BMJ Open

Stress load and volunteer motivation of patient volunteers in Fangcang shelter hospitals in Shanghai, China during the COVID-19 pandemic: a cross-sectional survey

Liyan Gu, Fengmei Liu, Ji Wang, Jie Li, Jie Wei, Jiping Xu

ABSTRACT

Objectives This study aims to assess the volunteer motivation and stress load of patient volunteers in Fangcang shelter hospitals (FSHs), examine their associations, and explore the potential influence factors of volunteer motivation.

Design Cross-sectional online survey conducted from 21 April to 20 May 2022.

Setting Questionnaires were collected from patient volunteers selected by random cluster sampling in the FSHs in Shanghai, China.

Participants 197 participants who met the inclusion criteria as patients who were asymptomatic or presenting with mild symptoms in the FSHs and who volunteered to assist with routine work under quarantined settings.

Outcome measures We investigated sociodemographic information, stress load and volunteer motivation through an online survey using the Volunteer Function Inventory and the Stress Overload Scale. Comparisons between groups were conducted by applying t-tests or analysis of variance. The correlation between volunteer motivation and stress was analysed by Pearson correlation. Influencing factors of volunteer motivation were determined by multivariable linear regression models. A value of p<0.05 was used to declare statistical significance.

Results The mean score of volunteer motivation of patient volunteers was 73.24 (SD 12.00), while that of stress load was 46.08 (SD 21.28). The mean scores of the personal vulnerability (PV) and event load (EL) stress category. Participants’ volunteer motivation was negatively correlated with stress load (r=-0.238, p<0.001), as well as PV (r=-0.188, p<0.01) and EL (r=-0.283, p<0.001). Multivariable linear regression analysis identified that the potential influencing factors of volunteer motivation were occupation (B=1.100, 95% CI 0.037 to 2.164, p=0.043), health condition (B=-3.302, 95% CI -5.287 to -1.317, p<0.001) and EL (B=-0.434, 95% CI -0.756 to -0.111, p=0.009). Participants who worked in the public sector, had better health conditions and had lower EL were more likely to have higher volunteer motivation.

Conclusions Our study suggested that reducing stress load might be a possible pathway to encourage and maintain volunteerism in the FSH context. Implications and suggestions for future research on patient volunteer recruitment and management could be drawn from our findings.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Cross-sectional assessment of the stress load and volunteer motivation of patient volunteers in Fangcang shelter hospitals (FSHs) during the COVID-19 pandemic.
⇒ Includes an exploration of factors influencing FSH patients’ volunteer motivation.
⇒ Health conditions of patient volunteers in the survey were self-reported instead of assessed by medical professionals.
⇒ Future research should compare volunteer motivation and stress load levels between patient volunteers and general patients during the COVID-19 pandemic, which might present more meaningful results.

INTRODUCTION

In March 2020, WHO declared the global pandemic of COVID-19. South Africa reported the first confirmed case of the Omicron variant to the WHO on 24 November 2021.1, 2 Shanghai also saw an Omicron outbreak, which seriously threatened people’s lives and health in the first half of 2022.3 Over the past two years, countries worldwide have been influenced to varying degrees by the significant increase in confirmed and asymptomatic cases of COVID-19.4, 5 The capacity of medical services has been shocked. The contradiction between admitting and quarantining patients is prominent.

The primary paradigm of the response to the Novel Coronavirus Pneumonia Pandemic (NCPP) in various countries is the debate between ‘zero’ or ‘coexistence’. The white paper ‘China’s Action to Combat the Novel...
Coronavirus Pneumonia Pandemic divides China’s fight against the NCPP into five stages: rapid response to the outbreak, initial containment of the epidemic, gradual decline in new cases, temporary success and normalized control. In the face of the NCPP outbreak, the Chinese government coordinated epidemic prevention, control and medical treatment. They adopted the policy of ‘early detection, early reporting, early isolation, early treatment’ to contain the spread of the epidemic and change the course of virus transmission. Additionally, their ‘dynamic zero’ principle consists of a unified and efficient command system, and a tight prevention and control system with universal participation. Chinese healthcare services also strengthen the treatment of severe patients (e.g., the establishment of two infectious disease hospitals, Vulcan Mountain Hospital and Thunder Mountain Hospital, with a capacity of more than 1000 beds each), the early intervention of patients who are asymptomatic or with mild symptoms, and the public and transparent release of information on the NCPP.

