

Volunteering During the COVID-19 Pandemic: Attitudes and Perceptions of Clinical Medical and Dental Students in Lagos, Nigeria

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Abstract

Background: Volunteering within the health-care sector is crucial during pandemics. This study aimed to assess the attitudes and perceptions of clinical medical and dental students in Lagos, Nigeria, about volunteering during the coronavirus disease 2019 (COVID-19) pandemic. **Materials and Methods:** A descriptive cross-sectional study was conducted amongst medical and dental students undergoing clinical postings at the two public universities in Lagos, Nigeria, using total population sampling. Data were collected using a web-based questionnaire and analysed using Statistical Package for the Social Sciences. Chi-square test and logistic regression analysis were used to test for association at the level of significance of 5%. **Results:** The mean age of the respondents was 23.3 years \pm 2.6 standard deviation and 62.5% were females. The majority (82.9%) of the respondents agreed to volunteer if provided with adequate personal protective equipment (PPE) and if adequately trained to do so (79.3%). Although perceived as dangerous, the majority (91.2%) of the respondents considered volunteering during the COVID-19 pandemic as a form of educational experience. Compared to the final-year students, penultimate year students were more likely to volunteer in the event of a health manpower shortage. The final-year students were more likely to volunteer if government made the request. Female students were more likely than male students to volunteer even if they were not compensated but would require parental approval. **Conclusion:** Medical and dental students perceived their involvement during the COVID-19 pandemic as a form of educational experience but would require adequate training and PPE. There is a need to train and provide adequate PPE for them to function as volunteers.

Keywords: Attitudes, coronavirus disease 2019, Lagos, medical and dental students, Nigeria, perceptions, SARS-CoV-2 infection, volunteers

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic is a global health crisis. It is caused by a novel virus, and the disease has spread fast, taking a toll on even the most advanced health systems.^[1] Governmental agencies and staff of each country usually lead and play a major role in emergency response. However, in situations such as this, the scale of the response needed might exceed the capacity of government agencies and professional rescue bodies, thus depending on volunteers.^[2] Volunteering within the health-care sector has been the pillar of the international response during pandemics.^[3] At any given time, altruistic members of the society volunteer in

support of social causes, but the importance of volunteering and contributions of volunteers become more obvious during times of crisis.^[4] Volunteers place their knowledge, skills and time at the disposal of others. They contribute their services free of charge in support of effective responses which serve the common good.

Medical students and health science trainees have been considered as potential support for the health workforce. Due to

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the challenges posed by the COVID-19 pandemic, there is now an unprecedented necessity by many medical schools around the world to restructure their final-year assessments as a way of ensuring that their students enter the health-care workforce earlier than previously planned.^[3] There is uncertainty about the actual role of medical students during a pandemic.^[5] One opinion is that trainees in the health sciences have background knowledge which can easily be brought up to pace before being deployed to conduct tasks within their range of competence.^[6,7] Giving credence to this is a student leadership initiative on COVID-19 at the Harvard Medical School. Through this initiative, the student body has made tangible contributions in the form of preparing training modules and materials, coordinating and matching intending volunteers to placements, contributing to the development of patient management guidelines and contributing to advocacy amongst others.^[8] On the other side of the argument is the opinion that these students may not yet have acquired sufficient knowledge and skills to stay safe in clinical settings during a crisis.^[2,9] However, nursing and medical students have shown the willingness to volunteer in public health disease outbreaks. For example, 59% of respondents in a study carried out amongst medical students at the National University of Ireland, Galway, were willing to volunteer in the event of an infectious crisis, 98% indicated that selflessness is a motivating factor for such volunteering.^[10] Another study amongst nursing students showed that a higher proportion of respondents, 68%, were willing to volunteer in pandemic situations if given appropriate personal protective equipment (PPE).^[11]

Attitudes, norms and self-efficacy are three overlapping theoretical components that predict volunteering.^[12] Attitude is determined by an individual's belief in the outcome of a behaviour, which could be positive or negative. The most important determinant of a positive attitude and willingness to volunteer was having a sense of duty. In a study conducted amongst 10,000 medical students consisting of participants from over 250 medical schools in Brazil, medical students who felt that it was a professional responsibility to volunteer were many more times more likely to be willing to volunteer.^[13] During the influenza pandemic, a web-based study conducted amongst medical students at the University of Alberta, Canada, reported that the majority (70%) exhibited a positive attitude towards volunteering while citing moral obligations as the motivator.^[14] Norms are the perceived social support or approval which will determine if a person will carry out an activity or not. Community expectations, particularly, from family, friends and other close influencers are associated with a positive attitude to volunteering and may serve as influencing norms.^[15] Self-efficacy and perceived control refer to an individual's confidence in behaving in a certain way. Two-thirds of medical and nursing students in a University in Spain reported feeling unprepared to volunteer during the COVID-19 pandemic, while the fear of infecting family members or other loved ones also shaped their attitudes.^[16] Similarly, other studies found that the majority of medical

students expressed reluctance to attend clinics during the pandemic because of fear of getting infected.^[17,18] Other possible predictors of volunteering include sociodemographic factors such as age and sex.^[13,19] There is a gap in the literature on the attitudes and perceptions of clinical students towards volunteering in sub-Saharan Africa. The aim of this study, therefore, was to assess the attitudes and perceptions of clinical, medical and dental students in the two public universities in Lagos, Nigeria, towards volunteering during the COVID-19 pandemic.

MATERIALS AND METHODS

Ethical approval with protocol number CMUL/HREC/05/20/725 was obtained from the Health Research Ethics Committee of the College of Medicine, University of Lagos on the 14th May, 2020. This study was conducted in Lagos, Nigeria, between May and June 2020. Lagos State is the epicentre of COVID-19 outbreak in Nigeria. The state is situated in the south-western part of Nigeria with an estimated population of about 14 million in 2020.^[20] There are two public universities with medical schools in Lagos, Nigeria; and they are the College of Medicine of University of Lagos (CMUL), Idi-Araba and the Lagos State University College of Medicine (LASUCOM), Ikeja. This study was conducted at CMUL and LASUCOM. Both Colleges are affiliated with their respective teaching hospitals where the medical students receive their clinical training. The teaching hospitals provide specialist health-care services to the people of Lagos and its neighbouring states. Medical students comprised those who are studying medicine and surgery as well as dentistry. They spend 6 years to complete their training in medical schools. By the 4th year of their training, they move to clinical classes. They acquire some clinical experience in the 5th year which is the penultimate year and then complete their clinical training at the end of the 6th year which is the final year. There are over 500 medical and dental students in clinical postings at CMUL (including of two sets of final-year students and a set of penultimate year students) and over 100 medical and dental students in clinical postings at LASUCOM.

