Students@nmji

Willingness of medical students to volunteer during the Covid-19 pandemic: Assessment at a tertiary care hospital in India

MANRAJ SRA, AMULYA GUPTA, ABHISHEK JAISWAL, KAPIL YADAV, ANIL GOSWAMI, KIRAN GOSWAMI

ABSTRACT

Background. The involvement of medical students in strategies to control Covid-19 might be considered to cope with the shortage of healthcare workers. We assessed the knowledge about Covid-19, willingness to volunteer, potential areas of involvement and reasons for hesitation among medical students towards volunteering.

Methods. We did this cross-sectional study among undergraduate students at a tertiary care teaching hospital in New Delhi. We used a web-based questionnaire to elicit demographic information, knowledge of Covid-19, willingness to volunteer and reasons deterring them from working during the Covid-19 pandemic, and self-declared knowledge in six domains.

Results. A total of 292 students participated in the study with a mean (SD) age of 19.9 (3.1) years. The mean (SD) knowledge score of Covid-19 was 6.9 (1.1) (maximum score 10). Knowledge score was significantly different among preclinical (6.5), paraclinical (7.18) and clinical groups (7.03). Almost three-fourth (75.3%) participants were willing to volunteer in the Covid-19 pandemic, though 67.8% had not received any training in emergency medicine or public health crisis management. Willingness to work was maximum in areas of social work and indirect patient care (62.3% each). Lack of personal protective equipment was cited as a highly deterring factor for volunteering (62.7%) followed by fear of transmitting the infection to family members (45.9%), fear of causing harm to the patient (34.2%) and the absence of available treatment (22.2%).

Conclusions. A majority of the students were willing to volunteer even though they had not received adequate training. Students may serve as an auxiliary force during the pandemic, especially in non-clinical settings.

INTRODUCTION

Covid-19, a viral pneumonia caused by SARS-CoV-2,

All India Institute of Medical Sciences, Ansari Nagar, New Delhi 110029, India
MANRAJ SRA, AMULYA GUPTA   Undergraduate students
ABHISHEK JAISWAL, KAPIL YADAV, ANIL GOSWAMI, KIRAN GOSWAMI   Centre for Community Medicine

Correspondence to KAPIL YADAV; *dr.kapilyadav@gmail.com*

overburdened healthcare facilities worldwide since its origin in December 2019. Compared to India with just 43 healthcare workers (HCWs) per 10 000 population, the USA and UK with 682 and 664 HCWs per 10 000 people, respectively, are much better equipped to handle the pandemic.[1] Despite this, healthcare systems worldwide have adopted various strategies such as enrolling retired doctors, nurses and cancelling elective procedures to expand capacity for the medical surge.[2] Diversion of HCWs to Covid-19 management has further affected routine care for other acute and chronic diseases.[3]

Medical students could potentially play a role in supporting HCWs during a pandemic, the precedent for which was during the 1918 Spanish Flu when medical students at the University of Pennsylvania helped in patient care.[4] Similarly, during a polio outbreak in Denmark in 1952, a group of students was tasked with manual ventilation of patients.[5] The UK and Italy allowed final year medical students to graduate early and join Covid-19 hospitals. Some schools in the USA such as the New York University followed suit.[6] Medical students at Harvard Medical School made a 'Covid-19 Student Response Team' to carry out tasks such as supporting medical personnel in daily lives, spreading awareness and activism in the community.[7] In India, the Gujarat government instituted strategies to involve medical, dental and nursing students in the Covid-19 response.[8]

With limited involvement in care delivery, students are seen as a non-essential part of healthcare systems. However, medical students will become future HCWs and their involvement in Covid-19 care can be a valuable training experience. Further, being young adults, medical students are much less susceptible to Covid-19-related mortality compared to retired HCWs, who are elderly with many having comorbid conditions.[9]

We aimed to assess the level of willingness to volunteer, knowledge about Covid-19, potential areas of involvement and reasons for deterrence to volunteering among medical students towards volunteering.

