

Title: Residents' practice and perceptions during the COVID-19 pandemic

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Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions

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25 **Abstract**

26 **Rationale, aims and objectives:** This study aimed to determine the residents' perspectives
27 on clinical practice during the pandemic of coronavirus disease 2019 (COVID-19).

28 **Methods:** A cross-sectional survey was carried out online among medical residents in our
29 hospital. The survey covered basic information, condition of clinical practice, and
30 perspectives related to the COVID-19.

31 **Results:** total 174 (26.8%) residents responded and completed the survey. Nearly half of the
32 residents (51.7%) expressed willingness of going to the frontline to fight against the virus and
33 62.3% of the residents showed good morale. Online courses were delivered to 87.9% of the
34 residents with satisfaction at 89.7%. Approximate one third of the residents concerned the
35 impact of the epidemic on graduation (34.0%) and taking up an occupation (32.8 %).
36 Majorities (79.3%) determined to be a doctor after the pandemic. Notably 40.2% of the
37 residents thought they were underpaid. 21.8% of the residents reported to be unfairly treated
38 in clinical practice. Overall no statistical differences were revealed between internal medicine
39 and surgery residents, and between those married and singles, regarding the perceptions
40 related to the COVID-19.

41 **Conclusion:** Administrators should take cognizance of perspective of the residents and
42 formulate corresponding strategies to reassure trainees' safety and continuous training,
43 address the residents' concerns and get prepared for the second wave of COVID-19.

44 **KEY WORDS:** COVID-19 pandemic, residents, practice, concern, perspective

1 Introduction

The coronavirus disease 2019 (COVID-19) has spread on a global scale and placed significant strain on the healthcare system. Health care workers and physicians are on the frontlines in response to the pandemic. In China the government has mobilized tens of thousands of medical staffs and centered huge medical resources from all over the country to help Wuhan city, the epicenter of the outbreak. As of February 25, 2020 over 3400 health care workers have being infected with the virus and over 20 have died nationwide¹. In face of the shortage of medical resources, medical staffs were reorganized and redeployed in the combat against COVID-19, regardless of their subspecialty. A proportion of resident physicians were quickly mobilized and redeployed to the frontline.

Meanwhile a three-year standardized resident training (SRT), which is launched by the government ministries and recognized as a continuing medical education process, aiming at cultivating post-graduation professions², was temporally suspended due to the COVID-19 crisis. As this pandemic continues, residents' well-being, environment of clinical practice, and medical education are largely unknown. The perception of the residents related to the COVID-19, an important issue of our nation's healthcare workforce, therefore, needs to be determined.

2.Methods

2.1 Study areas and participants

This survey was implemented in our hospital, which is located in western China. Participants

were from resident physicians, who were under SRT in our hospital, including all 3 clinical postgraduate years (1 to 3).

2.2 Procedures and data collection

Ethics approval was obtained from the Institutional Review Board of our hospital. All participants were approached by one of our investigators via telephone contact or WeChat (which is one of the leading Chinese multipurpose messaging and social media Apps) in advance on June 1 to 7, 2020. Residents were informed that their participation was completely voluntary and all the answers were guaranteed to be confidential. Incentives of small digital red packets were sent via WeChat for participation. If the interviewee agreed to participate, online questionnaire was then forwarded to the participants through an online survey platform ('SurveyStar', Changsha Ranxing Science and Technology, Shanghai, China). All participants were asked to complete the electronic questionnaire within 3 days of their consent. Afterwards, we compiled our respondents' response for analysis.

2.3 Questionnaire

The questionnaire consisted of 20 items, which was divided into three parts: (1) basic information (gender, age, clinical postgraduate years, specialty, marriage, marital status, and children), (2) working and education status during the pandemic, (3) perception on clinical practice and education related to the COVID-19. Personal identifiers were not included in the questionnaire. To ensure data integrity, any missing data occurred in the e-questionnaire would cause submission failure.

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93 **2.4 Statistics**

94 The analyses were executed using SPSS 22.0 (IBM Corp., Armonk, NY, USA). Differences
95 between internal medicine and surgery resident were explored. Plus, differences between
96 married and single resident were examined. Categorical variables were assessed in χ^2 ,
97 corrected χ^2 , or Fisher exact test. Ranked ordinal scale variables were compared using the
98 Mann-Whitney test. A p value of <0.05 was considered statistically significant.

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100 **3 Results**

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102 Among 650 residents contacted, total 174 (26.8%) residents responded and completed the
103 survey including 23 surgery residents (13.2%). The average age of the sample was 25.9 years.
104 Female respondents took up 74.2% and the majority (43.1%) was in their first year of the
105 residency. 20.7% of the residents got married and 9.2% had children or pregnancy (Table 1).