A descriptive cross-sectional study was carried out amongst penultimate year and final year medical and dental students in clinical postings at CMUL and LASUCOM. The minimum sample size was calculated using Cochran formula for descriptive study, $n = z^2 pq / d^2$, where z is the standard normal deviation at 95% confidence interval (1.96), p is the proportion of medical students in University of Alberta, Canada, who believed that health-care students have obligations to volunteer in a pandemic which is 69.8% (0.698),^[14] $q = 1 - p$ (0.302) and d which is the error of precision at 5% (0.05). The minimum sample size for this study was 324. Total population sampling technique was used in this study. All the penultimate year and final-year medical and dental students in clinical postings at CMUL and LASUCOM were invited to participate in this study. The total population size was 696 medical and dental students.

Data were collected using a semi-structured and self-administered web-based questionnaire which assessed sociodemographic characteristics of the respondents, attitudes of the respondents towards volunteering during the COVID-19 pandemic as well as perceptions of the respondents about moral and professional obligations to volunteer, about the condition for recruitment of medical students as volunteers, about compensation of medical students as volunteers and about the risk, knowledge and protection of medical students as volunteers during the COVID-19 pandemic. The attitudes and perceptions were assessed on a 3-point Likert-type item as agree, indifferent and disagree. The web-based questionnaire also assessed the opinions of the respondents about settings, in which medical and dental students can serve as volunteers during the COVID-19 pandemic. The questionnaire was adapted from literature.^[14,21,22] The questionnaire was sent online as a Google Form to the e-mail addresses of all the medical and dental students in the 5th and 6th year of study at CMUL and LASUCOM. Data were accrued online over 2 months. Each participant reviewed the purpose of the study and gave informed consent by clicking the confirm button on the online survey form. The participants were informed that their participation was voluntary. They were also assured of the confidentiality of information provided and their rights to withdraw from the study at any point in time. To prevent duplicate responses, only one questionnaire per person was accepted, and this was achieved by tracking internet protocol addresses.

Data were analysed using IBM Statistical Package for Social Sciences (SPSS) for Windows, version 20, manufactured by IBM Corp., located in Armonk, N.Y., USA and summarised as frequencies and proportions. Continuous variables were expressed as means and standard deviation (SD). The Likert-type questions were individually analysed for deeper insights into specific attributes. Inferential statistics were determined using the Chi-square test and multiple logistic regression analysis. Medical students were grouped according to the year of study, course of study and gender for the analysis. The variables that showed statistical significance at $P < 0.2$ using Chi-square test were entered into a multiple logistic regression model.^[23,24] The level of significance was set at 5% ($P < 0.05$).

RESULTS

Sociodemographic characteristics of the respondents

The web-based survey questionnaire was sent to all medical and dental students in the penultimate year (5th year) and final year (6th year) classes of the two public universities in Lagos, Nigeria. They comprised 548 students in CMUL and 148 students in LASUCOM. A total of 411 respondents completed the survey giving the overall response rate of 59.1%. The mean age of the respondents was 23.26 years \pm 2.59 SD. Of the 411 respondents, 357 (86.9%) were from CMUL, whereas 54 (13.1%) were from LASUCOM (giving the response rate of 65.1% and 36.5% amongst CMUL and LASUCOM

students, respectively); 154 (37.5%) were males, whereas 257 (62.5%) were females; 336 (82.0%) were medicine and surgery students, whereas 74 (18.0%) were dentistry students; 79 (19.2%) were in the penultimate year (5th year), whereas 332 (80.8%) were in the final year (6th year).

Attitudes and perceptions about volunteering during the coronavirus disease 2019 pandemic

Table 1 shows the students' responses to each of the 42 statements on the attitudes and perceptions about volunteering during the COVID-19 pandemic. The majority of the respondents would volunteer if they are provided with adequate PPE (82.7%) and if they are adequately trained to do so (79.3%). Two-thirds of the respondents (66.4%) perceived that they have a moral duty to volunteer, while more than half of them (56.2%) would work as volunteers if the request is from the government. The majority (95.1%) were of the view that medical students should receive epidemic preparedness education in the curriculum and up to 91.0% of them believed that volunteering during a pandemic should be a form of experience and education for medical students. Similarly, 89.0% of the respondents were of the opinion that participation as volunteers should count towards practical experience in Medicine. Even though the majority (86.4%) of the respondents perceived that medical students can assist the doctors and work under their supervision during the COVID-19 pandemic, close to half (47.9%) of them were of the view that medical students should not volunteer for case management. Over three-quarters of the respondents perceived that medical students as volunteers should be compensated as frontline health workers and that they should be compensated if they become ill or die. Close to a quarter (23.0%) of them were of the view that medical students should be paid stipend only. The majority of the respondents perceived COVID-19 as a dangerous and highly infectious disease (95.6%) and that they are at risk of being infected as volunteers (95.9%). The majority (85.4%) of the respondents believed that they have adequate knowledge about COVID-19 and its preventive strategies.