METHODS

We did a cross-sectional study using a web-based (Google forms), pretested questionnaire among all 475 undergraduate medical students of a tertiary care teaching hospital in New Delhi. The face validity and content validity of the questionnaire were checked by one senior resident and three faculty members of the Centre for Community Medicine.

At the beginning of the questionnaire there was information on the purpose of the study and a question on consent. The questionnaire was available for viewing only if the student gave consent.

The 37-items survey questionnaire was sent out first on 24

April 2020, two reminders were sent at a 1-week interval. A semi-structured questionnaire was developed to analyse the medical student's demographics, knowledge of the Covid-19 pandemic, willingness to volunteer for working in the Covid-19 pandemic, an inclination to work in various fields during the Covid-19 pandemic (a. direct patient care, b. indirect patient care, c. laboratory work, d. social work, e. spreading awareness and f. supporting medical staff) and self-declared knowledge in those fields, and their reasons for deterrence.

The correct responses for knowledge questions on Covid-19 were based on information provided by the Centers for Disease Control, WHO, and the Ministry of Health and Family Welfare, Government of India.[10,11] Knowledge of Covid-19 was assessed using multiple-choice and short descriptive questions. A 6-point Likert scale was used to assess the inclination to work and their self-declared knowledge in six areas namely: history-taking through phone, direct patient care, spreading awareness, supporting healthcare workers outside the hospital, laboratory work and social work. Deterrence factors for volunteering were assessed using a matrix-based question with six potential reasons for deterrence to be graded as highly deterrent, moderately deterrent, weakly deterrent and not deterrent. The respondents were asked the maximum mortality rate ranging from 0% to 100% at which the students were willing to work under two scenarios—with minimal safety equipment (MS) or with full-body safety equipment (FS). Two open-ended free text questions were asked for any reasons for deterrence and potential areas of involvement that were not listed in the survey.

The students were classified into preclinical, paraclinical and clinical years depending on their current year in the course. The preclinical year consisted of MBBS students who were currently in first year, paraclinical year of MBBS students who were currently in the second year and clinical year of MBBS students who were currently in the third or fourth year or were interns.

For knowledge assessment, a score of 10 was given to each respondent depending on the number of correct answers. Responses involving the Likert scale (1–6) for self-declared knowledge and inclination to work was dichotomized: 1–3 indicating Not enough knowledge/Not willing to volunteer and 4–6 indicating Enough knowledge/Willing to volunteer. A multivariate logistic regression model was developed to capture the relationship between the willingness to work and (i) gender, (ii) year of study and (iii) knowledge of Covid-19. All variables with p<0.25 were entered in the multivariate model. Odds ratios were calculated with 95% confidence intervals.

The model included all subjects with complete data on all variables. Since the responses to all questions that were included in the model were compulsory, no response was excluded due to incomplete data. All p values are two-tailed and a p<0.05 was considered to be significant. Statistical analysis was performed using STATA version 13.1 (StataCorp LP, College Station, TX, USA).

Our study was approved by the Institute Ethics Committee (ID-IEC/267/17.04.2020).

RESULTS

Two hundred and ninety-two participants gave consent and responded. The overall response rate was 61.5%, including 85 from the preclinical year (79.4% response rate), 90 from para-clinical years (84.1% response rate) and 107 from clinical years (40.9% response rate). Three-quarters (76.4%) of the respondents were men with a mean (SD) age of 19.9 (3.1) years.

TABLE I. Demographic details and previous training of our study population

Demographic indicator	n (%)
Mean (SD) age (years)	19.9 (3.1)
Gender	
Men	223 (76.4)
Women	69 (23.6)
Study years	
Preclinical (1st year)	85 (29.1)
Paraclinical (2nd year)	90 (30.8)
Clinical (3rd year, 4th year and interns)	107 (40.1)
Previous training	
Basic life support	89 (30.5)
Triage	14 (4.8)
Infection control measures	26 (8.9)
Handling hazardous material such as biomedical waste in hospital	39 (13.4)
Management of suspected Covid-19 cases	7 (2.4)
Public health emergency	4 (1.4)
Other	7 (2.4)
Not received any of the above training	198 (67.8)

For assessing the power of the sample size, previous studies for Covid-19 were not available. We referred a previous study on the influenza pandemic where 88% of students showed the desire to volunteer.[12] Based on this study, we used 80% as approximation for the proportion of population (p) in the Cochran formula. Using Z=1.96 for 95% confidence and 10% margin of error (d), we had a sample size of 61.

