



BMJ Open What are the barriers and facilitators of volunteering among healthcare students during the COVID-19 pandemic? A Saudi-based cross-sectional study

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ABSTRACT

Objectives The objectives of this study were to assess the volunteering of undergraduate health students and interns in the Ministry of Health (MOH) services in the Kingdom of Saudi Arabia (KSA) during the COVID-19 pandemic, its motivational factors and barriers, as well as their risk perception of COVID-19.

Design A cross-sectional study.

Participants From 12 to 21 May 2020, an online survey was sent to all undergraduate health students and interns in the KSA. This included questions on demographics, volunteering status, risk perception of COVID-19, as well as motivations and barriers towards volunteering.

Results In a convenience sample of 6016 students and interns across KSA, 1824 (30.31%) have volunteered with the MOH services during the COVID-19 pandemic. Volunteering was more likely among older participants, from the College of Medicine, those with self-perceived at risk of COVID-19 infection and those with self-perceived healthy participants. Females, those who did not think that students had moral duties to volunteer, those who were at risk of seasonal influenza and those with self-perceived at risk of hospitalisation from COVID-19 were less likely to volunteer. Patriotism, gaining experience, assisting when able and religious rewards all were reported as major motivators to volunteer. Non-volunteering participants reported that lack of interest, protocol and knowledge, as well as issues related to their personal health and transportation were the main barriers to volunteering.

Conclusions About one-third of undergraduate health students and interns volunteered during the first 2 months of the COVID-19 pandemic in KSA. Moral values were the most important motivations among volunteers. Efforts to encourage health students and interns to volunteer and providing those with appropriate educational programmes are recommended.

INTRODUCTION

COVID-19 initially emerged in Wuhan, China, was first reported in late December 2019 and is caused by SARS-CoV-2.¹ The WHO declared the outbreak as a Public Health Emergency of International Concern in January 2020.¹

Strengths and limitations of this study

- To the best of our knowledge, this is the first study to investigate volunteering during the COVID-19 pandemic in the Middle East.
- This is a multicentre study; we included undergraduate health students and interns from all Saudi universities, with an appropriately sized sample.
- The study design is cross-sectional; temporality and causality cannot be assured between factors.
- Some factors are depending on participants' memories, hence the risk of recall bias cannot be excluded.

By May 2020, COVID-19 cases have reached almost 5 million with more than 300 000 confirmed deaths in more than 200 different countries.² In the Kingdom of Saudi Arabia (KSA), the first case was confirmed on 2 March 2020, and more than 240 000 cases have been detected until mid-July 2020. There is no approved treatment or vaccine for COVID-19 until this time.²

Many measures have been taken worldwide to try to control the spread of COVID-19. These measures in some countries included encouraging medical students to participate in different areas of need in their countries.³ In China, medical students participated in the community as volunteers.⁴ In Denmark, Aalborg University's final-year medical students, all of the Master and two-thirds of the Bachelor medical students were working as temporary residents, ventilator therapy assistants or nursing assistants.⁵ Student leaders from Harvard Medical School (HMS) established a COVID-19 Medical Student Response Team which had more than 500 HMS medical student volunteers within a week, which represents 71% of their total medical students.³



Within the National University of Ireland, a study showed that 59% of medical students will volunteer during pandemics.⁶ Healthcare students were found to be highly motivated to volunteer in medical-related work. Primary motivations included having the opportunity to work with people from different cultures, an intrinsic desire to volunteer, educational opportunities, clinical skills improvement and having a chance to work with many healthcare professionals. The last two were considered the strongest motivations of some students.⁷ Such participation may provide an opportunity for medical students to continue their education efficiently by returning to clinical rotations which have been cancelled due to this pandemic.⁸

Volunteering has been examined across several health specialties. For example, in Canada, a study reported that 67.9% of nurses were likely to volunteer in the event of a pandemic.⁹ In contrast, a UK-based study reported that 42% of nurses have volunteered at some point.¹⁰ Although nursing students have reported that limitations due to time, curricular intensity, accessibility as well as a lack of academic support may be the reasons for the low rate, the differences between both studies may be due to the fact that the first considered a hypothetical future scenario and the latter considered actual past volunteering.

