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Dear Editor,

COVID-19 hit Iran early and hard (Jahanshahi et al., 2020). The first confirmed case in Iran appeared on 19 February 2020, and active cases rise quickly since then, overwhelming healthcare workers. However, no study to date has examined the health conditions of healthcare staff in a major outbreak area beyond China. Furthermore, no study has examined their job satisfaction, even though job satisfaction is a critical motivational resource to prevent burnout during the outbreak (Zhang et al., 2020a).

This study reports the health conditions (SF-12, K6, PHQ-4) and job satisfaction of healthcare staff in Iran when the country faced its highest number of total active COVID-19 cases. In a sample of 304 healthcare staff (doctors, nurses, radiologists, technicians, etc.), we found a sizable portion reached the cutoff levels of disorders in anxiety (28.0%), depression (30.6%), and distress (20.1%). Age, gender, education, access to PPE (personal protective equipment), healthcare institutions (public vs. private), and individual status of COVID-19 infection each predicted some but not all the outcome variables of SF-12, PHQ-4, K6, and job satisfaction. The healthcare workers varied greatly in their access to PPE and in their status of COVID-19 infection: negative (69.7%), unsure (28.0%), and positive (2.3%). The predictors were also different from those identified in previous studies of healthcare staff during the COVID-19 crisis in China. This study helps to identify the healthcare staff in need to enable more targeted help as healthcare staff in many countries are facing peaks in their COVID-19 cases.

At the height of the storm: Healthcare staff’s health conditions and job satisfaction and their associated predictors during the epidemic peak of COVID-19

ARTICLE INFO
Keywords: Healthcare workers Psychiatric screening Epidemic peak Risk factors Coronavirus 2019-nCoV Covid-19 infection PPE

ABSTRACT
This study reports the physical health, mental health, anxiety, depression, distress, and job satisfaction of healthcare staff in Iran when the country faced its highest number of total active COVID-19 cases. In a sample of 304 healthcare staff (doctors, nurses, radiologists, technicians, etc.), we found a sizable portion reached the cutoff levels of disorders in anxiety (28.0%), depression (30.6%), and distress (20.1%). Age, gender, education, access to PPE (personal protective equipment), healthcare institutions (public vs. private), and individual status of COVID-19 infection each predicted some but not all the outcome variables of SF-12, PHQ-4, K6, and job satisfaction. The healthcare workers varied greatly in their access to PPE and in their status of COVID-19 infection: negative (69.7%), unsure (28.0%), and positive (2.3%). The predictors were also different from those identified in previous studies of healthcare staff during the COVID-19 crisis in China. This study helps to identify the healthcare staff in need to enable more targeted help as healthcare staff in many countries are facing peaks in their COVID-19 cases.
Table 1
Descriptive statistics and risk factors of the health conditions (SF-12, PHQ-4 and K6) and job satisfaction among healthcare staff (*p < 0.5).