Our sample size of preclinical (85), paraclinical (90) and clinical (107) years is more than the calculated sample size of 61, indicating that the sample of each year is adequately powered.

The demographic details and previous training and awareness of the students are summarized in Table I.

Knowledge and skills
The overall mean (SD) knowledge score of Covid-19 among participants was 6.92 (1.05) (out of a maximum score of 10). Distribution of mean knowledge score according to study year groups was as follows: preclinical years had a mean (SD) knowledge score 6.5 (1.12), paraclinical and clinical years had a score of 7.18 (0.97) and 7.03 (0.99), respectively. The knowledge score was significantly different among groups (One-way ANOVA, F-ratio=10.67, p<0.001).

Most of the participants (98.6%, 288) were aware of the Covid-19 pandemic situation. Almost half the respondents (48.3%, 141) reported being aware of the clinical management of a Covid-19 patient, 59.6% (174) reported knowing appropriate use of personal protective equipment (PPE) and 70.6% (206) were aware of mitigation procedures such as contact tracing. Over two-thirds of the respondents (67.8%) had not received any training in emergency medicine or public health crisis management. Three-fourths of participants (75.3%) indicated their willingness to volunteer in the Covid-19 pandemic.

Knowledge and inclination to work
The inclination to work and self-declared knowledge of six domains was analysed. These were as follows: Direct patient care included assisting in minor procedures or screening of patients; indirect patient care involved telemedicine; laboratory work included assisting in Covid-19 testing laboratories; social work included helping with governmental and non-governmental

agencies to cater to the underprivileged; spreading awareness in the community through social media or other means, and supporting medical staff in their households.

The average inclination to work was highest for social work and indirect clinical work (62.3% for both) followed by laboratory work (51.7%), spreading awareness (48.3%), direct clinical work (47.6%) and supporting staff non-medically (39.4%). The self-declared knowledge level was highest for supporting staff non-medically (55.5%) followed by spreading awareness (54.1%), indirect clinical work (52.1%), social work (43.5%), laboratory work (33.2%) and direct clinical work (24.7%). All the domains showed a positive and significant correlation between knowledge of the participant and inclination to work (all p<0.01). The inclination to work and self-declared knowledge for each domain is summarized year-wise in Figs 1a and b, respectively.

Reasons for deterrence
Lack of PPEs was the most deterrent factor (rated highly deterrent by 67.2% of respondents), and the fear of watching someone die was the least deterrent factor (rated highly deterrent by 5.5% of respondents). Preclinical students showed greater deterrence due to parental factor (p=0.033) and fear of watching someone die (p=0.026) compared to students of paraclinical and clinical years (Fig. 2).

The respondents were asked the maximum mortality rate of a disease ranging from 0% to 100%, at which they were willing to volunteer under two situations, one where MS was provided and second where full safety equipment including biohazard suits (FS) was provided (Table II). These values signify the fear for one's safety during volunteering. The students in the preclinical, paraclinical and clinical years indicated a median threshold of 5%, 2% and 1%, respectively, in MS conditions. Comparatively, in the FS conditions, the students of preclinical, paraclinical and clinical years indicated a median threshold of 10%, 8% and 5%, respectively. There was a significant difference between the maximum mortality rates of MS and FS (p<0.01).

Thirty-seven students filled the open-ended question for the reasons for deterrence. Incidents of violence against health professionals were the most prominent theme. This was followed by apathy or lack of concern for the well-being of others.

The open-ended question for additional ways to contribute to the pandemic was filled by 36 students. Contact tracing was the only new theme among the answers given.