The level of knowledge medical students possess in this pandemic could be considered a big motivator towards involving them in volunteering. A cross-sectional study of 240 medical students in Iran revealed that 79.60% of participants had a high level of COVID-19-related knowledge and 94.2% had high level of performance in preventive measures, which are factors likely to play a role in volunteering.^{11 12}

Although the Association of American Medical Colleges and the Liaison Committee on Medical Education highly recommended the participation of final-year medical students during COVID-19 pandemic, some authors argued that students' participation will increase the exposure and the spread of the virus as well as waste personal protective equipment.¹³ Furthermore, students may not be well prepared exposing them to possible moral trauma and adverse health outcomes.¹⁴

On the other hand, some barriers may be experienced by medical students preventing them from participating in volunteer work. Psychological factors could arguably be the most prevalent of those barriers. A study aimed to assess the psychological impact of COVID-19 on college students found that around 25% of college students are experiencing one form or another of anxiety during the pandemic.¹⁵ Another study found that in addition to anxiety symptoms, depressive emotions were reported by 21% of college students during the same period.¹⁶

Due to the lack of knowledge regarding the motivations and barriers behind students' volunteering, this study aimed to assess the motivational factors and barriers towards volunteering with the Ministry of Health (MOH) services in KSA among undergraduate health students and interns, as well as their risk perception of COVID-19.

METHODS

Study design and participants

Inclusion criteria were undergraduate students and interns in either the School of Medicine, School of Dentistry, School of Applied Medical Sciences, Public Health or the School of Nursing across governmental and private universities of KSA.

Sample size

According to the Saudi Commission for Health Specialities' most recent report in 2018, the total number of students in medical and health colleges was 101 256.¹⁷ The minimum required sample size was calculated to be 2345 students using Epiinfo V.7.0. The 49.2% prevalence of likely volunteers which was taken from a study based on the students and staff of Alberta University in Canada was used to derive the sample size,¹⁸ with an alpha level of 0.05 and a precision of 2%. Assuming 20% non-respondents of the calculated sample size, the minimum sample increased to 2814.

Data collection tool and process

Data were collected through self-administered questionnaires. A cover letter that had described the purpose of the study was attached to the questionnaire, along with the voluntary nature of participation and authors' contact information. The cover letter also stated that the student's participation was considered as consent. Participants were encouraged to contact the researchers if they had any queries regarding the questionnaire.

Students were invited to participate by answering a paper-based questionnaire, which was subsequently made online due to COVID-19 lockdown measures (online supplemental file). Data collectors who were leaders of their respective groups and had access to their colleagues' phone numbers were assigned at major universities to facilitate the distribution of the questionnaire. The QuestionPro questionnaire software (Seattle, Washington, USA) was used for the online version. The questionnaire was adapted from one that was originally developed at the University of Alberta in Canada, as part of their pandemic influenza planning.¹⁹ The questionnaire comprised 21 questions, covering sociodemographic information such as age, sex and marital status, academic information such as the faculty and year of education, risk perception of COVID-19 (likelihood of contracting and dying from the disease), willingness to volunteer and possible barriers to volunteering. Questions were generally either a 5-point Likert scale or multiple responses. To avoid duplication of responses, the URL did not accept more than one response from the same participant. Participants submitted the questionnaire after answering all the questions and, consequently, we did not have incomplete data. A pilot study was performed for the adapted questionnaire on 50 students, not included in the final responses, to assess the time needed to finish the questionnaire and clarity of the questions, and no modifications were

performed after that. The Cronbach's alpha test was calculated as 0.81 showing high internal consistency.