Fangcang shelter hospitals (FSHs) are often used in mass disasters because they have the characteristics of rapid construction, massive scale and low cost to adapt to emergency medical rescue missions. They have been widely implemented in China to tackle the COVID-19 pandemic by converting existing stadiums and exhibition centres into healthcare facilities. It is reported that more than 95% of the recent cases of Omicron in China are mild or asymptomatic. The morbidity characteristics of the Omicron variant and the promotion of COVID-19 vaccination boosters have increased the proportion of patients with mild/moderate symptoms and asymptomatic cases. This situation placed a higher demand on the capacity of medical institutions in addition to designated hospitals. The construction of FSHs can solve the dilemma of admission capacity expansion.

As is known, FSHs admit COVID-19 patients who are asymptomatic or have mild symptoms in order to isolate confirmed and asymptomatic cases and prevent community spread. Han’s study on 174 308 COVID-19 cases during the Omicron outbreak in Shanghai revealed that patients in FSHs had an average hospital stay of 7.39 (SD 0.53) days, with asymptomatic cases accounting for 71.50%. Patients admitted to the FSHs had daily PCR tests more than 95% of the recent cases of Omicron in China confirmed and asymptomatic cases and prevent community spread. This situation placed a higher demand on the capacity of medical institutions in addition to designated hospitals. The construction of FSHs can solve the dilemma of admission capacity expansion.

During the pandemic, volunteers contributed a lot to protecting public health and augmenting the overwhelmed public services. Volunteers in FSH consist of socially recruited volunteers and patient volunteers. Socially recruited volunteers are supervised by the logistics department of FSHs, which is responsible for the recruitment, training, organisation, implementation and evaluation of volunteer services. Ward administrators recruit patient volunteers who meet the inclusion criteria. They are authorised to work after health assessment and training. Like a unique community in a quarantined setting, FSHs have the potential for various social conflicts to occur. It is meaningful to encourage those with the drive to engage in social activities to give full play to volunteer work. Collaboration between patient volunteers and medical staff in FSHs contributes to developing a unique working environment with identity and belonging. Patient volunteer teams are believed to play essential roles in psychological support for patients, resolving conflicts, and facilitating patients’ return to society. Training of patient volunteers included infection prevention and control, communication, and coordination, logistical support, conflict management and emergency response.

However, it was found that under the COVID-19 pandemic, the general population has been subjected to psychological stress due to long-time epidemic control. Furthermore, they tend to get stressed, especially when infected with COVID-19 and admitted to designated hospitals. Previous studies have revealed that traumatic events and chronic stress have an impact on the psychological state of the general population, leading to loneliness, low self-confidence and even post-traumatic stress disorder. He et al. and Wang et al. also find that patients in the FSHs tend to develop distress due to the quarantine settings. Additionally, Roditi et al. reported that volunteers have higher mental health disorders than medical workers. Their negative psychological impact includes low self-esteem, perceived health, educational and occupational achievement, and functional capacity. Chawłowska examined student volunteers’ perceptions towards student volunteerism projects, in which inducement training (79.11%) was commonly reported, and the majority noted the development of their soft skills and medical skills. Furthermore, in a qualitative study in Poland, researchers believed medical students’ volunteerism benefited students, patients and the healthcare system, as well as reinforced important values of medical ethos such as altruism, public service and solidarity. Volunteerism in health services emerged in the USA and has since gained popularity in other countries where patients and healthcare professionals highly regard it. Motivational and incentive factors are hot topics of current research on volunteerism. Volunteer work in China has recently developed, and domestic scholars in this field mainly concentrate on its role, current situation and management. According to the types of services, volunteer work in Chinese hospitals includes counseling, rehabilitation, and physical and mental healthcare. Furthermore, social workers are typically responsible for the supervision and training of volunteers to ensure service quality in healthcare settings.
state comes from exposure to various stressful events and might be affected by coping strategies. Since volunteers have different levels of stress, types of stress load are believed to be associated with volunteer motivation (volunteer motivation) and thus impact the maintenance of enthusiasm for volunteerism. Conversely, stress may also positively affect patients by improving relationships, increasing self-efficacy and leading to post-traumatic growth, as revealed by Vazquez. Therefore, it is essential to understand the stress pattern of patient volunteers in the FSH and explore whether patients’ volunteer motivation is associated with stress.