Compared to students of preclinical years, the students of paraclinical (aOR=1.61 [0.79–3.29], p=0.193) and clinical years (aOR=1.23 [0.64–2.39], p=0.538) were more likely to volunteer, but the difference was not significant (Table III). Women respondents (aOR=2.09 [0.98–4.47], p=0.057) were more willing to volunteer compared to men respondents, though the difference was not significant. The knowledge of Covid-19 did
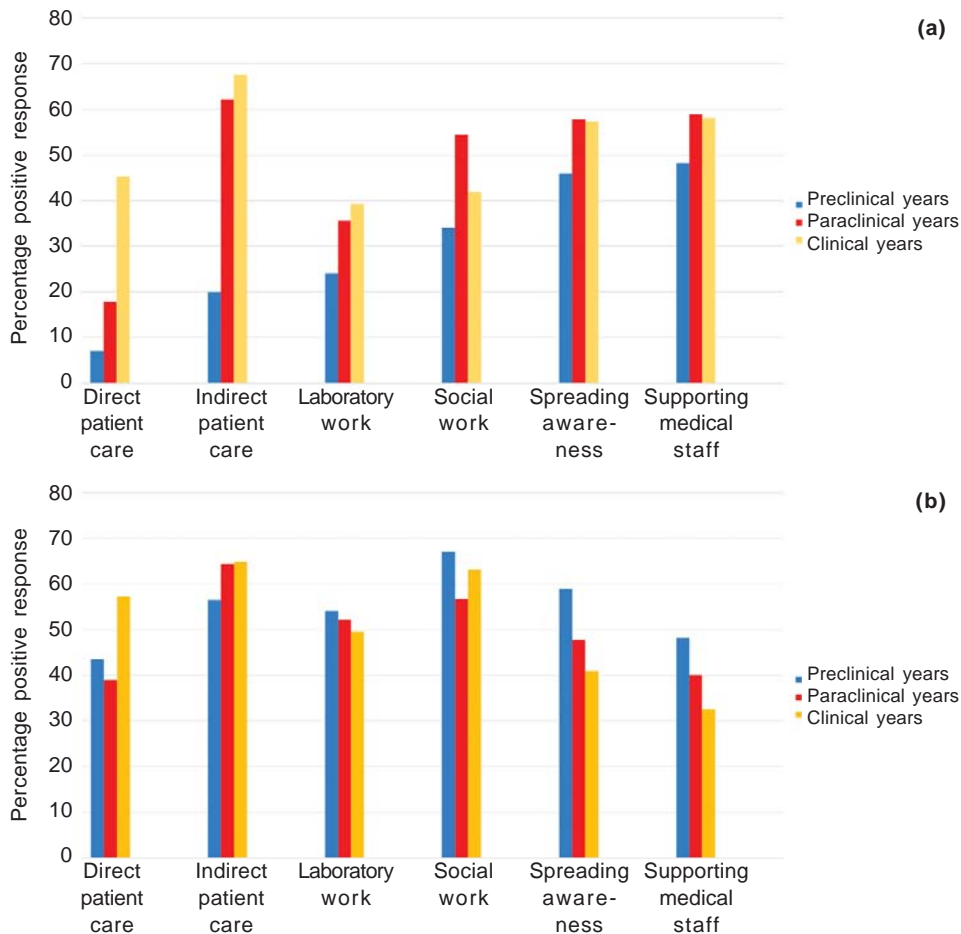

