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## Research paper

# Risk perception and emotional wellbeing in healthcare workers involved in rapid response calls during the COVID-19 pandemic: A substudy of a cross-sectional survey



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## ABSTRACT

**Background:** Coronavirus disease-2019 (COVID-19) has effected major changes to healthcare delivery within acute care settings. Rapid response calls (RRCs) in healthcare organisations have been effective at identifying and urgently managing acute clinical deterioration. Code-95 RRC were introduced to prewarn healthcare workers (HCWs) attending to patients suspected or confirmed with COVID-19 infection.

**Aims:** The primary aim of the study was to identify the personal impact of the COVID-19 pandemic on HCWs involved in attending Code-95 RRC. We sought to evaluate their perception of risks and effects on wellbeing and identify potential opportunities for improvement at organisational levels.

**Methods:** We undertook a detailed survey on HCWs attending Code-95 RRCs, including questions that sought to understand the impact of the pandemic as well as their perception of infection risk and emotional wellbeing. This was a substudy of the prospective cross-sectional single-centre survey of HCWs that was conducted over a 3-week period at Frankston Hospital, Victoria, Australia. We adopted a quantitative content analysis approach for free-text responses in this secondary analysis.

**Results:** Four hundred two free-text comments were received from 297 respondents and were analysed. More than two-thirds (68%, 223/297) were female. Of all comments, 39% (155/402) were related to organisational issues including communication, confusion due to constantly changing infection control policies, and insufficient training. Thirty-three percent of comments (133/402) raised issues regarding the adequacy of personal protective equipment. Anxiety was reported in 25% of comments (101/402) with concerns predominantly relating to emotional stress and fatigue, risks of virus exposure and transmitting the infection to others, and COVID-19 precautions impairing care delivery.

**Conclusion(s):** Our study raises important issues that have relevance for all healthcare organisations in the management of patients with COVID-19. These include the importance of improving communication, especially when infection control policies are revised, optimising training, maintaining adequate personal protective equipment, and HCW support. Early recognition and management of these issues are crucial to maintain optimal healthcare delivery.

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## 1. Introduction

The novel coronavirus disease 2019 (COVID-19) pandemic, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has infected more than 157 million people worldwide, with 3.27 million confirmed deaths as of May 11th 2021.<sup>1</sup> This pandemic has

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been severely burdening and outstripping healthcare system capacities in many parts of the world. The majority of the early confirmed cases of COVID-19 in the Australian state of Victoria were acquired overseas. Significant community transmission occurred mainly in metropolitan Melbourne between June and September 2020 that triggered a large second wave of infection.<sup>2,3</sup> Aged-care facilities and hospitals became major hotspots for SARS-CoV-2 virus transmission. It is important to acknowledge that the Australian experience of the pandemic was vastly different when compared with the international situation. Australia, especially the state of Victoria, has experienced moderate infection rates and low mortality rates relative to other comparable countries.<sup>4</sup>

We have recently published results of a detailed survey that explored the healthcare workers' (HCWs) perspectives on "Code-95" being added to announcements of rapid response calls (RRCs) and aggression management teams across a tertiary public hospital.<sup>5</sup> The Code-95 add-on aimed to help prewarn attending teams about the potential positive COVID status of the patient. Our results confirmed that Code-95 RRCs for patients with suspected or confirmed COVID-19 was beneficial in terms of improved safety, but implementation required further training and support to reduce HCW anxiety.

Our survey questions also considered the general impact of the pandemic on the emotional wellbeing of HCWs involved in Code-95 RRCs. The aim of this study was to identify, in a structured way, any further opportunities of organisational significance based on the feedback from HCWs involved in Code-95 RRCs. We also aimed to evaluate the personal impacts of the COVID-19 pandemic on these HCWs and investigate their perception of associated risks and impact on emotional wellbeing.

## 2. Methods

### 2.1. Study design, setting, and survey development

A prospective cross-sectional single-centre survey of all HCWs was undertaken to understand the perspectives of HCWs on pre-warning Code-95 RRCs for patients suspected or confirmed with COVID 19 infection. This was a secondary analysis, and the data pertinent to personal impact including respondent feedback that was not included in the initial publication<sup>5</sup> is presented in this study.