Volunteer motivation refers to ‘the motivation of individuals to seek volunteer opportunities, commit to volunteering, and sustain their involvement in volunteerism over time,’ which drives the initiation, direction and maintenance of volunteer attempts. Attitude, job performance and differential incentives have been proposed to be associated with volunteer motivation. However, factors influencing FSH patients’ volunteer motivation are rarely reported. Although volunteer motivation might not act as the only factor determining volunteer behaviour, understanding volunteer motivation can help in volunteer recruitment and maintenance.

Therefore, the purpose of this study was as follows: (A) To assess the volunteer motivation and stress load among patient volunteers in the FSHs; (B) To examine the association between volunteer motivation and stress load and explore the potential influence factors of volunteer motivation. We hope this study will provide a guiding basis for developing volunteer recruitment and incentive programmes, psychological support procedures, and management strategies.

**METHODS**

**Study design**

This cross-sectional study was conducted in Shanghai from 21 April to 20 May 2022. An online survey via https://www.wxj.cn/ (an online survey platform) was issued with standardised psychometric instruments.

**Participants**

Random cluster sampling was used to recruit patient volunteers for the online survey in FSHs in Shanghai. There were 18 variables in our study. We calculated an estimated sample size of 212 (10 times the variables) to allow for a sample loss of 15%. We predicted 60 patient volunteers per subunit. Therefore, we selected 4 out of 28 subunits in seven FSHs using the random number table method after numbering each subunit. All the patient volunteers in the four randomly selected subunits were seen as subjects. We have 238 patient volunteers on the list, and 215 of them (90.33%) were recruited after giving informed consent before the online survey. Patients who agreed to help with routine work while under quarantine and were assessed to be asymptomatic or to have only minor symptoms of coronavirus pneumonia met the inclusion criteria. Exclusion criteria included self-reported physical or mental illness, cognitive deficits, or any other impairment which would make it challenging for participants to understand and complete the online questionnaires. The participants received no financial compensation during their stay in the FSHs.

**Instruments**

All the participants were assigned to fill out a structured online questionnaire (see online supplemental appendix 1), including sociodemographic information, the Volunteer Function Inventory (VFI) and the Stress Overload Scale (SOS).

The VFI has 18 items with six dimensions, including understanding (3 items), career (3 items), values (3 items), enhancement (3 items), protective (3 items) and social (3 items). This scale was developed by Clary et al after a comprehensive synthesis of previous studies, which proposed six volunteer motivations and edited the scale accordingly. As denoted in prior studies, the six-dimension instrument of volunteer motivation has a solid scientific and rational nature. In the investigation study of volunteers in Guangdong Province by Jiang Wei, the Chinese version of VFI also has high reliability and validity. The Cronbach coefficient of the total scale is 0.952, and the Cronbach coefficients of the six dimensions are between 0.807 and 0.878, which confirms this scale’s adaptability and explanatory power in China. In this study, this Likert 5-point scale was used as a part of the structured questionnaire, in which participants could choose options 1 to 5 meaning ‘strongly disagree, disagree, average, agree, and strongly agree’ respectively. The VFI has a maximum score of 90. Higher scores mean higher volunteer motivation among individuals.