FIG 1. (a) Proportion of medical students who showed an inclination to volunteer in different domains; (b) proportion of medical students who showed sufficient knowledge in different domains
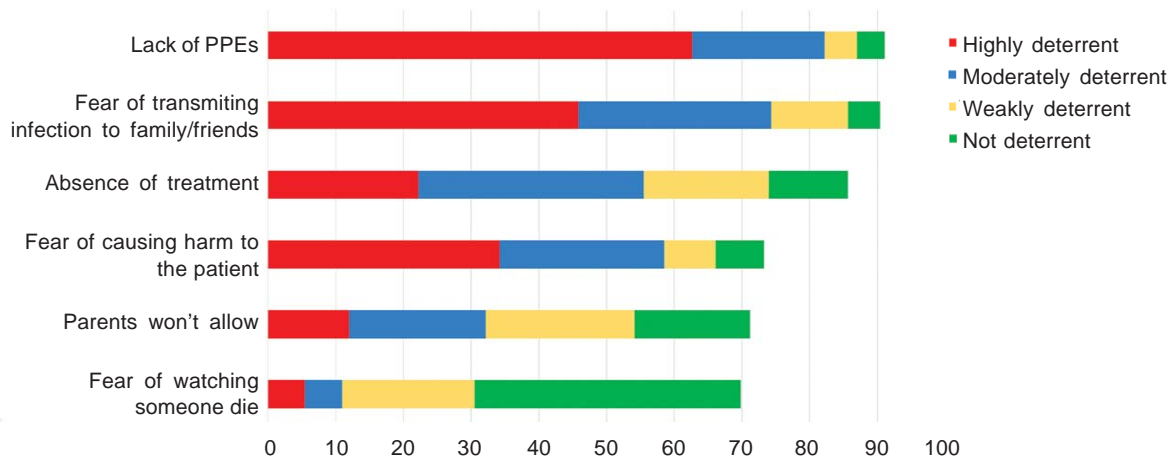
FIG 2. Reasons for deterrence to volunteer in Covid-19 pandemic situation   PPE personal protective equipment

TABLE II. Willingness to volunteer with respect to mortality and study year

Maximum mortality of a communicable disease at which you may volunteer	Median (interquartile range)		
	Preclinical	Paraclinical	Clinical
If minimal safety equipment is provided	5 (1–25)	2 (1–5)	1 (0.02–5)
If full safety equipment is provided	10 (2–50)	8 (3–16)	5 (1–16)

TABLE III. Multivariate logistic regression model for willingness to volunteer

Variable	Unadjusted odds ratio (95% CI)	p value	Adjusted odds ratio (95% CI)	p value
Year				
Preclinical	Reference	–	Reference	–
Paraclinical	1.86 (0.93–3.71)	0.077	1.61 (0.79–3.29)	0.193
Clinical	1.55 (0.83–2.91)	0.170	1.23 (0.64–2.39)	0.538
Gender				
Men	Reference	–	Reference	–
Women	2.27 (1.09–4.72)	0.028	2.09 (0.98–4.47)	0.057
Knowledge score (continuous scale)	1.22 (0.95–1.58)	0.124	1.12 (0.86–1.46)	0.396

not significantly affect the willingness to volunteer of the respondents (aOR=1.12 [0.86–1.46], p=0.396).

DISCUSSION

We found that a majority of medical students across various years were willing to volunteer during the Covid-19 pandemic. They were most inclined to work in areas of indirect patient care and social work. The most important reasons for deterrence to volunteer were the lack of PPE and the fear of transmitting the disease to family and friends. A considerable number of medical students were aware of various aspects of the management of a pandemic though they had not received any formal training to deal with a public health emergency.

On stratification of students according to their year of study, key observations are brought out in their attitudes towards volunteering. Students in the preclinical years indicated greatest inclination to work in social work and spreading awareness. This is in agreement with the fact that with limited clinical knowledge, they are best suited for non-clinical work. Students of the paraclinical years were most inclined to work in indirect patient care and social work. Students of clinical years showed the highest inclination to work in direct and indirect patient care. These observations correlate with the level of knowledge of each group. Thus, these trends show us that if the need arises for medical students to be involved in the management of the pandemic, stratification of students is important for effective utilization of their services.