The online questionnaire was launched on 12 May 2020 and was open for a total of 9 days. The average completion time was 7 min. A WhatsApp message with a link to the online questionnaire was sent to students and interns through their group leaders. Two reminders were sent to participants 3 days apart.

Statistical analysis

The primary outcome was whether students have or are currently volunteering in the COVID-19 crisis (Yes/No). Similar to the original questionnaire, variables which were measured on a 5-point Likert scale were collapsed into two main categories (eg, 1, 2, 3=Unlikely to volunteer, 4, 5=Likely to volunteer). Descriptive analyses were obtained by counts and percentages, and potential associations were tested through the Pearson χ^2 test. Unadjusted and adjusted ORs and 95% CIs of volunteering were drawn through binary logistic regression. For the adjusted ORs, a series of models were computed along with model diagnostics, and the ones that achieved lower the Akaike information criteria and the Bayesian information criteria were chosen. Multiple response data were analysed through cross-tabulation and a Pearson χ^2 test for each response item was performed to obtain p values, as well as an overall Pearson χ^2 test to obtain a p value of the whole model with all multiple response categories combined. Analyses were performed in Stata V.15.0.

Patient and public involvement

No patients were involved.

RESULTS

A total of 6016 students and interns (5.9% of the target population) from specified health colleges across KSA have participated in this study, of which 1824 (30.31%) have volunteered with the MOH services during the COVID-19 crisis, and 4192 (69.68%) have not. Of the 2510 male respondents, 37.29% have volunteered, compared with 25.33% of females. This difference was found to be statistically significant ($p < 0.0001$). Married students formed the highest percentage in volunteering compared with other groups (32.89%), and students who had children participated more than students who did not have children (37.29% and 30.18%, respectively). With regard to the different schools, nursing students were found to have a higher percentage of volunteering (39.20%), followed by medicine (30.28%). None of the students who had poor self-perceived health status reported volunteering (table 1).

The multivariable model on risk perception with adjustments for age and sex is presented in table 2. Age was found to be a predictor for volunteering both in the unadjusted and adjusted models and females were less likely to volunteer. Students who perceived themselves at a risk of contracting seasonal influenza were less likely

Table 1 Sociodemographic characteristics of participating health students and interns by volunteering status during COVID-19 pandemic, Kingdom of Saudi Arabia, 2020

| Socioeconomic characteristics | Volunteering (n=6016) | | P value |
|-------------------------------|-----------------------|--------------|---------|
| | Yes, n (%) | No, n (%) | |
| Age (\bar{x} , SD) | 22.56 (1.94) | 21.87 (1.76) | <0.001 |
| Sex | | | <0.001 |
| Male | 936 (37.29) | 1574 (62.71) | |
| Female | 888 (25.33) | 2618 (74.67) | |
| Marital status | | | 0.007 |
| Single | 1712 (30.09) | 3978 (69.91) | |
| Married | 100 (32.89) | 204 (67.11) | |
| Divorced | 08 (44.44) | 10 (55.56) | |
| Widowed | 04 (100.00) | 0 | |
| Have children | | | 0.09 |
| Yes | 44 (37.29) | 74 (62.71) | |
| No | 1780 (30.18) | 4118 (69.82) | |
| Have dependents | | | <0.001 |
| Yes | 236 (40.41) | 348 (59.59) | |
| No | 1588 (29.23) | 3844 (70.77) | |
| Faculty | | | <0.001 |
| Medicine | 1000 (30.28) | 2302 (69.72) | |
| Dentistry | 172 (29.97) | 402 (70.03) | |
| Applied Medical Sciences | 360 (27.44) | 952 (72.56) | |
| Public Health | 96 (29.27) | 232 (70.73) | |
| Nursing | 196 (39.20) | 304 (60.80) | |
| Living arrangements | | | <0.001 |
| With family | 1684 (70.43) | 4010 (70.43) | |
| With friends | 28 (43.75) | 36 (56.25) | |
| Alone | 112 (3.41) | 146 (69.68) | |
| Perceived health status | | | 00.02 |
| Excellent | 1128 (31.61) | 2440 (68.39) | |
| Good | 660 (28.37) | 1666 (71.63) | |
| Poor | 36 (31.03) | 80 (68.97) | |
| Very poor | 0 | 06 (100.00) | |