The SOS was developed by Amirkhan and translated and culturally adapted by Xi et al in China. After comprehensive guidance from relevant experts and strict tests on nurses in clinical settings, the scale had a Cronbach coefficient of 0.936, retest reliability of 0.858, and content validity of 0.86, displaying good reliability and validity. The SOS differs from other scales in the following aspects. First, it mainly reflects the perceived degree of personal stress. Second, it is more practical since the items are simple and easy to understand, and there are no restrictions on specific demographic characteristics. Third, it is possible to assess the risk of developing stress-related diseases and the degree of risk of the surveyed subjects. The SOS is divided into two dimensions, personal vulnerability (PV, 12 items), in which individuals react to events that are accompanied by powerlessness, frailty and fatigue; and event load (EL, 10 items), in which individuals are subjected to extreme external events, responsibilities and pressure. A Likert 5-point Likert Scale of 1 to 5 was used, with never = 1, rarely = 2, occasionally = 3, often = 4 and always = 5. The total score of SOS was 110, with 60 for PV and 50 for EL. Higher scores indicate higher stress in each dimension. The SOS also offers four categories, low (PV)-low (EL), low (PV)-high (EL), high (PV)-low...
(EL), and high (PV)-high (EL) by splitting PV and EL scores into high versus low, separating those most at risk of stress from others.

**Data collection**

Researchers used Wenjuanxing.com (an online survey platform) to generate the questionnaire quick response code (QR code) and conduct the survey from 21 April to 20 May 2022. Healthcare workers in the FSH personally invited patient volunteers. If patients satisfied the study’s eligibility requirements, healthcare workers would let them scan the code via WeChat (a social networking tool) to complete the survey. Each WeChat account was limited to one opportunity to answer. We also set strong passwords to avoid unauthorised data access. The survey was designed and optimised to be short (50 questions with an average answering time of 6.2 minutes) and clear to avoid non-response errors. Finally, 200 of the 215 patient volunteers participated in the online survey after giving informed consent, with a response rate of 93.02%. Fifteen volunteers failed to respond because of a lack of smartphones and the purpose of a contact-free survey. After the participants filled out the questionnaires anonymously, 197 valid questionnaires were received by eliminating invalid ones (selecting all the same options). Therefore, the effective response rate of the online survey was 91.63%.

**Statistical analysis**

The statistical software SPSS V.25.0 (IBM Corp, Armonk, New York, USA) was used for data analysis. Countable data were described by number and percentage, while continuous variables were displayed by mean and SD after the normality check. Moreover, continuous variables like age and stay in FSHs were categorised by quartile range. Comparisons between groups were conducted by applying t-tests or analysis of variance. The correlation between volunteer motivation and stress was analysed by Pearson correlation. Influencing factors of volunteer motivation were determined by multivariable linear regression. No missing data were found during the analysis due to the prior setting of the online survey design. A value of p<0.05 was considered statistically significant for all calculations.

**Patient and public involvement**

None.

**RESULTS**

**Characteristics of the study sample**

We recruited 215 patient volunteers during the initial stage of the survey and collected 197 valid questionnaires finally. Fifteen participants failed to finish the survey (lack of smartphones and the contact-free requirement), while three gave invalid answers. Therefore, the effective response rate of our survey was 91.63%. Table 1 shows the characteristics of the study sample. The average age of the 197 patient volunteers who participated in the study was 31.43 (SD 7.86) years, with 31 (15.74%) women and 166 (84.26%) men. Their average stay in the FSH after being infected with COVID-19 was 14.59 (SD 9.88) days. See table 1 for the sociodemographic data of the sample.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>(Mean (SD))/ (n (%))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>166 (84.26)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>31 (15.74)</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td>31.43 (7.86)</td>
</tr>
<tr>
<td>Education</td>
<td>Junior high school</td>
<td>59 (29.95)</td>
</tr>
<tr>
<td></td>
<td>Senior high school</td>
<td>72 (36.55)</td>
</tr>
<tr>
<td></td>
<td>Junior College</td>
<td>39 (19.79)</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree or above</td>
<td>27 (13.71)</td>
</tr>
<tr>
<td>Political background</td>
<td>Communist party</td>
<td>14 (7.11)</td>
</tr>
<tr>
<td></td>
<td>Communist youth league</td>
<td>36 (18.27)</td>
</tr>
<tr>
<td></td>
<td>Non-communist parties</td>
<td>3 (1.52)</td>
</tr>
<tr>
<td></td>
<td>Citizen</td>
<td>144 (73.11)</td>
</tr>
<tr>
<td>Marital status</td>
<td>Unmarried</td>
<td>99 (50.25)</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>83 (42.13)</td>
</tr>
<tr>
<td></td>
<td>Divorced or widowed</td>
<td>15 (7.62)</td>
</tr>
<tr>
<td>Occupation</td>
<td>Student</td>
<td>4 (2.03)</td>
</tr>
<tr>
<td></td>
<td>Public-sector workers</td>
<td>6 (3.05)</td>
</tr>
<tr>
<td></td>
<td>Private-sector workers</td>
<td>59 (29.95)</td>
</tr>
<tr>
<td></td>
<td>Self-employed</td>
<td>30 (15.23)</td>
</tr>
<tr>
<td></td>
<td>Non-profit organisation workers</td>
<td>7 (3.55)</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>91 (46.19)</td>
</tr>
<tr>
<td>Health condition</td>
<td>Sound</td>
<td>89 (45.18)</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>74 (37.56)</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>27 (13.71)</td>
</tr>
<tr>
<td></td>
<td>Out of condition</td>
<td>7 (3.55)</td>
</tr>
<tr>
<td>Stay in the FSH (days)</td>
<td></td>
<td>14.59 (8.88)</td>
</tr>
<tr>
<td>Experiences in epidemic prevention</td>
<td>Yes</td>
<td>48 (24.37)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>149 (75.63)</td>
</tr>
<tr>
<td>Volunteering experiences</td>
<td>Yes</td>
<td>80 (40.61)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>117 (59.39)</td>
</tr>
</tbody>
</table>

