table 4). Respondents also felt that their family members had adverse physical ( $n=35$ , 26%) and mental health ( $n=80$ , 60%) effects linked to COVID-19. Respondents who believed COVID-19 had an adverse effect on a family members' mental health, also had higher personal BO (test statistic=4.1, df: 1,  $p=0.045$ ) and work-related BO (test statistic=7.1, df: 1,  $p=0.008$ ).

The majority of respondents felt they had adequate information about COVID-19 ( $n=94$ , 71%), adequate access to PPE ( $n=100$ , 75%) and were able to keep themselves safe at work ( $n=75$ , 56%). However, respondents reported that they had experienced difficulty (to a high/very high degree) in taking either sick ( $n=26$ , 20%) or annual ( $n=51$ , 38%) leave. Overwhelmingly, ( $n=125$ , 95%) respondents felt able to adhere (sometimes/often or always) to public health advice, they perceived this advice to be less easily adhered to by the public, where 18% ( $n=24$ ) of respondents believed that public adherence was seldom or almost ever adhered to.

Survey respondents presented a picture of low evidence of stress reduction training at any stage of their career. The majority 'definitely' had no stress reduction training in their professional training ( $n=80$ , 60%), when taking up their job ( $n=83$ , 62%), or during COVID-19 ( $n=78$ , 59%). Staff felt that their employer had 'definitely not' ( $n=32$ , 24%) or 'probably not' ( $n=40$ , 30%) made any effort to reduce work-related stress during the pandemic. While most were aware of the occupation health supports offered by their organisation ( $n=109$ , 82%), and the majority ( $n=79$ , 60%) had someone within their organisation they could talk to about work-related stress, few respondents would seek out such supports if needed. Thirty per cent ( $n=40$ ) responded that they were 'unlikely' to access these supports if needed with many ( $n=39$ , 29%) perceiving them to lack efficacy (25% never and 5% seldom effective).

## DISCUSSION

The majority of respondents to this survey reported moderate or higher levels of personal and work-related

BO as measured by the CBI. Patient-related BO was lower suggesting that despite high overall levels of stress, compassion fatigue had not set in.

The majority (63%) of staff felt there was an increase or a 'significant increase' in their workload during COVID-19, and this occurred alongside reduced overall staff numbers, and reduced clinical and administrative support. Although respondents attributed some of this increased work to be due to increased patient referrals, this is at odds with hospital attendance data at that time. A study on the presentations to five emergency paediatric departments in Ireland, representing approximately 48% of national annual public paediatric emergency department (ED) attendances, during the early stages of COVID-19, highlighted this.<sup>10</sup> These data included the study hospital and showed that between March and May 2020, there was a drop of 46% in paediatric attendances. This trend continued when data collection was extended for a full 12 months, with attendances 34% below prior year rates.<sup>10</sup> There was however, a disproportionate increase in paediatric psychiatric presentations to the ED during COVID-19.<sup>10</sup> Following an initial decrease of 27%, rates increased by 52% in summer months and this increase was sustained throughout 2020. This delayed increase in referrals of youth with psychiatry presentations was also evidenced in community settings. Referral patterns for specialist child and adolescent mental health services in the Ireland during phase III (September–November 2020) of the pandemic increased by 180%.<sup>11</sup> Given the study did not gather clinical specialties, or nature of clinical contact, we are unable to establish whether the perceived increase of patient-related workload was due to increased referrals in certain subspecialties, such as psychiatry, increased intensity of work or additional time taking in clinical encounters linked to PPE use. The study was conducted during the second lockdown period of COVID-19, and while overall referrals to ED were reduced, psychiatry referrals had increased. However, even if responses are an inaccurate reflection on actual patient contact time, the mismatch between perceived or real service demands and available clinical and administrative support is likely to contribute to high levels of BO. Research already conducted in Ireland during COVID-19, among medical consultants, showed a high prevalence of



BO, with three-quarters (n=88) of those screened scoring above cut-offs on the Maslach Burnout Inventory.<sup>12</sup>

Paediatric settings present some unique challenges at a clinical level, in terms of specialised care, a family systems approach, working with a broad multidisciplinary and non-hierarchical team and engagement in high-intensity emotional work.<sup>13</sup> These stressors may have intensified for staff and families during COVID-19, even if not linked to management of actual COVID-19 cases. COVID-19 restrictions on hospital visitors, for example, meant that only one parent could attend at any one time, and visits from siblings were restricted. This would have added additional stress for patients, families and staff. Some of the added challenges identified are an increase in patient complexity, a need for regular upskilling and attainment of knowledge, parental (and societal) expectations about survival and quality of life, often exposing challenging moral and ethical dilemmas and conflict between teams and families. Clinicians needed to manage clinical, collegial and personal aspects of their work, which are likely to have increased during COVID-19.