### 2.2. Survey development and distribution

A provisional questionnaire was prepared after review of the literature. This questionnaire was then revised following input by clinical experts. A pilot study helped further refine the questions. Finally, a web-based anonymous survey was developed using the SurveyMonkey™ platform and published online (supplementary appendix). This survey targeted staff members who were involved in both the afferent and efferent rapid response teams (will be referred as HCWs, henceforth) in the study hospital. The survey weblink was distributed in the hospital e-Bulletin for 3 weeks between 17th August, 2020, and 6th September, 2020, initially once a week and then daily in the last week to improve the response rate. An intranet hyperlinked desktop banner was created for all hospital computers in the last week prompting staff to complete the survey. Survey participation was voluntary and anonymous, with no reimbursement offered to participants.

### 2.3. Ethical approval

This study was approved as a low-risk project by the Peninsula Health research ethics committee (HREC Reference number:

66401). Participation was voluntary, with no incentives offered, and consent was implied by completion of the survey.

### 2.4. Data collection

The survey included 48 questions grouped in 10 domains. Apart from domain 1 (information about the survey participants), all other domains had a section for free-text comments. All free-text comments from domains 2 to 10 were included in this study.

### 2.5. Data analysis

Survey responses were exported from the online survey platform and converted to Microsoft Excel format and the textual data. We only analysed the free-text responses using simple quantitative content analysis and reported them as frequencies and percentages of the valid responses.<sup>6</sup> Content analysis allows us to classify and quantify the occurrence of certain words, phrases, or concepts within the texts into identified categories of similar meanings.

## 3. Results

Over a 3-week period, 334 respondents completed the survey, with an overall response rate of about 10% who were directly or indirectly involved in Code-95 calls.<sup>5</sup> We included responses from 297 HCWs for the final analysis, as in the previous study.<sup>5</sup> More than half (54%) of all respondents were older than 40 years, and 65% (n = 193) were female. Most respondents denied having either mental illness or chronic conditions associated with risks for severe COVID-19 infection. A total of 402 free-text comments from these 297 HCWs were grouped into three major thematic categories and analysed (Table 1). Example quotes from the free-text comments are illustrated in Table 2.

### 3.1. Organisational issues

A significant number of responses (39%, 155/402) raised concerns about organisational issues. Of the 155 responses, more than half (52%, 80/155) had worries about frequently changing infection control policies, as evidenced by comments such as "*The anxiety over the ever-changing requirements at work and you're more likely to hear new policy through word of mouth than management*" by one of the respondents. More than a quarter of responses (27%, 42/155) expressed that there was a lack of effective communication, both interprofessional and between frontline HCWs and patients. An example of one of the actual quotes was "*Strategic information does not reach coal-face workers*". About 13% (20/155) had concerns about inadequate training for HCWs involved in RRCs. Five percent of responses (8/155) were related to possible redeployment to other areas of the hospital, having to work outside of their area of expertise, and working overtime to provide cover for furloughed colleagues.

### 3.2. Personal protective equipment-related issues

A third of responses (33%, 133/402) had concerns about personal protective equipment (PPE), as one person expressed concerns about poor PPE training with regards to staff attending MET/Code Blue: "*PPE training has been minimal*", while another respondent wrote "*I contracted COVID-19 post a MET call in March*". Of the 133 responses, the majority (77%, 102/133) were concerned about the availability and quality of PPE equipment, while others raised concerns about lack of fit testing as expressed by this respondent "*Insufficient N95 masks. Limited fit-testing of clinical staff*". Ten percent (14/133) of these responses specifically mentioned

**Table 1**  
Free-text feedback comments.

Free-text feedback comments	n/N (%) <sup>a</sup>
<b>1. Organisational issues</b>	<b>155/402 (39%)</b>
- Concerns about frequently changing infection control policies	80/155 (52%)
- Lack of concise communication	42/155 (27%)
- Inadequate training	20/155 (13%)
- Redeployment	8/155 (5%)
- Lack of Buddy/spotter	5/155 (3%)
<b>2. Personal protective equipment (PPE)–related issues</b>	<b>133/402 (33%)</b>
- Concerns regarding availability, quality of PPE, lack of fit-testing	102/133 (77%)
- COVID-precautions limiting care delivery	17/133 (13%)
- Discomfort due to PPE use	14/133 (10%)
<b>3. Anxiety</b>	<b>101/402 (25%)</b>
- Emotional stress, fatigue	37/101 (37%)
- Social isolation and not being able to see family	14/101 (14%)
- Concerns about getting exposed to the SARS-CoV-2 virus	12/101 (12%)
- Concerns about colleagues not taking precautions seriously	8/101 (8%)
- Burnout	5/101 (5%)
- Weight gain	5/101 (5%)
- Concerns about personal health concerns	5/101 (5%)
- Concerns about passing infection to relatives and vulnerable patients	5/101 (5%)
- Excess alcohol intake	4/101 (4%)
- Insomnia	3/101 (3%)
- Concerns about worsened relation with family or friends	3/101 (3%)
<b>4. Miscellaneous comments<sup>b</sup></b>	<b>13/402 (3%)</b>

<sup>a</sup> Percentages may not total 100 because of rounding.

