

## Analysis of the impact of COVID-19 pandemic on house-staff in the USA: addressing the ripple effects

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### ABSTRACT

**Background:** The novel corona virus has changed the way individuals interact with each other and society. In the medical sector, this has affected the residents and fellows who spend the majority of their time on the front lines.

**Methods:** We conducted a cross-sectional survey to assess the impact of the COVID-19 pandemic on the lives and training of house-staff across the USA. Respondents in our survey reported feeling significantly overwhelmed by the ongoing pandemic.

**Results:** The majority of house-staff were significantly concerned about the lack of protective equipment, inability to safeguard themselves from infection and inability to look after their families. Concerns regarding contracting the infection and transmitting it to their loved ones were reported as a cause of mental distress among resident physicians. Increasing patient load, lack of protective equipment, and disruption of educational and academic activities during the COVID-19 pandemic have all reportedly affected the training and overall well-being of resident physicians.

**Conclusion:** Our study adds further support for measures to safeguard house-staff with proper protective equipment and ensure adequate support for both mental and physical well-being during these challenging times.

### ARTICLE HISTORY

Received 15 December 2020  
Accepted 14 April 2021

### KEYWORDS

COVID-19; resident wellness; pandemic; graduate medical education; physician burnout

## 1. Introduction

The COVID-19 (Corona Virus Disease-19) pandemic has placed unprecedented demands on healthcare workers around the world, and their response to the challenge has been both courageous and inspiring. Unfortunately, front-line healthcare workers have been negatively impacted in several ways. Firstly, lack of personal protective equipment has led to anxiety and concern amongst physicians regarding not just their own safety, but also the safety of their families and loved ones [1,2]. Secondly, observing first-hand the toll that the pandemic has taken on their communities, including sometimes their own colleagues has negatively affected the mental well-being of healthcare workers [3]. Finally, and most devastatingly, thousands of physicians world-wide have lost their lives in the fight against COVID-19 [4].

Many training programs have tried to limit exposure to COVID (+) patients for house officers, but nonetheless resident physicians have experienced the same stressors as more senior colleagues. They have suffered anxiety due to a lack of PPE and mental distress from observing the serious impact of the pandemic on their communities [5]. Despite

duty hour restrictions, residents report that shifts during the pandemic have been more rigorous [6]. Educational activities have taken a back seat due to increased workload and social distancing, elective rotations have been cancelled, and there has been a reduced focus on outpatient care, all of which has culminated in a more labor-intensive experience [7]. These changes have not only affected the personal lives and well-being of house officers just as they have every other frontline worker, but they have also suddenly and dramatically changed the face of residency training.

## 2. Materials and methods

We conducted a cross-sectional survey to assess the impact of the pandemic on the lives and training of resident physicians from April to June 2020. The survey was disseminated via e-mails and social media. Initial questions were yes/no, and designed to assess the overall impact of the pandemic on resident physicians' life and training. Next, residents were asked to rate, on a scale of 1 to 10, the degree to which they were concerned about particular issues

(questions 1 to 12) and the degree to which their well-being was affected (questions 13 to 17). Responses were categorized as 'not significantly [1–4]', 'somewhat significantly [5–7]' and 'significantly [8–10].' The statistical analysis was performed using R software v 3.6.0.

### 3. Results

A total of 210 resident physicians across multiple specialties responded to the survey over a 2 weeks period. One hundred percent (210/210) of the respondents stated that their hospital was taking care of confirmed/suspected COVID-19 cases, and just over half (51.9% or 109/210) were directly involved in the care of COVID (+) patients. The majority of participants did not suffer from any chronic medical conditions (84.8%), nor did they report symptoms suggestive of COVID-19 infection in the preceding 1 month (78.6%). More than half of the respondents (57.9%) acknowledged that they were feeling significantly overwhelmed by the ongoing pandemic. A total of 48 (22.9%) respondents stated that they had dependents (young children or elderly adults) to take care of at home.