Attitudes and perceptions about volunteering during the coronavirus disease 2019 pandemic by year of study

Compared to the final-year students, Table 2 shows that significantly higher proportions of the penultimate year students would volunteer during the COVID-19 pandemic if allowed to do so ($P = 0.022$), if adequate PPE is provided for them ($P = 0.002$) and even if they are not compensated ($P < 0.0001$). Analysis from the multiple logistic regression model for this group is shown in Table 3. Compared to the final-year students, penultimate-year students were five times more likely to volunteer during the COVID-19 pandemic if adequate PPE is provided for them (odds ratio [OR]: 5.98 [95% confidence interval (CI): 1.423–25.164]) and two times more likely to volunteer even if they are not compensated (OR: 2.32 [95% CI: 1.136–4.734]). Concerning perceptions about moral and professional obligations to volunteer in Table 2, a significantly higher proportion of

Table 1: Attitudes and perceptions about volunteering during the coronavirus disease-19 pandemic (n=411 [% of total])

Statements	Agree, n (%)	Indifferent, n (%)	Disagree, n (%)
Attitudes to volunteering during COVID-19			
I will volunteer my service if given the opportunity to do so	256 (62.3)	73 (17.8)	82 (19.9)
I will volunteer if adequately trained to do so	326 (79.3)	46 (11.2)	39 (9.5)
I will volunteer if adequate PPE is provided	340 (82.7)	37 (9.0)	34 (8.3)
I will volunteer even if I am not compensated	109 (26.5)	74 (18.0)	228 (55.5)
I will volunteer only if I am compensated	205 (49.9)	81 (19.7)	125 (30.4)
I will volunteer because I am capable to do so	247 (60.1)	60 (14.6)	104 (25.3)
I will only volunteer if my parents support it	257 (62.5)	76 (18.5)	78 (19.0)
Perceptions about moral and professional obligations to volunteer			
I have a moral sense of duty to volunteer as a person	273 (66.4)	72 (17.5)	66 (16.1)
Medical/dental students have moral and professional obligations to volunteer	162 (39.4)	86 (20.9)	163 (39.7)
I am not qualified to volunteer in any pandemic	108 (26.3)	102 (24.8)	201 (48.9)
Government would be justified to request for medical students as volunteers	154 (37.5)	81 (19.7)	176 (42.8)
I will work as a volunteer if there is a request for that from government	231 (56.2)	84 (20.4)	96 (23.4)
Government has no right to invite medical students to volunteer in a pandemic	114 (27.7)	113 (27.4)	164 (39.9)
Perceptions about conditions for the recruitment of medical students as volunteers			
Medical/dental students should be recruited in event of health manpower shortage	278 (67.6)	69 (16.8)	64 (15.6)
Medical students should not volunteer for case management	197 (47.9)	83 (20.2)	131 (31.9)
Medical students can assist the doctors and work under their supervision	355 (86.4)	21 (5.1)	35 (8.5)
Volunteering during a pandemic is a form of experience and education for students	375 (91.2)	21 (5.1)	15 (3.7)
Experience as a volunteer should count towards practical experience in medicine	353 (85.9)	31 (7.5)	27 (6.6)
Medical students should receive epidemic preparedness education in the curriculum	391 (95.1)	13 (3.2)	7 (1.7)
Medical student should only volunteer if they receive adequate PPE	393 (95.6)	9 (2.2)	9 (2.2)
There should not be a negative consequence for the student who would not volunteer	381 (92.7)	10 (2.4)	20 (4.9)
Perceptions about compensation to medical/dental students as volunteers			
Medical/dental students as volunteers should be paid stipend only	96 (23.4)	79 (19.2)	236 (57.4)
Medical/dental students as volunteers should be given monetary compensation	357 (86.9)	46 (11.2)	8 (1.9)
Compensation should be paid to volunteers if they become ill	365 (88.8)	14 (3.4)	32 (7.8)
Compensation should be paid to the family of volunteers who died from the illness	387 (94.2)	15 (3.6)	9 (2.2)
Volunteers should be given first access to scarce resources e.g., screening kits	365 (88.8)	30 (7.3)	16 (3.9)
Medical/dental students as volunteers should be compensated as frontline workers	336 (81.7)	39 (9.5)	36 (8.8)
Perceptions about risk, knowledge, protection and being isolated as volunteers			
I think the disease is dangerous and highly infectious	393 (95.6)	10 (2.4)	8 (2.0)
I am at risk of being infected as a volunteer	394 (95.9)	7 (1.7)	10 (2.4)
I am anxious about infecting my family members if volunteer	349 (84.9)	23 (5.6)	39 (9.5)
I am worried because I think I can be infected when moving around as volunteer	327 (79.6)	46 (11.2)	38 (9.2)
I think I have adequate knowledge and information about COVID-19	306 (74.5)	43 (10.5)	62 (15.0)
I have adequate knowledge about how infectious and virulent the virus is	337 (82.0)	31 (7.5)	43 (10.5)
I have adequate knowledge about the infection and the preventive strategies	351 (85.4)	24 (5.8)	36 (8.8)
I have adequate knowledge and information on the use of PPE	290 (70.5)	34 (8.3)	87 (21.2)
I feel I will have adequate PPE and take precautions when I volunteer	178 (43.3)	41 (10.0)	192 (46.7)
I feel I will be protected by the security and government when I volunteer	116 (28.2)	57 (13.9)	238 (57.9)
I feel I will be protected by the hospital or the community where I volunteer	152 (37.0)	55 (13.4)	204 (49.6)
I feel I will not be protected with adequate compensation if I volunteer	165 (40.1)	109 (26.5)	137 (33.3)
I feel I will be isolated if I volunteer as a medical student	107 (26.0)	66 (16.1)	238 (57.9)
I feel I will be avoided by my friends if I volunteer	117 (28.5)	80 (19.4)	214 (52.1)
I feel I will be avoided by my family if I volunteer	172 (41.9)	65 (15.8)	174 (42.3)

PPE: Personal protective equipment, COVID: Coronavirus disease

the final-year students (56.9%) compared to the penultimate year students (53.2%) would work as volunteers if there is a request from the government ($P = 0.032$). The penultimate year students were less likely to volunteer than the final-year students if there is a request for that from the government (OR: 0.33 [95% CI: 0.167–0.631]) [Table 3]. Concerning the

conditions for recruitment of medical students as volunteers in Table 2, a significantly higher proportion of penultimate year students (82.3%) compared to the final-year students (64.2%) perceived that medical students should be recruited in the event of health manpower shortage ($P = 0.006$). The penultimate year students were two times more likely to volunteer than

Table 2: Student's attitudes and perceptions about volunteering during the coronavirus disease-19 pandemic by year of study-number of students that agreed to the statement (% of total per group)