<sup>b</sup> Suggestions on improving processes, general comments.

experiencing dehydration, heat stress, and skin irritation due to the need for constant sanitation, developing pressure sores, and shortness of breath due to N95 mask use and impaired visibility due to protective goggles and face shields, as experienced by one respondent “headaches, extreme heat sweats, extreme tiredness, rash pimples on face, sore nose”. Thirteen percent (17/133) of the responses believed that COVID-19 precautions with donning of PPE before attending RRCs impeded time to critical care delivery.

### 3.3. COVID-related personal health issues and mental wellbeing

Further to what was reported in the previous study<sup>5</sup> that 87% of respondents (n = 257) attending Code-95 calls reported moderate to high levels of emotional stress and anxiety, 25% (101/402) of all open feedback comments were related to anxiety. Comments such as this “I am afraid of the unknown, fear of being an asymptomatic carrier and sharing the virus increased level of fatigue” frequented. Among the respondents with anxiety, emotional stress and fatigue were very high (38%, 38/101), with an additional 5% (5/101) reporting burnout. Five HCWs reported weight gain, four reported increased alcohol consumption, three experienced insomnia, and another two stated having been newly prescribed antidepressants. Twelve percent (12/101) of these comments reported on the feelings of self-isolation from family and separation from colleagues and friends. About 7% of these (7/101) reported they or their colleagues had confirmed COVID-19 infection or were quarantined owing to potential virus exposure. About 5% (5/101) had concerns about the risks of passing the infection to their family, 5% (5/101) were in relation to their poor health status increasing personal risks for severe COVID-19 infection, and 8% (8/101) were related to observing their colleagues not taking infection control precautions seriously.

## 4. Discussion

Our study has identified important organisational challenges related to ensuring the adequacy of PPE, minimising changes to infection control policies, and optimising HCWs’ communication and training. One in four HCW study respondents involved in a

Code-95 RRC in this large tertiary referral hospital experienced emotional stress, fatigue, and anxiety during the global COVID-19 pandemic, with the majority of concerns related to potential SARS-CoV-2 viral exposure, transmitting the infection to others, and COVID precautions impairing care delivery.

Effective communication is a key factor in fighting the COVID-19 pandemic.<sup>7</sup> Misinformation can negatively impact risk-appraisal and behaviours, and strategies to detect and effectively respond to inaccurate or conflicting messages need to be implemented.<sup>8</sup> Many respondents in our survey highlighted concerns of the lack of clear and effective communication at various levels, both interprofessional as well as between HCWs and patients. A key learning from the pandemic to date has been to ensure clear and concise communication to all HCWs whenever infection control policies change to avoid further outbreaks within health-care environments. To navigate this challenge, individuals, teams, and systems need to ensure effective communication, both frequently and multimodally, to ensure that policy and guidance changes not only reach but are readily accessible by all frontline HCWs.<sup>9</sup>

Our survey respondents found PPE guidelines and infection control policies at times confusing and changing too frequently. However, it is important to acknowledge that understanding of the viral transmission mechanisms and pathophysiology of the infection was incomplete in the early phases of the pandemic. Rapidly changing guidelines and infection control policies could reflect the evolving progress in our knowledge of the virus and increasing community spread of the infection at the time of the survey. It is therefore essential to clearly communicate any changes to the infection control policies along with appropriate explanations of the reasons for change. In addition, infection control policies did not address some perceived inadequacies with respondents in our survey identifying early that fit testing of N95 masks (unavailable at the time) was urgently required to enhance HCW protection.

Our survey also identified other key issues of concern to HCWs including redeployment of HCWs, insufficient or lacking important elements of PPE, and inadequate training.<sup>10,11</sup> Redeployment was one of the strategies adopted early in the pandemic to optimise team size and resilience to combat against COVID-19.<sup>9,12</sup> A lack of

training for redeployed HCWs and failure to fully consider the adequacy of skills of redeployed HCWs in their new areas have been previously reported.<sup>13</sup> Adequate training and constant reassurance and support are essential to safeguard the mental health of redeployed HCWs.