to volunteer (unadjusted OR=0.78, 95% CI 0.68 to 0.88; adjusted OR=0.81, 95% CI 0.71 to 0.93). Students who perceived themselves as likely to recover from COVID-19 as well as those who are likely to be hospitalised both were less likely to volunteer in the adjusted and unadjusted models.

Interestingly, students who perceived themselves at a high risk for contracting COVID-19 still were more likely to volunteer (unadjusted OR=1.22, 95% CI 1.06 to 1.41; adjusted OR=1.35, 95% CI 1.15 to 1.57). A similar but not statistically significant association was seen for death due

Table 2 Risk perception of COVID-19 and volunteering among undergraduate health students and interns in the Kingdom of Saudi Arabia, 2020 (n=6016)

| Predictors | Volunteering | | Unadjusted OR (95% CI) | Adjusted OR (95% CI) |
|--|--------------|--------------|---------------------------|-------------------------|
| | Yes | No | | |
| Age (μ , SD) | 22.56 (1.94) | 21.87 (1.76) | 1.22 (1.18 to 1.26) | 1.20 (1.16 to 1.24) |
| Sex | | | | |
| Male | 936 (37.29) | 1574 (62.71) | Ref | Ref |
| Female | 888 (25.33) | 2618 (74.67) | 0.57 (0.51 to 0.63) | 0.65 (0.58 to 0.73) |
| P value | <0.001 | | | |
| Self-perceived seasonal influenza risk | | | | |
| Likely | 428 (26.55) | 1184 (73.45) | 0.78 (0.68 to 0.88) | 0.81 (0.71 to 0.93) |
| Unlikely | 1396 (31.71) | 3006 (68.29) | Ref | Ref |
| P value | <0.001 | | | |
| Self-perceived COVID-19 risk | | | | |
| Likely | 340 (34.00) | 660 (66.00) | 1.22 (1.06 to 1.41) | 1.35 (1.15 to 1.57) |
| Unlikely | 1484 (29.60) | 3530 (70.40) | Ref | Ref |
| P value | 0.006 | | | |
| How likely to recover from COVID-19 | | | | |
| Likely | 788 (25.35) | 2320 (74.65) | 0.61 (0.54 to 0.68) | 0.63 (0.56 to 0.71) |
| Unlikely | 1036 (35.65) | 1870 (64.35) | Ref | Ref |
| P value | <0.001 | | | |
| How likely to be hospitalised from COVID-19 | | | | |
| Likely | 740 (26.35) | 2063 (73.65) | 0.70 (0.62 to 0.78) | 0.82 (0.73 to 0.92) |
| Unlikely | 1084 (33.81) | 2122 (66.19) | Ref | Ref |
| P value | <0.001 | | | |
| How likely to die from COVID-19 | | | | |
| Likely | 128 (36.16) | 226 (63.84) | 1.32 (0.96 to 1.45) | 1.28 (0.98 to 1.48) |
| Unlikely | 1696 (29.96) | 3964 (70.04) | Ref | Ref |
| P value | 0.01 | | | |
| Should universities remain open during COVID-19? | | | | |
| Yes, all faculties should remain open | 244 (40.94) | 352 (59.06) | Ref | Ref |
| Yes, but provide classes online | 1004 (29.49) | 2400 (70.51) | 0.60 (0.50 to 0.72) | 0.70 (0.58 to 0.84) |
| No, fully closed | 576 (28.60) | 1438 (71.40) | 0.57 (0.47 to 0.69) | 0.66 (0.54 to 0.80) |
| P value | <0.001 | | | |

to COVID-19. Students believed that universities should remain fully closed and had an unadjusted OR=0.57, 95% CI 0.47 to 0.69 and adjusted OR=0.66, 95% CI 0.54 to 0.80 to volunteer (table 2).