Health condition refers to self-reported physical and mental well-being, with ‘sound’ meaning a good health state, ‘mild’ meaning a health state with some illnesses, ‘moderate’ meaning health with bearable illnesses, and ‘out of condition’ meaning poor health. Experiences in epidemic prevention refers to experiences in early diagnosis, treatment, screening, contact tracing, and support for those who have been affected by the disease.

FSH, Fangcang Shelter Hospital.
Stress load and volunteer motivation of patient volunteers in the FSH

Patient volunteers had a mean score of 73.24 (SD 12.00) for VFI. Dimension 'understanding' had the highest mean score 12.89 (SD 2.01), while 'career' had the lowest mean score 11.42 (SD 2.85). The ranks and scores of each dimension are shown in Table 2.

As displayed in Table 3, the total SOS Score was 110 points with a mean score of 46.08 (SD 21.28). The total score of the PV dimension was 60, with a mean score of 26.99 (SD 12.46), while the total score of the EL dimension was 50, with a mean score of 19.09 (SD 9.63). Patient volunteers were grouped into four categories based on the PV and EL scores. The majority of the sample was classified as low (PV)-low (EL), including 136 participants (69.04%).

Comparison of volunteer motivation among patient volunteers with different characteristics

The comparison of volunteer motivation scores of patient volunteers with different characteristics is displayed in Figure 1. Differences exist among patient volunteers with different occupations, health conditions and stress load types (p<0.05).

Correlation of stress load and volunteer motivation among patient volunteers

Table 4 shows the correlation between stress and volunteer motivation among patient volunteers. Overall, volunteer motivation was negatively associated with stress load (r=-0.238, p<0.01), as well as the PV (r=-0.188, p<0.01) and EL (r=-0.283, p<0.01) dimensions, as displayed in Figure 2.

Influencing factors of volunteer motivation among patient volunteers

The multivariable linear regression model was conducted using volunteer motivation as the dependent variable. Sociodemographic factors were found statistically significant above, and dimensions of stress (PV and EL) were listed as independent variables. As shown in Table 5, influencing factors of volunteer motivation were determined, including career, health conditions and EL, accounting for 13.5% of the variance.

DISCUSSION

The present study aimed to investigate the stress load and volunteer motivation of patient volunteers in the FSHs and examine their association. Additionally, we explored the potential influencing factors of volunteer motivation. According to our findings, the volunteer motivation of patient volunteers in the FSHs was at a relatively high level, while their stress load was at a low level. Furthermore, scores of VFI were found to be negatively correlated with those of SOS and its two dimensions (PV and EL), indicating that volunteer motivation negatively correlated with stress load among FSH patients. Influencing factors of volunteer motivation were also determined, including career, health condition and EL.