In this study, although the majority of staff felt adequately informed about COVID-19, were confident in their ability to remain safe while working and have ready access to PPE, many experienced additional COVID-19-related impacts on their physical and mental health. Maladaptive habits such as increased eating (10%), alcohol use (25%), poorer sleep (53%) and lower exercise (37%) were reported, perhaps reflecting maladaptive coping strategies. Negative effects on health were correlated with higher BO scores, perhaps each influencing the other. The association between BO and increased risk for poor self-care and addictive behaviours have previously been outlined.<sup>14</sup> Some staff reported difficulties in taking annual leave (38%), losing out on the much-needed and recognised postvacation reduction in stress.<sup>15</sup> Staff (20%) also reported on difficulty in taking sick leave, leading to presentism and the inherent negative downstream effects in terms of reduced staff productivity, clinical errors and personal adverse health effects. The impact of quality of clinical care and patient satisfaction is well recognised. Vicarious concern existed among staff when family members experienced adverse mental health effects from COVID-19, as evidenced by higher BO scores.

The fact that respondents, while aware of available occupational health supports, expressed reservations about using them needs to be examined further. Reduced efficacy of interventions was reported by 29%, whether this was attitudinal or preconceived, and based on previous personal or another experience, was not explored further in this study. A further limitation of the study is that recent innovative supports introduced in the study hospital during 2020 (such as a professional leadership programme, Schwartz rounds and Balint groups) were not distinguished from occupational health supports and therefore also unexplored. The extent of personal competence in self-management or access to

other psychological services was also absent from the study questionnaire. However, minimal prior stress reduction training, reported by the majority of respondents, exposed staff not personally equipped with alternative support structures. Organisational interventions need to ensure that they meet the needs of their target audience, are accessible, acceptable and efficacy regularly evaluated.

BO can have a major organisational effect in terms of reduced staff productivity, increased staff turnover with poor retention of staff and increased costs to the hospital. BO can ultimately affect patient care with lower quality of care, medical errors<sup>16</sup> and lower patient satisfaction reported. BO has major implications on staff absenteeism and staff attrition, and is an immediate concern given the correlation in this study with turnover intention, seriously considered by 65% of respondents. The most recent report overviewing medical manpower in Ireland, published by the Health Information and Quality Authority, confirm longstanding difficulties with delivery of care and resourcing.<sup>17</sup> Vacant posts, recruitment shortfalls, difficulties with staff retention, long waiting lists, overcrowding and capacity deficits all compete with the added pressures brought about by the pandemic. These challenges will persist in our health service for many months to come, presenting as ongoing and relentless triggers for occupational BO.

### Strengths and limitations

The study benefits from the use of the CBI, a well-validated measure of occupational stress, allowing examination of different components of stress; personal, work-related and patient-related stress. It is augmented by study-specific questions capturing organisational and personal lived experience during this unprecedented time in healthcare where both clinical and personal care was stressed.

The study is limited by the small sample size, difficulty in accurately estimating a valid response rate. Potential respondent bias cannot be ruled out, in that respondents opting to complete the survey may have been experiencing higher rates of BO and more motivated to have their voices heard. However, an alternative position exists in that those with high stress levels may not have had the time or energy to respond, or might have been absent from work and unaware of the study. Demographic omissions felt necessary to minimise respondents' identity, such as ethnicity and race, clinical profession and specialty, seniority, marital status and having children, prior adversities, pre-existing mental or physical illnesses, all factors known to be associated with risk of stress, also limited the study's ability to examine these during COVID-19. The study was gender weighted, and although in keeping with the feminisation of the paediatric workforce, might also bias the results. However, the dual role of worker and family carer rests more with women given they more often hold a role as carer when compared with men.<sup>18</sup> This might result in additional strain on female

frontline healthcare workers in terms of work-life integration, that is, child care needs, gender discrimination and the study may not be representative of male gender as they are under-represented. Future studies, if adequately powered, should try and address these important demographic limitations while still protecting respondent identity.

## Conclusion

Occupational stress during the pandemic is increasingly becoming an important deterrent to safe and effective healthcare delivery and employee well-being. Set against COVID-19, increased demand with limited and dwindling resources, effective management and government commitment to reform is essential. However, employer ownership of optimising work environments and providing effective occupational supports is essential. The high rates of BO and turnover intention in this study, coupled with a low intention of occupational support use, should be cause for concern. The wide reaching effect of public health containment measures exposed the general population to additional personal and work-related stressors not typically experienced in other crisis. Public awareness of the adverse impact of COVID-19 on the national's mental health needs, which include that of workers, need to be met with dedicated planning and resourcing. Occupational supports need to be co-designed and evaluated by the employees. Perhaps, the pandemic has highlighted occupational and mental health vulnerabilities among healthcare settings, and this can be a catalyst for change going forward.

**Contributors** All contributors have met at least one of the criteria recommended by the ICMJE. FM made a substantial contribution to the conception and design of the paper. JM made a substantial contribution to the acquisition, analysis and interpretation of the data for the body of the work and wrote the first draft, acting as guarantor. DA provided statistical analysis of data. JM, DA and FMcN contributed to subsequent drafts and revisions of the paper.

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**Patient consent for publication** Not applicable.

**Ethics approval** This study involves human participants and was approved by Children's Hospital Ireland at Crumlin (Reference ID: GEN/770/19). Participants gave informed consent to participate in the study before taking part.

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**Data availability statement** Data are available upon reasonable request. The anonymous data set is held with PI, JM. Any request to access the data should be made to johannamurray@rcsi.ie and will be considered.

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