Statements	5 th year <i>n</i> =79, <i>n</i> (%)	6 th year <i>n</i> =332, <i>n</i> (%)	χ^2	<i>P</i>
Attitudes to volunteering during COVID-19				
I will volunteer my service if given the opportunity to do so	55 (69.6)	201 (60.5)	7.651	0.022
I will volunteer if adequately trained to do so	70 (88.6)	256 (77.1)	5.533	0.063
I will volunteer if adequate PPE is provided	76 (96.2)	265 (79.5)	12.500	0.002
I will volunteer even if I am not compensated	36 (45.6)	73 (22.0)	20.507	<0.0001
I will volunteer only if I am compensated	32 (40.5)	173 (52.1)	5.023	0.081
I will volunteer because I am capable to do so	49 (62.0)	198 (59.6)	1.650	0.438
I will only volunteer if my parents support it	54 (68.4)	203 (61.1)	2.602	0.272
Perceptions about moral and professional obligations to volunteer				
I have a moral sense of duty to volunteer as a person	57 (72.2)	216 (65.1)	3.759	0.153
Medical/dental students have moral and professional obligations to volunteer	35 (44.3)	127 (38.3)	3.618	0.164
I am not qualified to volunteer in any pandemic	19 (24.1)	89 (26.8)	0.998	0.607
Government would be justified to request for medical students as volunteers	30 (38.0)	124 (37.3)	0.047	0.977
I will work as a volunteer if there is a request for that from government	42 (53.2)	189 (56.9)	6.885	0.032
Government has no right to invite medical students to volunteer in a pandemic	22 (27.8)	92 (27.7)	0.191	0.909
Perceptions about conditions for the recruitment of medical students as volunteers				
Medical/dental students should be recruited in event of health manpower shortage	65 (82.3)	213 (64.2)	10.160	0.006
Medical students should not volunteer for case management	41 (51.9)	156 (47.0)	0.625	0.732
Medical students can assist the doctors and work under their supervision	74 (93.7)	281 (84.6)	5.045	0.080
Volunteering during a pandemic is a form of experience and education for students	75 (94.9)	300 (90.4)	1.753	0.416
Experience as a volunteer should count towards practical experience in medicine	68 (86.1)	285 (85.8)	2.010	0.366
Medical students should receive epidemic preparedness education in the curriculum	73 (92.4)	318 (95.8)	1.587	0.452
Medical student should only volunteer if they receive adequate PPE	77 (97.5)	316 (95.2)	0.797	0.671
There should not be a negative consequence for the student who would not volunteer	72 (91.1)	309 (93.1)	2.070	0.355
Perceptions about compensation to medical/dental students as volunteers				
Medical/dental students as volunteers should be paid stipend only	21 (26.6)	75 (22.6)	2.727	0.256
Medical/dental students as volunteers should be given monetary compensation	58 (73.4)	299 (90.1)	16.234	<0.0001
Compensation should be paid to volunteers if they become ill	69 (87.3)	296 (89.2)	0.213	0.899
Compensation should be paid to the family of volunteers who died from the illness	75 (94.9)	312 (94.0)	0.393	0.821
Volunteers should be given first access to scarce resources e.g., screening kits	71 (89.9)	294 (88.6)	2.073	0.355
Medical/dental students as volunteers should be compensated as frontline workers	59 (74.7)	277 (83.4)	3.330	0.189
Perceptions about risk, knowledge, protection and being isolated as volunteers				
I think the disease is dangerous and highly infectious	76 (96.2)	317 (95.5)	0.723	0.697
I am at risk of being infected as a volunteer	77 (97.5)	317 (95.5)	2.800	0.247
I am anxious about infecting my family members if volunteer	71 (89.9)	278 (83.7)	2.294	0.318
I am worried because I think I can be infected when moving around as volunteer	71 (89.9)	256 (77.1)	8.518	0.014
I think I have adequate knowledge and information about COVID-19	59 (74.7)	247 (74.4)	0.169	0.919
I have adequate knowledge about how infectious and virulent the virus is	66 (83.5)	271 (81.6)	2.298	0.317
I have adequate knowledge about the infection and the preventive strategies	67 (84.8)	284 (85.8)	0.314	0.855
I have adequate knowledge and information on the use of PPE	59 (74.7)	231 (69.6)	0.902	0.637
I feel I will have adequate PPE and take precautions when I volunteer	42 (53.2)	136 (41.0)	4.292	0.117
I feel I will be protected by the security and government when I volunteer	26 (32.9)	90 (27.1)	3.579	0.167
I feel I will be protected by the hospital or the community where I volunteer	38 (48.1)	114 (34.3)	5.262	0.072
I feel I will not be protected with adequate compensation if I volunteer	30 (38.0)	135 (40.7)	0.972	0.615
I feel I will be isolated if I volunteer as a medical student	13 (16.5)	94 (28.3)	6.041	0.049
I feel I will be avoided by my friends if I volunteer	21 (26.6)	96 (28.9)	1.027	0.598
I feel I will be avoided by my family if I volunteer	31 (39.2)	141 (42.5)	1.543	0.462

PPE: Personal protective equipment, COVID: Coronavirus disease

the final-year students in the event of health manpower shortage (OR: 2.37 [95% CI: 1.057–5.292]) [Table 3]. Regarding compensation of medical students as volunteers in Table 2, a significantly higher proportion of final-year students (90.1%)

compared to the penultimate year students (73.4%) perceived that medical students as volunteers should be given monetary compensation ($P < 0.001$). The penultimate year students were less likely the final-year students to expect monetary

Table 3: Adjusted odds ratio (confidence interval) for the association between the year of study and attitudes and perceptions of student about volunteering during the coronavirus disease-19 pandemic