Previous research has identified unprecedented challenges and lack of forward planning to be present among health systems worldwide.<sup>14</sup> A lack of important PPE equipment was in keeping with findings from a multinational survey early in the pandemic that observed wide variations in PPE preparedness both between and within countries, with several ICUs reporting suboptimal PPE training, practice, and stock awareness.<sup>15</sup> A follow-up survey 6 months later by the same authors reported that although PPE preparedness improved between the two survey periods, particularly in PPE use, PPE inventory, and HCW perceptions of safety, there continued to be low uptake of HCW training and implementation of other low-cost safety measures.<sup>16</sup> Furthermore, awareness of PPE breach management policies was also identified as suboptimal.<sup>16</sup>

HCWs are amongst the highest-risk group for acquiring COVID-19<sup>17,18</sup> and seven times more likely than any other worker to

develop a severe infection.<sup>19</sup> Hence, there is a growing focus on protecting HCWs around the world through providing appropriate PPE and training, addressing fatigue, and preventing psychosocial consequences.<sup>20,21</sup> Not surprisingly, emotional stress, mental fatigue, and physical exhaustion have all been reported among frontline HCWs affected by COVID-19 pandemic in many parts of the world.<sup>14–16,22–27</sup> It is unclear if being female has influenced the higher reported levels of anxiety in our study. Women HCWs likely continue to be primary care providers in their homes in addition to their healthcare responsibilities, which could have impacted their mental health differently and contributed to higher reported anxiety levels. Ethical dilemmas, uncertainty about COVID-related practice changes, and stigmatisation are also likely contributors to psychological stress.<sup>5,20,28</sup> These factors in workplace culture may all contribute to loss of psychological and physical workplace safety as reported in a recent Australian study.<sup>29</sup>

A key strength of our study is the real-time measurement resulting in obtaining precious information from HCWs at the forefront of dealing with the pandemic. Some limitations of our study include the timing of the survey that coincided with a major SARS-CoV-2 virus outbreak in our healthcare system. This may have

**Table 2**

Some direct quotes from the free-text comments.

### 1. Organisational issues

#### Lack of communication

"No clear infection control policy implemented at the time of suspected outbreaks."

"The anxiety over the ever-changing requirements at work and you're more likely to hear new policy through word of mouth than management."

"More openness, clarity & consistent communication. Throughout this process it has been evident that different teams/areas receive different, sometimes conflicting advice."

"Strategic Information does not reach coal face workers."

"The rules change every day, and nothing seems stable"

#### Inadequate training

"PPE training has been minimal."

"Reduced training and education opportunities, Reduced clinical experience/exposure for junior staff"

"Only recently provided SPOTTERS but not all of them are trained properly."

#### Redeployment

"increased stress due to being redeployed and having to cancel regular clients as a result being aware of heightened stress for my clients due to isolation"

#### Spotter or buddy system

"An increased presence of Infection control team members on the wards observing donning and doffing would be beneficial."

#### Workplace issues

"Reduced social/comradery in workplace (ie loneliness)."

"Please ensure listening to the patient-facing staff, get them involved in the decision-making and be on the ground if possible, at times to understand the actual issues in order to develop effective problem solving"

"Isolation from colleagues - reduced ability to debrief."

"Met calls and Codes may need to be all Codes for the need of N95 Masks, as these can be patients that may be Asymptomatic for COVID on the ward."

"Delay of treatment often occurs due to donning process. Have observed significant delay to intubation due to this. Unfortunately, nothing one can really do about it."

"Hazmat suits for MET teams?"

"Issues with not enough negative pressure rooms to adequately care for these patients appropriately and keep staff safe."

"Lack of crit care liaison during furlough of staff."

### 2. Personal protective equipment (PPE)–related issues

"Insufficient N95 masks. Limited fit-testing of clinical staff."

"COVID-precautions has limited care delivery."

"There was clearly inadequacy of PPE and PPE-related processes, just simply compare how we have changed the hospital policies, protocols and layout".

"Poor outcomes re: MET/Code Blue Code 95 & timing required to Don PPE prior to attending MET."

"headaches, extreme heat sweats, extreme tiredness, rash pimples on face, sore nose."

### 3. Anxiety

"I have ongoing concerns about the long-term health effects I will have from contracting covid."

"Tension from anxieties surrounding the uncertain nature of the pandemic"

"Feelings of being overwhelmed with work/responsibility."

"Concerns about colleagues not taking precautions seriously"

"I am anxious about going to work what the shift will be like."