One finding of our study was that the mean score of VFI of patient volunteers in the FSH was 73.24 (SD 12.00), indicating that they have high levels of volunteer motivation. Prior research has demonstrated that volunteer motivation is relevant to thriving at work and volunteer behavior. It has also been reported that volunteers were most motivated by personal and social benefits. Therefore, one explanation for the high volunteer motivation here might be that patients were affected by the dedication and professionalism of healthcare workers in saving lives and helping the injured. Moreover, as patient volunteers took up part of the logistic support work in the FSH, such as helping nursing staff to distribute meals, carry supplies and record patient information, they could change the monotonous routine of cabin life while enriching activity and enhance confidence in overcoming the disease.

Table 2  Scores and ranks of volunteer motivation of patient volunteers in the FSH (n=197)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Scores (mean (SD))</th>
<th>Total score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding</td>
<td>12.89 (2.01)</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Values</td>
<td>12.86 (2.04)</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>Enhancement</td>
<td>12.39 (2.37)</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Protective</td>
<td>11.97 (2.66)</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Social</td>
<td>11.70 (2.45)</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Career</td>
<td>11.42 (2.85)</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>73.24 (12.00)</td>
<td>90</td>
<td></td>
</tr>
</tbody>
</table>

FSH, Fangcang Shelter Hospital.

Table 3  Status of patient volunteers’ stress in the FSH (n=197)

<table>
<thead>
<tr>
<th>Categories</th>
<th>N (%)</th>
<th>PV (mean (SD))</th>
<th>EL (mean (SD))</th>
<th>SOS (mean (SD))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (PV)-Low (EL)</td>
<td>136 (69.04)</td>
<td>20.23 (7.35)</td>
<td>14.49 (5.14)</td>
<td>34.71 (11.83)</td>
</tr>
<tr>
<td>High (PV)-Low (EL)</td>
<td>29 (14.72)</td>
<td>40.14 (4.25)</td>
<td>23.00 (5.12)</td>
<td>63.14 (6.21)</td>
</tr>
<tr>
<td>Low (PV)-High (EL)</td>
<td>4 (2.03)</td>
<td>30.75 (2.99)</td>
<td>22.75 (7.27)</td>
<td>53.50 (9.04)</td>
</tr>
<tr>
<td>High (PV)-High (EL)</td>
<td>28 (14.21)</td>
<td>45.68 (7.50)</td>
<td>36.89 (7.35)</td>
<td>82.57 (13.67)</td>
</tr>
<tr>
<td>Total</td>
<td>197</td>
<td>26.99 (12.46)</td>
<td>19.09 (9.63)</td>
<td>46.08 (21.28)</td>
</tr>
</tbody>
</table>

EL, event load; FSH, Fangcang Shelter Hospital; PV, personal vulnerability; SOS, Stress Overload Scale.
might also contribute to the increase in their volunteer motivation.

Regarding specific dimensions of VFI, the highest rated dimensions were ‘understanding’ and ‘values’. This finding may be due to the fact that patient volunteers could improve their competencies, skills and knowledge through volunteer activities, which is consistent with the findings of Soldavini.17 Meanwhile, the lowest rated dimension was ‘career’, reflecting that patient volunteers disagreed that volunteer experiences could help their career development. A potential reason for this may be related to the fact that the average FSH stay of patients was short, and short-term volunteer experience did not give patient volunteers a deep feeling. Another reason might be that most of the patient volunteers were not health-related workers, and volunteerism in FSHs benefited little for their career development. Unlike our finding, it is worth noting that prior research identified perceived career development benefits from volunteerism among healthcare students.18 48–51 This, however, could not be

| Table 4: Correlation between stress and volunteering motivation among patient volunteers |
|---------------------------------|------------|-----------|-------------|----------------|----------------|-----------|------------|
|                                | Understanding | Career     | Values      | Enhancement  | Protective     | Social    | VFI        |
| PV                             | -0.097       | -0.210**   | -0.092      | -0.122       | -0.199**       | -0.186**  | -0.188**   |
| EL                             | -0.169*      | -0.263***  | -0.184**    | -0.235**     | -0.281***      | -0.253*** | -0.283***  |
| SOS                            | -0.133       | -0.242**   | -0.137      | -0.178       | -0.244**       | -0.223**  | -0.238***  |

*p<0.05; **p<0.01; ***p<0.001.