The leading reasons why students were hesitant to volunteer were lack of PPE, fear of spreading the disease to family and friends, and the absence of any treatment for the disease. These concerns agree with previous studies.[13,14] This is also supported by the fact that students reported a significantly higher mortality rate at which they were willing to work when provided with FS compared to the conditions with MS. Since our study was conducted during the initial months of the outbreak, the fear of lack of PPE was important, but with progress of the outbreak most places have availability of sufficient numbers of PPE. Another factor that deters students is the fear of causing harm to the patient. This should be taken into consideration, especially when involving students in direct patient care. Previous studies have also shown that medical students have poor knowledge of patient safety.[15] Studies have also shown that in the event of students causing any harm, they might endure considerable stress and even quit work.[16] Deterrence towards volunteering due to family reasons was seen more in students of preclinical years. This factor is considerably dependent on the societal

perception of threat from Covid-19. Fear of watching someone die, though a minor factor for deterrence should in no way be ignored as previously it has been shown that students who have worked in emergency medicine may suffer from negative psychological effects of such exposure.[17]

Previously, studies conducted at the University of Alberta before the H1N1 pandemic showed that more than half the students believed that medical students have an obligation to be involved in influenza pandemics.[18] Another study conducted after the H1N1 pandemic at the University of Michigan showed that 88% of the students preferred to be formally involved in the response to this crisis.[12]

Willingness to volunteer was significantly higher among women students (p=0.025) compared to men. This supports the findings of previous studies done among hospital volunteers[19] and medical students[20] which found women HCWs were more willing to volunteer at the times of crisis. However, this was in contrast to the results of a study done at the University of Alberta,[21] which showed no significant impact of gender on willingness to volunteer among Canadian students.

The maximum mortality of a communicable disease at which the student is willing to volunteer showed a decreasing trend from preclinical to clinical years. This reflects the fact that without moral training, idealism in medical students tends to decrease over the years.[22]

In contrast to a study at Rutgers University[23] where a mortality threshold of 34% for respiratory illnesses was found, the values that we reported here were lower. This may be due to a difference in questions in the survey. (The present study questionnaire prompted the participant to write any value while that of Rutgers university used increments of 10% as options; exacerbated by fear during the ongoing pandemic or demographic differences—fewer women respondents and only students of the Indian subcontinent in our study.)

A few limitations of this study must be considered. This was a single-centre study; different institutes may have a varying emphasis on emergency medicine and public health crisis management. Filling all options in the reasons for deterrence section was not compulsory. Limitations in data analysis include dichotomizing the ordinal questions and depending on self-reported information could bias the results as well. Due to a lower response rate for students in the clinical years, the findings might not be generalizable. However, it is known that the response rate is generally low in clinical HCWs,[24] which does not change significantly with the mode of administration.[25]

Despite the limitations, our study provides considerable insights into the knowledge, skills and attitudes of medical students in a public health crisis. The ethical and moral issues surrounding the involvement of medical students in such a pandemic require a deeper probe. Our study helps in identifying the key areas where medical students would be most comfortable in being involved and their reasons for hesitation to volunteer. The findings highlight that medical students are an untapped resource that may serve as a valuable resource despite their limited skill set, and the critical role of disaster management programmes in medical schools that will serve to translate the inclination of volunteering of students to actual service.