Table 3 presents the predictors for volunteering before and after adjustment for age and sex. Students were found to have a higher odds of volunteering if they were healthy. A similar association was found for those willing to participate if offered compensation in the unadjusted model (OR=1.08, 95% CI 0.95 to 1.23), although after adjustment, the direction of association became the opposite and is insignificant (adjusted OR=0.86, 95% CI 0.73 to

1.01), indicating that students were less likely to volunteer if offered compensation.

Participants who answered no to whether students should be encouraged to volunteer in health crises, and those who answered no to whether students have a moral duty to volunteer during a pandemic all were found to be less likely to volunteer and these associations were statistically significant.

Table 4 presents the past experiences of volunteers and motivations for volunteering of participants. Among the volunteers, 29.36% have volunteered in hospitals, followed by 22.47% in social services, 18.81% in schools

Table 3 Predictors for volunteering during COVID-19 pandemic among health students and interns in the Kingdom of Saudi Arabia, 2020 (n=6016)

| Predictors | Volunteering | | Unadjusted OR (95% CI) | Adjusted OR (95% CI) |
|--|--------------|--------------|---------------------------|-------------------------|
| | Yes | No | | |
| Age (μ , SD) | 22.56 (1.94) | 21.87 (1.76) | 1.22 (1.18 to 1.26) | 1.20 (1.17 to 1.24) |
| Sex | | | | |
| Male | 936 (37.29) | 1574 (62.71) | Ref | Ref |
| Female | 888 (25.33) | 2618 (74.67) | 0.57 (0.51 to 0.63) | 0.61 (0.54 to 0.68) |
| P value | <0.001 | | | |
| Willing to volunteer if healthy | | | | |
| Likely | 1292 (33.93) | 2516 (66.07) | 1.61 (1.43 to 1.82) | 1.37 (1.19 to 1.57) |
| Unlikely | 532 (24.07) | 1678 (75.93) | | Ref |
| P value | <0.001 | | | |
| Willing to volunteer if provided with protective garments | | | | |
| Likely | 992 (33.70) | 1952 (66.30) | 1.36 (1.22 to 1.52) | 1.12 (0.97 to 1.29) |
| Unlikely | 832 (27.07) | 2242 (33.70) | | Ref |
| P value | <0.001 | | | |
| Willing to volunteer if conscripted by the government | | | | |
| Likely | 676 (32.82) | 1384 (67.18) | 1.19 (1.06 to 1.34) | 1.09 (0.94 to 1.27) |
| Unlikely | 1148 (29.00) | 2810 (71.00) | | Ref |
| P value | 0.002 | | | |
| Willing to volunteer if offered compensation | | | | |
| Likely | 464 (31.69) | 1000 (68.31) | 1.08 (0.95 to 1.23) | 0.86 (0.73 to 1.01) |
| Unlikely | 1360 (29.86) | 3194 (70.14) | Ref | Ref |
| P value | 0.18 | | | |
| Health students should be encouraged to volunteer in health crisis | | | | |
| Yes | 1424 (32.28) | 2988 (67.72) | Ref | Ref |
| No | 148 (22.09) | 522 (77.91) | 0.59 (0.49 to 0.72) | 0.73 (0.58 to 0.92) |
| I don't know | 252 (26.92) | 684 (73.08) | 0.77 (0.66 to 0.90) | 0.93 (0.78 to 1.12) |
| P value | <0.001 | | | |
| Retired workers should be encouraged to volunteer in health crisis | | | | |
| Yes | 1156 (31.79) | 2480 (68.21) | Ref | Ref |
| No | 328 (27.75) | 854 (72.25) | 0.82 (0.71 to 0.95) | 0.89 (0.76 to 1.05) |
| I don't know | 340 (28.33) | 860 (71.67) | 0.84 (0.73 to 0.97) | 0.95 (0.81 to 1.12) |
| P value | 0.008 | | | |
| Students have a moral duty to volunteer during a pandemic | | | | |
| Yes | 1352 (33.22) | 2718 (66.78) | Ref | Ref |
| No | 164 (21.08) | 614 (78.92) | 0.53 (0.44 to 0.64) | 0.66 (0.53 to 0.81) |
| I don't know | 308 (26.32) | 862 (73.68) | 0.71 (0.62 to 0.83) | 0.85 (0.73 to 1.00) |
| P value | <0.001 | | | |