Statements	6 th year (reference)	5 th year (OR)	CI	P
Attitudes to volunteering during COVID-19				
I will volunteer my service if given the opportunity to do so	1	0.797	0.364-1.745	0.570
I will volunteer if adequately trained to do so	1	0.765	0.248-2.353	0.640
I will volunteer if adequate PPE is provided	1	5.984	1.423-25.164	0.015
I will volunteer even if I am not compensated	1	2.319	1.136-4.734	0.021
I will volunteer only if I am compensated	1	0.918	0.467-1.804	0.804
Perceptions about moral and professional obligations to volunteer				
I will work as a volunteer if there is a request for that from government	1	0.325	0.167-0.631	0.001
Perceptions about conditions for the recruitment of medical students as volunteers				
Medical/dental students should be recruited in event of health manpower shortage	1	2.365	1.057-5.292	0.036
Medical students can assist the doctors and work under their supervision	1	1.400	0.471-4.158	0.545
Perceptions about compensation to medical/dental students as volunteers				
Medical/dental students as volunteers should be given monetary compensation	1	0.378	0.180-0.793	0.010
Perceptions about risk, knowledge, protection and being isolated as volunteers				
I am worried because I think I can be infected when moving around as volunteer	1	3.833	1.622-9.057	0.002
I feel I will have adequate PPE and take precautions when I volunteer	1	1.144	0.582-2.250	0.697
I feel I will be protected by the hospital or the community where I volunteer	1	1.653	0.844-3.237	0.143
I feel I will be isolated if I volunteer as a medical student	1	0.585	0.285-1.202	0.144

PPE: Personal protective equipment, COVID: Coronavirus disease, CI: Confidence interval, OR: Odds ratio

compensation as volunteers (OR: 0.38 [95% CI: 0.180–0.793]) [Table 3].

Attitudes and perceptions about volunteering during the coronavirus disease 2019 pandemic by course

Compared to dental students, Table 4 shows that significantly higher proportions of the medical students would volunteer during the COVID-19 pandemic if given the opportunity to do so ($P = 0.005$), if adequately trained to do so ($P = 0.019$) and if provided with adequate PPE ($P = 0.046$). A significantly higher proportion of medical students (62.9%) compared to dental students (47.3%) would volunteer because they felt that they are capable of doing so ($P = 0.035$) [Table 4]. Concerning the conditions for recruitment of medical students as volunteers, a significantly higher proportion of medical students compared to dental students perceived that students as volunteers can assist the doctors and work under their supervision ($P = 0.003$) that volunteering during a pandemic is a form of experience and education for students ($P = 0.045$) and that student should only volunteer if they will receive adequate PPE ($P = 0.001$) [Table 4]. Regarding compensation to students as volunteers, a significantly higher proportion of medical students (89.6%) compared to dental students (85.1%) perceived that compensation should be paid to volunteers if they become ill ($P = 0.047$). With regard to perceptions about risk, knowledge and protection from COVID-19, a significantly higher proportion of medical students compared to dental students believed that they had adequate knowledge on COVID-19 ($P = 0.035$), the preventive strategies ($P = 0.001$) and the use of PPE ($P = 0.004$). However, a significantly higher proportion of dental students (43.2%) compared to medical students (39.5%) felt that they will

not be protected with adequate compensation if they volunteer ($P = 0.006$) [Table 4]. There was no significant difference in all the statements on attitudes and perceptions about volunteering during the COVID-19 pandemic by course of study in the multiple logistic regression model [Table 5].

Attitudes and perceptions about volunteering during the coronavirus disease 2019 pandemic by gender

While a significantly higher proportion of male students than female students would volunteer only if they are compensated ($P = 0.006$) and because they believed they are capable of doing so ($P < 0.0001$), a significantly higher proportion of female students would volunteer only if their parents support it ($P < 0.0001$) and even if they are not compensated ($P = 0.022$) [Table 6]. Female students were two times more likely than male students to volunteer even if they are not compensated (OR: 2.44 [95% CI: 1.275–4.667]) and to volunteer only if their parents support it (OR: 2.95 [95% CI: 1.793–4.853]) [Table 7]. A significantly higher proportion of male students (51.3%) than female students (32.3%) have moral and professional obligations to volunteer ($P < 0.0001$), but a significantly higher proportion of female students (31.5%) than male students (17.5%) felt that they were not qualified to volunteer in any pandemic ($P = 0.007$) [Table 6]. Female students were less likely than male students to have moral and professional obligations to volunteer (OR: 0.49 [95% CI: 0.288–0.821]) [Table 7].

Opinions on the settings where students can serve as volunteers during the coronavirus disease 2019 pandemic

A significantly higher proportion of male students (29.2%) than female students (19.1%) believed that medical students can be involved in the case management of

Table 4: Student's attitudes and perceptions about volunteering during the coronavirus disease-19 pandemic by course of study-number of students that agreed to the statement (% of total per group)