EL, event load; PV, personal vulnerability; SOS, Stress Overload Scale; VFI, Volunteer Function Inventory.
expected in a mixed-profession sample like ours. The results of this section suggest that the administrators of the FSHs need to reinforce the training of patient volunteers and enhance their volunteer experience through comprehensive guidance to promote their adaptability.

Our results additionally presented that the mean score of SOS among patient volunteers was 46.08 (SD 21.28), of which 69.04% (136/197) participants were grouped in the low (PV)-low (EL) category, 14.72% (29/197) high (PV)-low (EL), 2.03% (4/197) low (PV)-high (EL), and 14.21% (28/197) high (PV)-high (EL). This indicates that the stress load of patient volunteers was relatively low during their stay in the FSH. Contrarily, prior literature reported high stress load and negative emotions among the general population in the early stage of the COVID-19 pandemic. The following reasons may explain the discrepancy. First, knowledge of COVID-19 and global experience with epidemic control and prevention vary at different waves of the pandemic. Hence, emotional responses fluctuate during the pandemic. Second, services in FSHs like infrastructure, medical care and logistics support were considered sufficient and of high quality, with psychology-related services carried out regularly. Psychological specialists provided various measures to alleviate patients' unfavorable emotions. Third, patient volunteers might achieve self-worth by playing volunteer roles and establishing collaborative relationships with medical professionals. Thus, they could probably reduce stress caused by quarantined settings and infection experiences. In light of this finding, administrators are recommended to develop more approaches to psychological support, such as strengthening patients' knowledge of COVID-19, positive stress reduction therapy and psychological relaxation training.

Moreover, this study indicated a negative association between volunteer motivation and stress load, as well as the PV and EL dimensions. This view is supported by Han et al who wrote that stressors were attenuated on days when volunteerism was performed. Similarly, in a mixed-methods study assessing the psychological burden on and experience of medical student volunteers, the volunteers' negative emotions were stronger before work and gradually diminished. Nevertheless, due to the influence of potential confounding factors, the negative correlation between stress load and volunteer motivation needs to be validated in more rigorously designed studies with large samples.

Another important finding was that the multivariable linear regression analysis identified occupation, health condition and EL as influencing factors of volunteer motivation. It implies that participants who were public-sector workers, in good health conditions and at a low EL level were more likely to be motivated to volunteerism, similar to the results of previous studies. For instance, Papa et al states that worsening health would likely reduce voluntary work participation in a cross-national comparison study. Moreover, AlOmar et al found that volunteerism was more common among senior undergraduate health students with a medical background and self-perceived health. According to the statistical analysis, health conditions seem more strongly associated with volunteer motivation than stress load. However, this does not appear

<table>
<thead>
<tr>
<th>Variables</th>
<th>B (95% CI)</th>
<th>SE</th>
<th>β</th>
<th>T</th>
<th>P value</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant item</td>
<td>78.446 (71.643 to 85.248)</td>
<td>3.449</td>
<td>-</td>
<td>22.745</td>
<td>&lt;0.001***</td>
<td>-</td>
</tr>
<tr>
<td>Occupation</td>
<td>1.100 (0.037 to 2.164)</td>
<td>0.539</td>
<td>0.136</td>
<td>2.040</td>
<td>0.043*</td>
<td>1.011</td>
</tr>
<tr>
<td>Health condition</td>
<td>−3.302 (−5.287 to 1.317)</td>
<td>1.006</td>
<td>−0.226</td>
<td>−3.282</td>
<td>0.001**</td>
<td>1.076</td>
</tr>
<tr>
<td>Personal vulnerability</td>
<td>0.144 (−0.101 to 0.388)</td>
<td>0.124</td>
<td>0.149</td>
<td>1.158</td>
<td>0.248</td>
<td>3.757</td>
</tr>
<tr>
<td>Event load</td>
<td>−0.434 (−0.756 to 0.111)</td>
<td>0.163</td>
<td>−0.348</td>
<td>−2.652</td>
<td>0.009**</td>
<td>3.901</td>
</tr>
</tbody>
</table>

R=0.854, R²=0.725, adjusted R²=0.135, F=6.824, p<0.001.
*p<0.05; **p<0.01; ***p<0.001.
VIF, Variance Inflation Factor.
to be the case, given the fact that the health condition was a self-reported indicator based on a single question. The impact of health conditions on volunteer motivation should be explored in future studies using more structured instruments.