All predictors are significant at the $p < 0.05$ level except for 'willing to volunteer if offered compensation'.

Table 4 Previous experience with volunteering and motivations for volunteering during COVID-19 pandemic among health students and interns in the Kingdom of Saudi Arabia, 2020

| Predictors* | Volunteering | | | P value |
|----------------------------------|--------------|--------------|--------------|---------|
| | Yes | No | Total | |
| In the past, you volunteered in† | | | | |
| Sports and recreation | 444 (11.60) | 800 (10.79) | 1244 (11.07) | <0.001‡ |
| Hospitals | 1124 (29.36) | 1902 (25.65) | 3026 (26.92) | <0.001‡ |
| Schools | 720 (18.81) | 1736 (23.42) | 2456 (21.85) | 0.16 |
| Religious events (eg, Hajj) | 388 (10.14) | 494 (06.66) | 882 (07.85) | <0.001‡ |
| Social services | 860 (22.47) | 1690 (22.79) | 2550 (22.68) | <0.001‡ |
| Others | 292 (07.63) | 792 (10.68) | 1084 (09.64) | 0.007 |
| Motivation for volunteering† | | | | |
| Gain experience | 1236 (20.85) | 3056 (22.99) | 4292 (22.33) | <0.001‡ |
| Patriotism | 1248 (21.05) | 2598 (19.54) | 3846 (20.01) | <0.001‡ |
| Assist when able | 1128 (19.03) | 2478 (18.64) | 3606 (18.76) | 0.04 |
| Religious reward | 960 (16.19) | 2072 (15.59) | 3032 (15.77) | 0.02 |
| Curriculum Vitae purposes | 916 (15.45) | 2092 (15.74) | 3008 (15.65) | 0.82 |
| Pass time | 364 (06.14) | 740 (05.57) | 1104 (05.74) | 0.03 |
| Other | 76 (01.28) | 258 (01.94) | 334 (01.74) | 0.002 |

*Multiple responses allowed.

†Overall χ^2 test is significant at the 0.05 level.

‡A significant difference in the response between volunteers and non-volunteers.

and 10.14% in religious events such as the annual Hajj. A highly significant association has been found for these, indicating a difference between volunteers and non-volunteers. Also, among the volunteers, the highest motivating reasons were patriotism (21.05%), gaining experience (20.85%), assisting when able (19.03%) and religious rewards (16.19%).

Figure 1 shows the barriers to volunteering as perceived by non-volunteers within the study participants. Lack of interest, personal health issues, lack of protocol and knowledge, and transportation issues all were perceived

as barriers. For transportation specifically, it was more of a barrier among females than males (58.13% and 41.87%, respectively). On the other hand, 68.42% of participants disagreed that fear was a major barrier to volunteering.

DISCUSSION

The current study contributes to the literature on the rate of volunteering of undergraduate health students and interns in KSA, as well as its associated related factors. Many studies that took place to assess the willingness