Statements	Medicine <i>n</i> =336, <i>n</i> (%)	Dentistry <i>n</i> =74, <i>n</i> (%)	χ^2	<i>P</i>
Attitudes to volunteering during COVID-19				
I will volunteer my service if given the opportunity to do so	222 (65.9)	34 (45.9)	10.496	0.005
I will volunteer if adequately trained to do so	276 (81.9)	50 (67.6)	7.926	0.019
I will volunteer if adequate PPE is provided	285 (84.6)	55 (74.3)	6.140	0.046
I will volunteer even if I am not compensated	92 (27.3)	17 (23.0)	0.583	0.747
I will volunteer only if I am compensated	175 (51.9)	30 (40.5)	4.152	0.125
I will volunteer because I am capable to do so	212 (62.9)	35 (47.3)	6.700	0.035
I will only volunteer if my parents support it	214 (63.5)	43 (58.1)	3.164	0.206
Perceptions about moral and professional obligations to volunteer				
I have a moral sense of duty to volunteer as a person	222 (65.9)	51 (68.9)	2.022	0.364
Medical/dental students have moral and professional obligations to volunteer	131 (38.9)	31 (41.9)	4.780	0.092
I am not qualified to volunteer in any pandemic	82 (24.3)	26 (35.1)	3.995	0.136
Government would be justified to request for medical students as volunteers	126 (37.4)	28 (37.8)	0.770	0.681
I will work as a volunteer if there is a request for that from government	191 (56.7)	40 (54.1)	0.283	0.868
Government has no right to invite medical students to volunteer in a pandemic	90 (26.7)	24 (32.4)	1.027	0.598
Perceptions about conditions for the recruitment of medical students as volunteers				
Medical/dental students should be recruited in event of health manpower shortage	235 (69.7)	43 (58.1)	3.918	0.141
Medical students should not volunteer for case management	166 (49.3)	31 (41.9)	2.038	0.361
Medical students can assist the doctors and work under their supervision	299 (88.7)	56 (75.7)	11.391	0.003
Volunteering during a pandemic is a form of experience and education for students	311 (94.9)	64 (86.5)	6.187	0.045
Experience as a volunteer should count towards practical experience in medicine	293 (86.1)	60 (81.1)	2.801	0.246
Medical students should receive epidemic preparedness education in the curriculum	234 (69.1)	67 (90.5)	4.415	0.110
Medical student should only volunteer if they receive adequate PPE	328 (97.3)	65 (87.8)	13.429	0.001
There should not be a negative consequence for the student who would not volunteer	318 (94.4)	63 (85.1)	18.924	<0.0001
Perceptions about compensation to medical/dental students as volunteers				
Medical/dental students as volunteers should be paid stipend only	80 (23.7)	16 (21.6)	0.425	0.808
Medical/dental students as volunteers should be given monetary compensation	294 (87.2)	63 (85.1)	5.820	0.054
Compensation should be paid to volunteers if they become ill	302 (89.6)	63 (85.1)	6.117	0.047
Compensation should be paid to the family of volunteers who died from the illness	320 (95.0)	67 (90.5)	2.621	0.270
Volunteers should be given first access to scarce resources e.g., screening kits	300 (89.0)	65 (87.8)	0.096	0.953
Medical/dental students as volunteers should be compensated as frontline workers	275 (81.6)	61 (82.4)	0.584	0.747
Perceptions about risk, knowledge, protection and being isolated as volunteers				
I think the disease is dangerous and highly infectious	324 (96.1)	69 (93.2)	1.293	0.524
I am at risk of being infected as a volunteer	325 (96.4)	69 (93.2)	1.569	0.456
I am anxious about infecting my family members if volunteer	290 (86.1)	59 (79.7)	2.859	0.239
I am worried because I think I can be infected when moving around as volunteer	268 (79.5)	59 (79.7)	1.040	0.595
I think I have adequate knowledge and information about COVID-19	259 (76.9)	47 (63.5)	6.685	0.035
I have adequate knowledge about how infectious and virulent the virus is	279 (82.8)	58 (78.4)	2.784	0.249
I have adequate knowledge about the infection and the preventive strategies	294 (87.2)	57 (77.0)	13.374	0.001
I have adequate knowledge and information on the use of PPE	246 (73.0)	44 (59.5)	11.141	0.004
I feel I will have adequate PPE and take precautions when I volunteer	148 (43.9)	30 (40.5)	0.392	0.822
I feel I will be protected by the security and government when I volunteer	93 (27.6)	23 (31.1)	1.042	0.594
I feel I will be protected by the hospital or the community where I volunteer	122 (36.2)	30 (40.5)	1.593	0.451
I feel I will not be protected with adequate compensation if I volunteer	133 (39.5)	32 (43.2)	10.200	0.006
I feel I will be isolated if I volunteer as a medical student	82 (24.3)	25 (33.8)	2.832	0.243
I feel I will be avoided by my friends if I volunteer	94 (27.9)	23 (31.1)	0.827	0.661
I feel I will be avoided by my family if I volunteer	135 (40.1)	37 (50.0)	4.683	0.096

PPE: Personal protective equipment, COVID: Coronavirus disease

COVID-19 patients. A significantly higher proportion of the penultimate year students (87.3%) compared to the final-year students (75.0%) were of the opinion that medical students can volunteer and work under the supervision of

certified doctors in hospital settings. A significantly higher proportion of medical students (88.1%) compared to dental students (77.0%) thought that medical students can volunteer in telemedicine unit or phone triage to schedule

Table 5: Adjusted odds ratio (confidence interval) for the association between the course of study and attitudes and perceptions of student about volunteering during the coronavirus disease-19 pandemic

Statements	Dentistry (reference)	Medicine (OR)	CI	P
Attitudes to volunteering during COVID-19				
I will volunteer my service if given the opportunity to do so	1	1.641	0.749-3.593	0.216
I will volunteer if adequately trained to do so	1	1.596	0.611-4.169	0.340
I will volunteer if adequate PPE is provided	1	0.633	0.234-1.652	0.350
I will volunteer only if I am compensated	1	1.634	0.889-3.004	0.114
I will volunteer because I am capable to do so	1	1.114	0.570-2.179	0.752
Perceptions about moral and professional obligations to volunteer				
Medical/dental students have moral and professional obligations to volunteer	1	0.698	0.394-1.239	0.220
I am not qualified to volunteer in any pandemic	1	0.746	0.396-1.405	0.364
Perceptions about conditions for the recruitment of medical students as volunteers				
Medical/dental students should be recruited in event of health manpower shortage	1	0.788	0.374-1.663	0.532
Medical students can assist the doctors and work under their supervision	1	2.119	0.905-4.964	0.084
Volunteering during a pandemic is a form of experience and education for students	1	0.508	0.153-1.686	0.268
Medical students should receive epidemic preparedness education in the curriculum	1	1.172	0.253-5.432	0.839
Medical student should only volunteer if they receive adequate PPE	1	3.811	0.991-14.654	0.052
There should not be a negative consequence for the student who would not volunteer	1	1.776	0.617-5.111	0.287
Perceptions about compensation to medical/dental students as volunteers				
Medical/dental students as volunteers should be given monetary compensation	1	0.751	0.292-1.935	0.554
Compensation should be paid to volunteers if they become ill	1	1.317	0.550-3.152	0.536
Perceptions about risk, knowledge, protection and being isolated as volunteers				
I think I have adequate knowledge and information about COVID-19	1	1.326	0.665-2.643	0.423
I have adequate knowledge about the infection and the preventive strategies	1	1.347	0.566-3.208	0.501
I have adequate knowledge and information on the use of PPE	1	1.039	0.519-2.081	0.914
I feel I will not be protected with adequate compensation if I volunteer	1	0.595	0.329-1.078	0.087
I feel I will be avoided by my family if I volunteer	1	0.718	0.402-1.283	0.263

PPE: Personal protective equipment, COVID: Coronavirus disease, CI: Confidence interval, OR: Odds ratio

appointments and reduce patients' visit to the hospital during the COVID-19 pandemic [Table 8].