#### 3.1. Ability to safeguard oneself from the pandemic

Feeling significantly overwhelmed by the pandemic was not associated with direct involvement in the care of confirmed or suspected COVID-19 cases ( $R = 0.126$ ,  $p = 0.070$ ) or having dependents to take care of at home ( $R = 0.074$ ,  $p = 0.287$ ). Paradoxically, house-staff with underlying chronic medical problems were actually less likely than their healthier colleagues to report being significantly overwhelmed ( $R = 0.163$ ,  $p = 0.018$ ).

Table 1 shows a quantitative analysis of the responses from house-staff.

#### 3.2. Ability to take care of patients and lack of PPE

Residents who reported the highest level of concern about their ability to take care of their patients did not report increased levels of concern about paranoia among patients ( $p < 0.001$ ), lack of communication from authorities ( $p < 0.001$ ) or lack of personal knowledge or understanding regarding COVID-19 ( $p = 0.01$ ). Those who had the highest levels of concern about the availability of PPE or increased patient loads did not report an increase in concern about their ability to take care of patients ( $p = 0.07$ ). Residents who were somewhat concerned about the lack of protective equipment were, not surprisingly,

significantly concerned about their ability to protect themselves from the infection ( $p < 0.001$ ).

#### 3.3. Health impact on house-staff

There were three groups of residents most likely to report that the pandemic has impacted both their physical and mental health: house-officers feeling overwhelmed by the pandemic (mental health –  $\chi^2 = 58.61$ ,  $p < 0.001$  and physical health –  $\chi^2 = 45.71$ ,  $p < 0.001$ ), those concerned about their ability to safeguard themselves from COVID-19 (mental health –  $\chi^2 = 29.88$ ,  $p < 0.001$  and physical health  $\chi^2 = 39.81$ ,  $p < 0.001$ ), and finally, those who were concerned about being able to take care of their family and loved ones (mental health –  $\chi^2 = 15.455$ ,  $p = 0.004$  and physical health  $\chi^2 = 17.80$ ,  $p = 0.001$ ).

#### 3.4. Positive changes

The final question was a free text and offered participants the opportunity to share any positive changes they have witnessed. About 62% respondents left comments, and the content varied widely. Two general themes did emerge. About 74% of respondents were pleased with the unity and camaraderie amongst co-workers and colleagues. About 42% respondents were happy with the pro-activeness of their hospital or program in dealing with the crisis. Roughly 10% respondents stated that they did not witness any positive changes in the current times.

### 4. Discussion

This analysis highlights the impact of the COVID-19 pandemic on the lives and training of residents in the United States. The majority of house-staff included in our survey reported feeling overwhelmed by the ongoing pandemic. This is consistent with reports from China, which indicated high psychological distress among frontline workers, including resident physicians, during current times [8,9]. Quantitatively, lack of protective equipment, ability to protect themselves from infection and ability to support and look after family were identified as the major concerns that residents voiced in the survey. Although the lack of protective equipment made residents somewhat concerned about their own safety, it was not linked with concern about their ability to take care of their patients. Reports from across the nation have highlighted how healthcare workers have prioritized patient care over their own safety because of the national shortage of personal protective equipment [10]. How having to prioritize patient care over their own safety might put their families at risk is a far greater concern. Feeling overwhelmed, fear of contracting the virus, and fear of