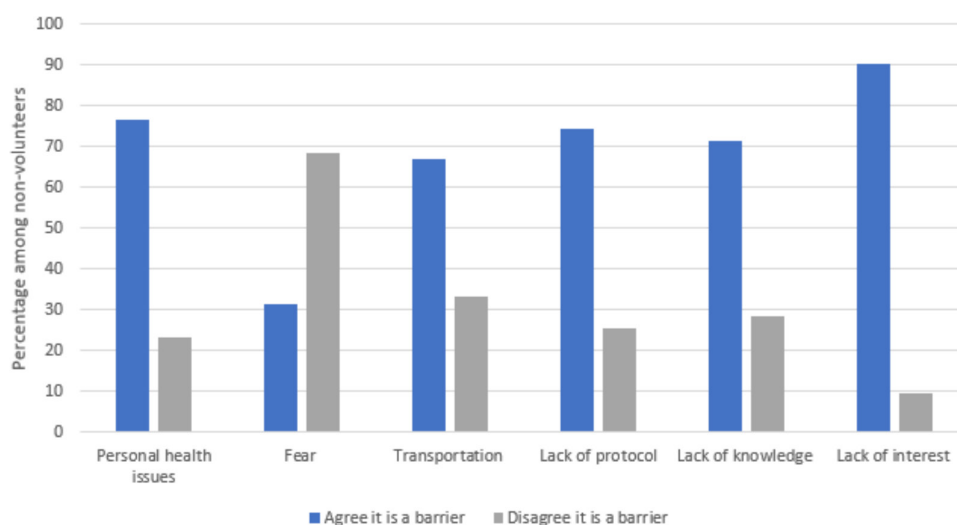


Figure 1 Perceived barriers towards volunteering of undergraduate health students and interns in the Kingdom of Saudi Arabia as perceived by non-volunteering participants, 2020 (n=4192).

of medical students to participate were for 'future' and 'potential' pandemics and to the best of our knowledge, this is the first study that has actually explored this issue during the COVID-19 pandemic.⁶ The findings of the current study demonstrated that 30.31% of health students and interns with our 6000+ students who have participated in the study in KSA have volunteered during the first 2 months of the COVID-19 pandemic in KSA. This rate of volunteering was lower than the findings of a cross-sectional study among 274 medical students at the National University of Ireland in 2015 that showed almost 60% of respondents were willing to volunteer in an event of an infectious epidemic.⁶

The low reported rate of volunteering in the current study could be explained by many reasons. The data of this study were collected in May 2020, 2 months only after the detection of the first case of COVID-19 in KSA. Many control measures were put into action in KSA, one of them was the closure of universities and, consequently, dramatic changes occurred with higher education in which teaching and examinations moved from traditional, classroom-based and direct clinical bedside teaching to distance learning.²⁰ These modifications may have been stressful, and students could be busy attempting to deal with all these changes during the time of our study.¹⁵ Moreover, data were collected during the period of the final examinations of students in KSA. Additionally, volunteering participants could be busier than others and, consequently, may have been missed in the current study. All these factors could explain that only one-third of healthcare students and interns in KSA volunteered during the first 2 months of the pandemic.

Our results have shown that despite the fact that there are a limited number of Colleges of Public Health in Saudi Arabia, they were not the lowest schools reporting volunteering in our study sample.

The current study showed that participants who perceived themselves at risk of contracting influenza or were hospitalised from COVID-19 were less likely to volunteer. In line with this finding, most volunteers perceived themselves as having excellent and good health and none of the volunteers had self-perceived poor health. Moreover, the results showed that participants were willing to volunteer if they were healthy. Additionally, a personal health issue was one major barrier to volunteering as perceived by non-volunteering participants.

The present study demonstrated that older participants volunteered more than younger ones. Senior students and interns usually have clinical rotations and consequently may contact suspected cases. This could explain why participants who thought they were likely to have COVID-19 were more likely to volunteer.