DISCUSSION

In this study, we aimed to assess the attitudes and perceptions of clinical medical and dental students in the two public universities in Lagos, Nigeria, towards volunteering during the COVID-19 pandemic. We also assessed the differences in the students' attitudes and perceptions according to the year of study, course of study and gender. Based on our literature review, there is a paucity of evidence on the attitudes and perceptions of clinical students towards volunteering during COVID-19 in Nigeria. This study will, therefore, contribute to the body of knowledge about the planning of medical education and workforce during health emergencies.

We observed that medical students would volunteer in a pandemic if they are provided with adequate PPE and if they are adequately trained to do so. This corroborated the reports from previous studies where nursing students expressed their willingness to volunteer in pandemic situations if provided with the appropriate PPE and that preparing medical students for a pandemic through training will improve their knowledge, attitude, skills and preparedness.^[11,25] This is a further proof that the training of medical students in public health emergencies such as the COVID-19 pandemic could be very essential in

the control of the outbreak. Medical students perceived that they have a moral duty to volunteer and that they would work as a volunteer if the request is from the government. This is consistent with the findings of studies amongst medical students in Ireland, Brazil, Canada and China, where medical student felt that they have moral and professional responsibilities to volunteer during a pandemic.^[10,13,14,22,26] This shows that as medical students build their professional identities, they also have important values such as altruism and service in times of crisis. Our findings showed that medical students perceived that they should receive epidemic preparedness education in their curriculum and that the experience as volunteers should count towards their practical experience in Medicine as volunteering during a pandemic should be a form of education for them. Evidence has shown the need for disaster training programs for medical students.^[3,25,27] Students with disaster training may be better suited to assist in both clinical and non-clinical roles during public health emergencies such as the COVID-19 pandemic.^[25] Moreover, with the current COVID-19 pandemic, medical students may be unprepared for the health-care workforce. Therefore, the mobilisation of medical students into the workforce could be accompanied by training in health emergencies.

Medical students felt that they can assist the doctors and work under their supervision during the COVID-19 pandemic but

Table 6: Student's attitudes and perceptions about volunteering during the coronavirus disease-19 pandemic by gender-number of students that agreed to the statement (% of total per group)

Statements	Male <i>n</i> =154, <i>n</i> (%)	Female <i>n</i> =257, <i>n</i> (%)	χ^2	<i>P</i>
Attitudes to volunteering during COVID-19				
I will volunteer my service if given the opportunity to do so	100 (64.7)	156 (60.7)	2.037	0.361
I will volunteer if adequately trained to do so	124 (80.5)	202 (78.6)	2.228	0.892
I will volunteer if adequate PPE is provided	127 (82.5)	213 (82.9)	0.013	0.994
I will volunteer even if I am not compensated	29 (18.8)	80 (31.1)	7.616	0.022
I will volunteer only if I am compensated	92 (59.7)	113 (44.0)	10.178	0.006
I will volunteer because I am capable to do so	109 (70.8)	138 (53.7)	18.090	<0.0001
I will only volunteer if my parents support it	71 (46.1)	186 (72.4)	29.387	<0.0001
Perceptions about moral and professional obligations to volunteer				
I have a moral sense of duty to volunteer as a person	113 (73.4)	160 (62.3)	5.660	0.059
Medical/dental students have moral and professional obligations to volunteer	79 (51.3)	83 (32.3)	15.717	<0.0001
I am not qualified to volunteer in any pandemic	27 (17.5)	81 (31.5)	9.916	0.007
Government would be justified to request for medical students as volunteers	167 (43.5)	87 (33.9)	4.343	0.114
I will work as a volunteer if there is a request for that from government	97 (63.0)	134 (52.1)	5.247	0.073
Government has no right to invite medical students to volunteer in a pandemic	45 (29.2)	69 (26.8)	2.967	0.227
Perceptions about conditions for the recruitment of medical students as volunteers				
Medical/dental students should be recruited in event of health manpower shortage	116 (75.3)	162 (63.0)	6.710	0.035
Medical students should not volunteer for case management	67 (43.5)	130 (50.6)	3.109	0.211
Medical students can assist the doctors and work under their supervision	135 (87.7)	220 (85.6)	1.490	0.475
Volunteering during a pandemic is a form of experience and education for students	140 (90.9)	235 (91.4)	0.047	0.977
Experience as a volunteer should count towards practical experience in medicine	133 (86.4)	220 (85.6)	0.061	0.970
Medical students should receive epidemic preparedness education in the curriculum	144 (93.5)	247 (96.1)	1.643	0.440
Medical student should only volunteer if they receive adequate PPE	144 (93.5)	249 (96.9)	3.577	0.167
There should not be a negative consequence for the student who would not volunteer	140 (90.9)	241 (93.8)	1.239	0.538
Perceptions about compensation to medical/dental students as volunteers				
Medical/dental students as volunteers should be paid stipend only	44 (28.6)	52 (20.2)	5.991	0.050
Medical/dental students as volunteers should be given monetary compensation	138 (89.6)	219 (85.2)	3.294	0.193
Compensation should be paid to volunteers if they become ill	136 (88.3)	229 (89.1)	2.848	0.241
Compensation should be paid to the family of a volunteer who died from the illness	142 (92.2)	245 (95.3)	1.898	0.387
Volunteers should be given first access to scarce resources e.g., screening kits	136 (88.3)	229 (89.1)	0.711	0.701
Medical/dental students as volunteers should be compensated as frontline workers	129 (83.8)	207 (80.5)	2.722	0.256
Perceptions about risk, knowledge, protection and being isolated as volunteers				
I think the disease is dangerous and highly infectious	147 (95.5)	246 (95.7)	0.775	0.679
I am at risk of being infected as a volunteer	146 (94.8)	248 (96.5)	0.786	0.675
I am anxious about infecting my family members if volunteer	118 (76.6)	231 (89.9)	14.016	0.001
I am worried because I think I can be infected when moving around as volunteer	120 (77.9)	207 (80.5)	1.570	0.456
I think I have adequate knowledge and information about COVID-19	126 (81.8)	180 (70.0)	7.420	0.024
I have adequate knowledge about how infectious and virulent the virus is	137 (89.0)	200 (77.8)	10.058	0.007
I have adequate knowledge about the infection and the preventive strategies	136 (88.3)	215 (83.7)	1.685	0.431
I have adequate knowledge and information on the use of PPE	121 (78.6)	169 (65.8)	8.131	0.017
I feel I will have adequate PPE and take precautions when I volunteer	77 (50.0)	101 (39.3)	11.503	0.003
I feel I will be protected by the security and government when I volunteer	57 (37.0)	59 (23.0)	25.704	<0.0001
I feel I will be protected by the hospital or the community where I volunteer	68 (44.2)	84 (32.7)	21.422	<0.0001
I feel I will not be protected with adequate compensation if I volunteer	72 (46.8)	93 (36.2)	4.482	0.106
I feel I will be isolated if I volunteer as a medical student	32 (20.8)	75 (29.2)	4.536	0.104
I feel I will be avoided by my friends if I volunteer	39 (25.3)	78 (30.4)	1.732	0.421
I feel I will be avoided by my family if I volunteer	48 (31.2)	124 (48.2)	14.979	0.001