**Table 1.** Quantitative breakdown of responses of house-staff to survey questions.

Numbers	Questions: To what extent are you concerned about the following:	Not significantly N(%)	Somewhat significantly N(%)	Significantly N(%)
1	Ability to take care and safeguard yourself from the ongoing pandemic	25 (11.9)	58 (27.6)	126 (60.0)
2	Ability to take care of your patients in an efficient manner	37(17.6)	84(40.0)	87(41.4)
3	Ability to take care of your family and loved ones, who are looking up to you in these times	45(21.4)	59(28.1)	104(49.5)
4	Slow down in career-related or academic endeavors	59(28.1)	70(33.3)	80(38.1)
5	Starting the next phase of your training/obtain a visa to continue training.	95(45.2)	48(22.9)	63(30.0)
6	Paranoia and hysteria among patients	76(36.2)	90(42.9)	43(20.5)
7	Misinformation among patients owing to internet/social media posts	53(25.2)	83(39.5)	73(34.8)
8	Increased patient load at the hospital/clinic	109(51.9)	60(28.6)	40(19.0)
9	General public seeking testing in the absence of symptoms, travel history or contact with known cases	90(42.9)	74(35.2)	44(21.0)
10	Lack of protective equipment available at your hospital due to a national shortage of PPE	31(14.8)	45(21.4)	133(63.3)
11	Lack of communication/guidelines from your hospital authorities on how to act or respond to a particular situation in these times	70(33.3)	52(24.8)	87(41.4)
12	Lack of personal knowledge or understanding of COVID-19 as a disease/clinical entity	98(46.7)	71(33.8)	40(19.0)
13	Ability to get proper sleep and relax.	58(27.6)	62(29.5)	89(42.4)
14	Ability to take care of your physical health.	46(21.9)	83(39.5)	80(38.1)
15	Ability to take care of your mental health.	59(28.1)	64(30.5)	86(41.0)
16	Ability to do daily chores.	85(40.5)	68(32.4)	56(26.7)
17	Ability to take care of dependents (like children, sick family members, elderly family members).	116(55.2)	51(24.3)	39(18.6)

transmitting the disease to loved ones are all shown to correlate with adverse effects on mental and physical well-being. House-staff with underlying comorbidities felt less overwhelmed than their healthier colleagues in our survey. This may be related to higher levels of resilience previously described in individuals with chronic health problems. Specifically, people with chronic diseases use mechanisms such as cognitive adaptation, personality adjustments via optimism and mindfulness, and benefit-finding through post-traumatic growth to adjust to their circumstances [11]. How these strategies may help house-staff adapt to a 'new normal' is a topic for further exploration.

#### 4.1. Limitations

The current survey is limited by its small sample size. We sent out the survey when hospitals across the states were dealing with high patient volumes and therefore most residents were likely unable to respond to surveys in a timely manner due to patient care-related responsibilities. Our current sample size represents <1% of the resident physicians training across the nation. Also, presumably most of the respondents belonged to internal medicine residency programs in our analysis, which makes the study sample less representative of resident physicians from other specialties. Gradual variations in local government rules related to lockdown may have also affected the stress levels among residents training in those states, which would also have affected the results of our survey. Since the pandemic impacted states in waves, a follow-up of current responses would help capture the overall impact of the pandemic on residents in a more thorough manner. It is

also possible that we were not able to capture responses from residents who were on busier rotations at the time the survey was sent out. This may have led to some underestimation of the magnitude of the impact of the COVID-19 pandemic. There may also have been some selection bias, in that those residents who had stronger feelings about the effects of the pandemic would be more likely to respond to the survey.

#### 4.2. Conclusions

The results of our survey indicate that the overall well-being of trainees has been significantly affected by the ongoing pandemic. Rapid implementation by residency programs and hospitals of measures to ensure the mental and physical well-being of residents is needed on multiple levels. First and foremost, the importance of adequate personal protective equipment cannot be overstated. There is also a need for community support to ensure safe care for children and elderly family members of all front-line workers, including house officers. On the positive side, residents have acknowledged that they have come closer to their colleagues and co-workers in these times and have appreciated the preparedness of their respective hospitals in dealing with the pandemic.

Again, it is worth mentioning that feeling overwhelmed by the pandemic was independent of being directly involved in the care of COVID-19 patients. Such a phenomenon could be related to the vicarious trauma suffered by some residents who feel extreme sympathy for COVID-19 patients and other physicians who are working directly with them [5], [8]. Regardless of the cause, mental or physical health-

based interventions should target residents irrespective of their direct involvement in the care of infected patients and should be initiated immediately. Timely interventions to regularize work responsibilities, provide adequate protection and safety to house-staff and ensure their overall well-being in these unusually challenging times will go a long way in defining the future of healthcare both nationally and worldwide.

### Disclosure statement

No potential conflict of interest was reported by the author(s).

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