Most of the participants in this study had previous experience with volunteering. We found that previous volunteering in hospitals was the most reported experience among both volunteering and non-volunteering participants. However, previous experience as a carer was found to be associated with volunteering of students in other

studies.²¹⁻²³ Other previous experiences demonstrated among the participants were social services, schools, sports and recreational activities, and religious events. Pilgrimage and Umrah are major worships in Islam; these massive and recurring mass gatherings take place annually in KSA and provide an opportunity for volunteering from all sectors.²⁰

It is interesting to note that patriotism was the most reported motivation to volunteer in our study. Other reported motivations were gaining experience, assisting when able and religious rewards. Moral values—although quite difficult to measure in questionnaire-based studies—were more important among volunteers. In agreement with this finding, our study revealed that participants were less likely to volunteer if they were provided with compensation. Nevertheless, this finding became non-significant after adjustment. Previous reports indicated that altruism was the main motivator for volunteering among medical students.⁶

Although it is voluntary, some experts recommend the participation of health students in the current pandemic, and in some countries such as Italy, the USA and the UK, medical and nursing students are graduating early to work as front-line healthcare providers. Other experts believe that learning medicine is the primary role of medical students, and since the risk associated with their involvement in the pandemic cannot be eliminated, any participation of medical students must be voluntary.²⁴ It is also recommended that healthcare students be well prepared for pandemic/crisis situations within their training. Unfortunately, only a few universities have embedded such material within clinical training exposing students to potential moral injury.¹⁴ In our study, we found that participants who did not think that students had moral duties to volunteer were less likely to volunteer.

Previous findings noted that the lack of skills was the main barrier to volunteering of medical students during healthcare emergencies and epidemics.⁶ This study revealed that lack of interest was the most reported barrier to volunteering among non-volunteering participants. Moreover, the lack of protocol and lack of knowledge were other reported barriers. This could be explained by the fact that the COVID-19 pandemic newly emerged in the world during the time of the current study and it was conducted in the second month of the pandemic in KSA.²⁰ Additionally, transportation issues were reported as a barrier to volunteering. This could be explained by the fact that the current study was conducted during the partial lockdown period in all regions of KSA and full lockdown in some major cities in KSA. Moreover, this finding may explain that male participation was more than females in our study. Furthermore, women driving in KSA was recently legalised, and the number of women with driving licences is extremely small but growing. This could also be a contributing factor to the differences between male and female volunteers in this study.²⁵ Contrary to this finding, a cross-sectional study of 948 of medical staff who have volunteered in China

found that 78.08% of the participants who volunteered were women.²⁶ No other factors pertaining to gender were reported as barriers to volunteering.

Fear was not a major barrier to volunteering as reported by more than two-thirds of non-volunteering participants in the current study. This could be explained by the fact that most of these students and interns were living with their families. In line with this explanation, a cross-sectional study conducted among 7143 college students in China to assess the anxiety and its associated factors during the COVID-19 pandemic found that living with parents was a protective factor for anxiety.¹⁵

There were some limitations to the current study. First, the sample was convenience and non-random. Although every effort has been made to avoid multiple responses to the questionnaire by each student, it is not really known whether this has been done. Second, since the study design was cross-sectional, temporality and causality cannot be assured between factors. Third, some questions depended on participants' memories, therefore the risk of recall bias cannot be excluded. Fourth, some questions depended on self-perception such as perceived health status. However, to the best of our knowledge, this is the first study to investigate volunteering during the COVID-19 pandemic in KSA; this gave strength to the present study. Moreover, it is a multicentre study; it had a large sample including undergraduate health students and interns from all Saudi universities.

CONCLUSION

About one-third of health students and interns volunteered during the COVID-19 pandemic in KSA. Volunteering was higher among males, older participants, nursing students and self-perceived healthy participants. In this study, the main motivating factors were having a sense of duty and patriotism, gaining experience and religious rewards. The main barriers were a lack of interest, lack of knowledge, personal health issues and transportation issues.

Although volunteering of all health students has been open and encouraged, it is suggested that the MOH and universities should collaborate to encourage students to volunteer and provide them with educational programmes needed to prepare them as well as target the potential barriers that have been identified in this study. This could be achieved by offering and advertising a variety of volunteering opportunities and organising transport where necessary. Future qualitative research with an in-depth assessment of the barriers and motivational factors is recommended.

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