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107 Table 2 reports the results of residents' perceptions related to COVID-19 pandemic. 88.5% of
108 the residents thought they were well protected in the pandemic. Nearly half of the residents
109 (51.7%) expressed willingness of fighting the virus in the frontline. 40.2% of the residents
110 thought they were underpaid. Nearly one fifth (21.8%) of the residents were ever unfairly
111 treated at work. 64.2% of internal medicine residents were reported that their training was
112 infected, lower than that of surgery residents (87.0%). 87.9% of the residents took online
113 courses for education and 78.2% of the residents increased self-study time during the

pandemic. 39/60 (65.0%) residents reported their research work was affected by the pandemic. 62.3% of the residents showed good morale (never or rarely lost passion) in fighting against the pandemic. Majority (89.7%) of the residents were satisfied with the online education mode. 60.3% of the residents had a sense of self-worth during the epidemic. 34.0% of the residents concerned about the delay on graduation and 32.8 % concerned about the impact on taking up an occupation. Majorities (79.3%) were willing to stick with medical career after the pandemic.

Overall no statistical differences were revealed between internal medicine and surgery residents regarding the perceptions related to the COVID-19, except that more surgery residents got paid properly than internal medicine residents did, and more online courses were given to internal medicine residents than surgery residents. Besides no statistical difference regarding the perceptions related to the COVID-19 was found between both married and single residents.

4 Discussion

The current study examined the residents' perceptions on clinical practice in the responses to the COVID-19 pandemic. To our knowledge, this is one of the first studies examining residents' concerns during the COVID-19 pandemic. Well understanding of those concerns is critical to make plans accordingly, in order to address the residents' concerns when they fulfill their duties.

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137 During the time of the pandemic, all medical staffs in our hospital may be redeployed into the
138 frontline for fighting against COVID-19, regardless of their subspecialty. Therefore all
139 medical staffs may encounter pressure and worries even though the workload seemed not
140 intensified due to the 'standby' working program, which reduced COVID exposure risk by
141 reducing the number of doctors in the hospital at one time and the number of working days
142 per week³. The residency programs in our hospital moved toward a shift-based schedule,
143 leading to self-quarantining at home and 'standby' program in hospital. Besides precipitous
144 decline in operative and clinic volume raised issues about disruption of the SRT. Depending

145 on the setting , high-quality virtual education was recommended to make up for the loss of
146 time in clinical practice⁴. In our hospital, online courses and academic conference are
147 satisfied by most of our trainees and proved its efficiency. In our survey, online education as
148 an alternative to maintain education was asserted by most of the residents. Note that
149 increased off-service time leads to increased self-study time which was used by most
150 residents to strengthen clinical ability despite reduced volume of clinical practice.

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152 One study pointed out that adequate access to PPE may optimize resident well-being, morale,
153 and education⁵. Another study indicated most otolaryngology residents were concerned about
154 personal protective equipment (PPE) shortage (93%) and were satisfied with their PPE (73%)
155 ⁶. By comparison, one report indicated 59.2% of trainee ophthalmologists felt that PPE was
156 not adequate⁷. In our study, majority of our respondents were satisfied with the working

environment.

Another concern, as more than one third of residents expressed, indicated a lack of reasonable financial compensation. Financial support (e.g., hazard pay, food subsidy and etc.) may be helpful to reduce the sense of unfairness and increase the sense of self-worth. Perceiving unfairness or injustice may evoke negative emotions and attitudes, leading to demoralizing and distressing⁸. Note that nearly one fifth of the residents reported they experienced unfair treatment during the pandemic and nearly 40% of the residents lost the sense of self value, indicating the situation is not optimal. Possibly as a consequence, a substantial percentage (around 50%) in our study had negative attitudes on going to the frontline of combating COVID-19. By contrast, one study from Italy reported that majority of students would rather remain at the frontlines⁹. Addressing those concerns and providing good support would improve morale by making residents feel more voluntary than mandatory. To our knowledge the COVID-19 has an impact on medical students' career progression and lives¹⁰. In our study a small fraction of residents revealed negative feeling of being a doctor. Nearly one third of residents showed worries about the delay of graduation and subsequent employment.

In view of our findings above, we propose several suggestions to improve residents' motivation of fighting against the COVID-19 as well as to address concerns encountered. First, additional benefits should be given to the residents, to balance between effort and reward. Second, we should ensure fairness and equality by a set of information and policies transparency regarding decision making and resources reallocation. Third, residents' value

should not be underestimated; respect and encouragement should be given to them. Fourth, rational workload and work environment with high quality and safety standards should be provided. Fifth, certain group of residents (e.g., the pregnant) should be specially treated.

5 Limitations

Our study had several limitations. First, low respondent rate and the small number of participating residents, especially predominant distribution of the male residents and surgical residents, could not be indicative of the entire population of residents. Second, single-center survey could impede the generalization of our findings. Third, behavioral biases such as conformity bias, for example residents may be inclined to provide acceptable responses, may contribute as a factor to skew the reliability of the results. Plus, professional ethics may to some extent conceal the real thoughts and attitudes. Nevertheless we believe our findings provide meaningful insights into the views of general residents on the aspect of the COVID-19 pandemic. National wide survey is further needed for a better analysis and understanding of our residents' perspectives and health in order to guarantee workforce preparedness for the COVID-19 emergency response.

6 Conclusion

Administrators should take cognizance of perceptions of the residents and make rational corresponding strategies to reassure the residents' safety and continuous education during the pandemic. Addressing residents' concerns and providing adequate support are critical to improve the preparedness for the second wave of COVID-19.

201

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205

206 **Conflict of Interest**

207 The authors declare that they have no conflict of interest.

208

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