Conflicts of interest. None declared

REFERENCES

1 COVID-19: Are there enough health workers? ILOSTAT; 2020. Available at *https://ilostat.ilo.org/2020/04/03/covid-19-are-there-enough-health-workers/* (accessed on 1 Jun 2020).
2 Kaji A, Koenig KL, Bey T. Surge capacity for healthcare systems: A conceptual framework. *Acad Emerg Med* 2006;**13:**1157–9.
3 Tartara F, Cofano F, Zenga F, Boeris D, Garbossa D, Cenzato M. Are we forgetting non-COVID-19-related diseases during lockdown? *Acta Neurochir (Wien)* 2020;**162:**1501.
4 Starr I. Influenza in 1918: Recollections of the epidemic in Philadelphia. 1976. *Ann Intern Med* 2006;**145:**138–40.
5 West JB. The physiological challenges of the 1952 Copenhagen poliomyelitis epidemic and a renaissance in clinical respiratory physiology. *J Appl Physiol (1985)* 2005;**99:**424–32.
6 DeWitt DE. Fighting COVID-19: Enabling graduating students to start internship early at their own medical school. *Ann Intern Med* 2020;**173:**143–4.
7 COVID-19 Student Response. Available at *https://covidstudentresponse.org/* (accessed on 7 Jun 2020).
8 Matter of preparing COVID assistants to deal with the epidemic of COVID-19. Available at *https://gujhealth.gujarat.gov.in/Portal/News/1227_1_17-7-20-COVID-19.pdf* (accessed on 21 Sep 2020).
9 Onder G, Rezza G, Brusaferro S. Case fatality rate and characteristics of patient dying in relation to Covid-19 in Italy. *JAMA* 2020;**323:**1775–6.
10 CDC. Coronavirus Disease 2019 (COVID-19). Centers for Disease Control and Prevention; 2020. Available at *www.cdc.gov/coronavirus/2019-ncov/index.html* (accessed on 1 Jun 2020).
11 WHO. Coronavirus disease (COVID-2019) situation reports; 2020. Available at *www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports* (accessed on 30 May 2020).
12 Waight G, Berhane A, Orton L, Cinti S, Billi JE, Kim CS. The role of the medical students in influenza pandemic response. *J Emerg Manag* 2011;**9:**60–6.
13 Qureshi K, Gershon RR, Sherman MF, Straub T, Gebbie E, McCollum M, *et al.* Health care workers' ability and willingness to report to duty during catastrophic disasters. *J Urban Health* 2005;**82:**378–88.
14 Smith E. Willingness to work during a terrorist attack: A case-study of first responders during the 9/11 world trade centre terrorist attacks. *J Emerg Prim Health Care* 2008;**6:**990288.
15 Li L, Duan Y, Chen P, Li J, Mao X, Barraclough BH, et al. Knowledge, skills, and attitudes of medical students to patient safety: A cross-sectional pilot investigation in China. *J Evid Based Med* 2012;**5:**124–33.
16 Paulsen PM, Brattebø G. Medisinstudentar og legar sine haldningar til medisinske feil og pasientskade [Attitudes to medical errors and patient injury among doctors and medical students]. *Tidsskr Nor Legeforen* 2006;**126:**2129–32. Available at *https://tidsskriftet.no/2006/08/tema-utdanning/medisinstudentar-og-legar-sine-haldningar-til-medisinske-feil-og-pasientskade* (accessed on 1 Jun 2020).
17 Murray E, Krahé C, Goodsman D. Are medical students in prehospital care at risk of moral injury? *Emerg Med J* 2018;**35:**590–4.
18 Herman B, Rosychuk RJ, Bailey T, Lake R, Yonge O, Marrie TJ. Medical students and pandemic influenza. *Emerg Infect Dis* 2007;**13:**1781–3.
19 Zweigenhaft RL, Armstrong J, Quintis F, Riddick A. The motivations and effectiveness of hospital volunteers. *J Soc Psychol* 1996;**136:**25–34.
20 Mortelmans LJ, Bouman SJ, Gaakeer MI, Dieltiens G, Anseeuw K, Sabbe MB. Dutch senior medical students and disaster medicine: A national survey. *Int J Emerg Med* 2015;**8:**77.
21 Rosychuk RJ, Bailey T, Haines C, Lake R, Herman B, Yonge O, *et al.* Willingness to volunteer during an influenza pandemic: Perspectives from students and staff at a large Canadian university. *Influenza Other Respir Viruses* 2008;**2:**71–9.
22 Mader EM, Roseamelia C, Morley CP. The temporal decline of idealism in two cohorts of medical students at one institution. *BMC Med Educ* 2014;**14:**58.
23 Patel R, Wattamwar K, Kanduri J, Nahass M, Yoon J, Oh J, *et al.* Health care student knowledge and willingness to work in infectious disease outbreaks. *Disaster Med Public Health Prep* 2017;**11:**694–700.
24 Cunningham CT, Quan H, Hemmelgarn B, Noseworthy T, Beck CA, Dixon E, *et al.* Exploring physician specialist response rates to web-based surveys. *BMC Med Res Methodol* 2015;**15:**32.
25 Weaver L, Beebe TJ, Rockwood T. The impact of survey mode on the response rate in a survey of the factors that influence Minnesota physicians' disclosure practices. *BMC Med Res Methodol* 2019;**19:**73.