"I am afraid of the unknown, fear of being an asymptomatic carrier and sharing the virus increased level of fatigue."

"I've had bladder infections, sore shoulders from extra cleaning, tiredness, work stress, skin conditions."

"I feel Withdrawn. Disengaged. Anxiety. Burnt out. Lack of control. Depression."

"Increased anxiety needing medication to cope."

"Having experienced the virus, I'm scared to give it to my kids."

"Concerned about spreading it to my family if I do contract it. Don't feel safe to visit my family when that is allowed given, I am working on the COVID ward."

"Isolation that you feel no-one wants to be near you because of where you work."

"Stress related to having constantly reassure my 14-year-old daughter I am not infected when returning from work"

### 4. Miscellaneous comments\*\*

"I contracted Covid-19 post a MET call in March"

\*\* suggestions on improving processes, general comments.



been perceived as an occupational moral injury for HCWs with a high number of HCWs ( $n = 68$ ) confirmed with COVID-19 infection and an unprecedented number ( $n = 632$ ) of quarantined HCWs.<sup>30,31</sup> This could have played a crucial role in the reported high levels of anxiety and precepted risk of exposure to infection as experienced in Wuhan, where 88.3% of HCWs reported psychological stress or emotional disturbance during their isolation in quarantine.<sup>32</sup> Second, the online survey was conducted over a relatively short timeframe and longitudinal alterations in perception are unknown. Third, the overall response rate was low compared with the total number of employees at the time of the survey (~10%). The low response rate could have potentially biased demographics of the respondents with senior and junior doctors, and nurses with critical care expertise were overrepresented in our survey; however, this was not surprising as the primary target was doctors, nurses, and patient services assistants (PSAs) involved in RRCs. This, unfortunately, resulted in an underrepresentation of ward nurses, allied health professionals, and support staff. Finally, inherent to any survey, there may have been selection bias in respondent sampling.

We propose the following recommendations based on our learnings that may be beneficial to other healthcare organisations. (1) With a rapidly evolving pandemic with a novel virus, changes to infection control policies are inevitable as the knowledge of the spread, infectivity, and virulence of the virus rapidly improves over time. Hence, better communication is vital and must accompany updated policies to explain the reasons for change; (2) it is essential to have regular training in key areas such as PPE donning and doffing, airway practices, and waste disposal;<sup>16</sup> (3) it is essential to maintain adequate PPE stocks and other essential inventory;<sup>16</sup> and (4) it is essential to strengthen the psychological skills of HCWs and support systems.<sup>29</sup>

Further research needs to focus on evaluating HCWs with and without exposure to SARS CoV-2 to evaluate their course of perceived anxiety. Specific issues relating to return to work, social reintegration, and effectiveness were different between these two groups (with and without exposure to SARS CoV-2) of HCWs with the presumed hypothesis that those who were not exposed to COVID-19 may not be immune to ongoing anxieties. It will also be important to specifically assess the perceived anxiety levels in those infected HCWs who developed postacute sequelae SARS-CoV-2 (PASC) or “long COVID”<sup>33</sup> as defined as persistent symptoms beyond 3 weeks.

## 5. Conclusion

Our study has identified important issues with relevance for all healthcare organisations in the management of patients with COVID-19. These include improving communication, especially when there is change to infection control policies and to clearly explain the reasons for this; optimising training; maintaining adequate PPE; and HCW support. Our findings confirm that HCWs involved in Code-95 RRCs have high rates of anxiety, emotional stress, and perceived risk of exposure to infection. Early recognition and management of these issues are crucial to maintaining optimal healthcare delivery.

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## Author contributions

**Ashwin Subramaniam:** Conceptualisation, Methodology, Data curation, Formal analysis, Supervision, Project administration, Writing – original draft, Writing – review & editing; **Ravindranath**

**Tiruvoipati:** Conceptualisation, Methodology, Supervision, Writing – review & editing; **Alexandr Zubarev:** Conceptualisation, Methodology, Data curation, Software, Writing – original draft, Writing – review & editing; **Robert Wengritzkzy:** Methodology, Writing – review & editing; **Wei Chun Wang:** Formal analysis, Writing – review & editing; **Christopher Bowden:** Methodology, Writing – review & editing; **Vikas Wadhwa:** Conceptualisation, Methodology, Supervision, Writing – review & editing.

## Conflict of interest

All authors declare no support from any organisation for the submitted work and no competing interests with regards to the submitted work.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.aucc.2021.08.006>.

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