| Variables                        | Mean + s.d or No. (%) | Physical health (SF-12) | Mental health (SF-12) | Anxiety (PHQ-4) | Depression (PHQ-4) | Distress (K6) | Job satisfaction |
|----------------------------------|-----------------------|-------------------------|-----------------------|-----------------|-------------------|---------------|-----------------|
|                                  | (N=304)               | β(95%CI)                | β(95%CI)              | β(95%CI)        | β(95%CI)          | β(95%CI)      | β(95%CI)        |
| Mean ± s.d.                      | 40.7 ± 7.0            | 26.3 ± 7.5              | 2.0 ± 1.5             | 2.1 ± 1.4       | 14.8 ± 5.3        | 3.3 ± 0.7     |
| Gender                           |                       |                         |                       |                 |                   |               |                 |
| Male (reference)                 | 1.040                 | 0.110                   | 0.354                 | 0.457*          | 2.140*            | −0.021        |
| Female                           |                       | (−0.865; 2.944)         | (−1.995; 2.214)       | (−0.016; 0.723) | (0.117; 0.796)    | (0.851; 3.429)|                 |
| Age                              | 35.1 ± 9.1            | −0.061                  | (−0.174; −0.052)      | −0.021          | −0.020            | −0.038        | −0.004          |
| Gender                           |                       |                         |                       |                 |                   |               |                 |
| Male (reference)                 | 178 (58.6%)           |                         |                       |                 |                   |               |                 |
| Female                           |                       | 126 (41.4%)             |                         |                 |                   |               |                 |
| Marital status                   |                       |                         |                       |                 |                   |               |                 |
| Single                           | 114 (37.5%)           | 0.030                   | −0.225                | −0.004          | 0.030             | −0.124        | 0.031           |
| Married without child            | 57 (18.7%)            |                         |                       |                 |                   |               |                 |
| Married with one child           | 61 (20.0%)            |                         |                       |                 |                   |               |                 |
| Married with more than one child | 69 (22.7%)            |                         |                       |                 |                   |               |                 |
| Others (i.e. divorced)           | 3 (1.0%)              |                         |                       |                 |                   |               |                 |
| Education level                  |                       |                         |                       |                 |                   |               |                 |
| Under diploma                    | 21 (6.9%)             | 0.977*                  | −0.902*               | 0.058           | 0.115             | 0.084         | 0.026           |
| Diploma (12 years)               | 21 (6.9%)             | (0.204; 1.750)          | (−1.797; −0.047)      | (−0.091; 0.207) | (−0.022; 0.252)  | (−0.436; 0.604)| (−0.047; 0.100)|
| 2-years college                  | 37 (12.2%)            |                         |                       |                 |                   |               |                 |
| Graduated or studying a bachelor degree | 143 (47.0%) |                         |                       |                 |                   |               |                 |
| Graduated or studying a master degree | 43 (14.1%) |                         |                       |                 |                   |               |                 |
| Graduated or studying a doctoral degree | 53 (17.4%) |                         |                       |                 |                   |               |                 |
| Access to PPE (Personal Protective Equipment) | Man (4.8%) | 1.875*                  | −0.404                | −0.069          | −0.084            | −0.570*       | 0.150*          |
| Rarely                           | 45 (15.4%)            | (1.027; 2.724)          | (−1.342; 0.534)       | (−0.223; 0.855) | (−0.226; 0.057)  | (−1.107; −0.033)| (0.074; 0.226)|
| Sometimes                        | 89 (30.5%)            |                         |                       |                 |                   |               |                 |
| Very often                       | 78 (26.7%)            |                         |                       |                 |                   |               |                 |
| Always                           | 66 (22.6%)            |                         |                       |                 |                   |               |                 |
| Public or private institution    |                       |                         |                       |                 |                   |               |                 |
| Public                           | 223 (73.4%)           |                         |                       |                 |                   |               |                 |
| Private                          | 81 (26.6%)            | 0.193                   | 2.349*                | −0.128          | −0.006            | 0.608         | −0.079          |
| Reference                        |                         | (−1.895; 2.281)         | (0.041; 4.657)        | (−0.521; 0.264) | (−0.367; 0.355)  | (−1.768; 1.973)| (−0.273; 0.116)|
| COVID-19 infection status        |                       |                         |                       |                 |                   |               |                 |
| Negative                         | 212 (69.7%)           |                         |                       |                 |                   |               |                 |
| Unsure                           | 7 (2.3%)              | −3.482                  | 1.807                 | 0.157           | −0.393            | 1.481         | 1.091           |
| Reference                        |                         | (−9.992; 3.037)         | (−5.388; 9.002)       | (−0.956; 1.271) | (−1.217; 0.830)  | (−2.406; 5.367)| (−0.360; 0.741)|
| Positive                         | 85 (28.0%)            | −1.081                  | 0.688*                | 0.449*          | 1.649*            | 0.260*        |                 |
| Reference                        |                         | (−3.074; 0.912)         | (−2.923; 1.476)       | (0.303; 1.073)  | (0.094; 0.803)    | (0.304; 2.995)| (−0.451; −0.070)|
| Reference                        |                         | (−3.074; 0.912)         | (−2.923; 1.476)       | (0.303; 1.073)  | (0.094; 0.803)    | (0.304; 2.995)| (−0.451; −0.070)|
| Reference                        |                         | (−3.074; 0.912)         | (−2.923; 1.476)       | (0.303; 1.073)  | (0.094; 0.803)    | (0.304; 2.995)| (−0.451; −0.070)|
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| Reference                        |                         | (−3.074; 0.912)         | (−2.923; 1.476)       | (0.303; 1.073)  | (0.094; 0.803)    | (0.304; 2.995)| (−0.451; −0.070)|
distressed and anxious, and less satisfied with their jobs, implying psychological harm of uncertainty (Zhang et al., 2020b). Third, workers at private institutions had better mental health than those in public institutions, suggesting to identify possible areas of improvement for public institutions.

While risk factors in this study predict various outcomes, we did not find a universal risk factor that predicted all outcome variables, highlighting a challenge to identify specific risk factors for specific mental disorders during the ongoing COVID-19 pandemic.

In conclusion, the risk factors for healthcare staff in Iran differed from those in China. As countries vary in their medical systems and clinical capacity, future studies should examine healthcare workers’ health conditions and their predictors in individual countries, given protecting their health and satisfaction is paramount during the COVID-19 pandemic.

CRediT authorship contribution statement

Stephen X. Zhang: Conceptualization, Investigation, Methodology, Formal analysis, Visualization, Writing - original draft, Writing - review & editing, Supervision. Jing Liu: Visualization, Writing - original draft, Writing - review & editing. Asghar Afshar Jahanshahi: Investigation, Resources, Conceptualization, Writing - review & editing. Khaled Nawaser: Investigation. Ali Yousefi: Investigation. Jizhen Li: Writing - review & editing, Funding acquisition. Shuhua Sun: Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgement

This research was supported (in part) by Tsinghua University-INDITEX Sustainable Development Fund (Project No. TISD201904).

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