In addition, we want to give more insights into the influencing factors of FSH patients’ volunteer motivation. To start with, public-sector workers consist of civil servants and staff from state-owned enterprises and public institutions, who are usually inclined to be more altruistic owing to consistent political education and cultivation. Next, although most patients admitted to FSHs were asymptomatic, or under mild/moderate conditions, some would still manifest respiratory symptoms combined with other systemic illnesses. Patient volunteers might undertake light physical activities, such as assisting nursing staff in distributing supplies, and the concern about health status might reduce their volunteer motivation. Papa et al also state that worsening health reduces voluntary work participation in a cross-national comparison study. Lastly, infection with COVID-19 and admission to the FSH was considered a significant life event for patient volunteers. Consequently, they might be prone to psychological problems and anxiety due to insufficient knowledge of the disease and lack of emotional support, as mentioned in the research paper by Wang et al.

Thus, it is suggested that healthcare workers in FSHs should inquire about patients’ sociodemographic information and check their health conditions after they are admitted to the ward. Then, the targeted patients in FSHs could be encouraged to engage in volunteer work and fully utilize their strengths.

Limitations
This study has several limitations. First, this online survey used self-reporting questionnaires, which might be susceptible to reporting biases. In addition, we adopted a cross-sectional design which could only provide a snapshot in time despite the changing situation with time and differing contexts. Also, the selected four units and the sample with a majority of men might cause a lack of generalisability and gender bias, so conclusions should be drawn with caution. Second, although we tried to collect comprehensive sociodemographic information in the structured questionnaire, some items were abandoned for privacy protection and sample size limitation. Third, we failed to compare volunteer motivation and stress load levels between patient volunteers and general patients in FSHs, as well as sociodemographic variables between the two groups, which might present more meaningful results. These flaws could be remedied through optimised design of future studies, including more diverse participants. Further prospective multicentre studies are also needed to confirm the external validity of the results of this study.

Conclusion
In this study, we investigated the status of stress load and volunteer motivation and examined their association among patient volunteers in the FSHs. Moreover, we explored factors influencing volunteer motivation. Overall, volunteer motivation of patient volunteers in the FSH was at a high level, while their stress load was at a relatively low level. We also noted that volunteer motivation has a negative association with stress load. Furthermore, patients were prone to have higher volunteer motivation if they worked in the public sector, had better health conditions and had lower EL. Hence administrators of FSHs should give consideration to patient volunteers’ psychological support and promote their resilience to the pandemic. Additionally, future research should include more FSH patients and develop adaptive recruitment programmes and management strategies for patient volunteers.

Author affiliations
1Department of Neurology, NO. 905 Hospital of PLA Navy affiliated to Naval Medical University, 200052 Shanghai, China
2Nursing Department, NO. 905 Hospital of PLA Navy affiliated to Naval Medical University, 200052 Shanghai, China
3Department of Disease Control and Prevention, NO. 905 Hospital of PLA Navy affiliated to Naval Medical University, 200052 Shanghai, China
4NO. 905 Hospital of PLA Navy affiliated to Naval Medical University, 200052 Shanghai, China

Acknowledgements The authors appreciate all the patients and staff who participated in the research.

Contributors JW and JX were responsible for the overall content as the guarantors. LG and JX designed the study. JW and LG wrote and revised the manuscript. FL and JW conducted the online survey and data collection. JL contributed to quality control of the study. LG also performed data analysis. All authors gave final approval for the manuscript.

Funding This research was funded by grants from Scientific Research Project of NO. 905 Hospital of PLA Navy (NO.2021X003 and NO.2021Q008).

Disclaimer The funding organization had no role in the design of the study and collection, analysis, interpretation of data, and writing the manuscript.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval The study was conducted following the Declaration of Helsinki and approved by the Institutional Review Board of NO.905 Hospital of PLA Navy, affiliated with Naval Medical University (NO. 2022-06).

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. Data presented in this study are available on request from the corresponding author.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/.

REFERENCES