PPE: Personal protective equipment, COVID: Coronavirus disease

some of them were of the view that they should not volunteer for case management. Literature suggested that there is a need for appropriate supervision for medical students as volunteers but recommended that they should avoid direct

care of COVID-19 patients in clinical settings.^[5,9,28] Medical students who may want to volunteer for case management of COVID-19 patients have a high risk of exposure to the infection given their limited clinical experience. Majority

Table 7: Adjusted odds ratio (confidence interval) for the association between gender and attitudes and perceptions of student about volunteering during the coronavirus disease-19 pandemic

Statements	Male (reference)	Female (OR)	CI	P
Attitudes to volunteering during COVID-19				
I will volunteer even if I am not compensated	1	2.440	1.275-4.667	0.007
I will volunteer only if I am compensated	1	0.690	0.400-1.192	0.184
I will volunteer because I am capable to do so	1	0.828	0.470-1.460	0.515
I will only volunteer if my parents support it	1	2.950	1.793-4.853	<0.0001
Perceptions about moral and professional obligations to volunteer				
I have a moral sense of duty to volunteer as a person	1	0.932	0.512-1.698	0.818
Medical/dental students have moral and professional obligations to volunteer	1	0.486	0.288-0.821	0.007
I am not qualified to volunteer in any pandemic	1	1.329	0.747-2.365	0.333
Government would be justified to request for medical students as volunteers	1	1.249	0.701-2.226	0.450
I will work as a volunteer if there is a request for that from government	1	1.002	0.547-1.838	0.994
Perceptions about conditions for the recruitment of medical students as volunteers				
Medical/dental students should be recruited in event of health manpower shortage	1	0.720	0.388-1.335	0.297
Perceptions about compensation to medical/dental students as volunteers				
Medical/dental students as volunteers should be paid stipend only	1	0.664	0.386-1.141	0.138
Perceptions about risk, knowledge, protection and being isolated as volunteers				
I am anxious about infecting my family members if volunteer	1	1.928	0.972-3.825	0.060
I think I have adequate knowledge and information about COVID-19	1	0.761	0.379-1.528	0.442
I have adequate knowledge about how infectious and virulent the virus is	1	0.757	0.323-1.774	0.522
I have adequate knowledge and information on the use of PPE	1	0.839	0.454-1.552	0.577
I feel I will have adequate PPE and take precautions when I volunteer	1	1.243	0.676-2.287	0.485
I feel I will be protected by the security and government when I volunteer	1	0.553	0.236-1.295	0.172
I feel I will be protected by the hospital or the community where I volunteer	1	1.301	0.595-2.840	0.510
I feel I will not be protected with adequate compensation if I volunteer	1	0.621	0.375-1.029	0.065
I feel I will be isolated if I volunteer as a medical student	1	1.193	0.656-2.168	0.563
I feel I will be avoided by my family if I volunteer	1	1.323	0.783-2.238	0.296

PPE: Personal protective equipment, COVID: Coronavirus disease, OR: Odds ratio

of the respondents in this study perceived COVID-19 as a dangerous and highly infectious disease and that they are at risk of being infected as volunteers. Recommendations on situations where medical students can volunteer during the COVID-19 pandemic include indirect patient's care such as outpatient clinic callbacks and phone triage as well as public health activities such as contact tracing and public health education.^[6-8] Medical students as volunteers during COVID-19 felt that they should be compensated. It has been recommended that medical students who volunteer may require modest stipend for their efforts.^[7] Some of the medical students in this study were worried about being infected and anxious about infecting their family members if they volunteer. As reported in other literature, COVID-19 has caused fear and anxiety amongst medical students and their families.^[28] Nearly 70.0% of medical students in India were reluctant to attend clinics for fear of getting infected or passing the infection on to others.^[17] However, participants of this study felt that they have adequate knowledge about COVID-19 infection and its preventive strategies. This is similar to the report of a study in Uganda where nine in ten of the medical students had sufficient knowledge of COVID-19.^[29]

We also assessed the factors that can influence the decision to volunteer during the COVID-19 pandemic according to the year of study, course and gender. With adequate PPE,

penultimate year students in their 5th year of study were more likely to volunteer in event of manpower shortage and even if they are not compensated. This is similar to the findings of a study in Germany where the majority (70.0%) of the medical students in the 3rd to 5th year of study registered as volunteers and they indicated a sense of duty to society (64.7%) and social commitment (69.1%) as the major motivations.^[30] Similarly, senior medical students in China were more reluctant to volunteer.^[26] However, the final year students in this study were more likely to volunteer if there is a request for that from government and they are more likely to expect monetary compensation as volunteers. This is similar to the study amongst medical students in Denmark on motivations for supporting COVID-19 efforts where salary was given priority with clinical experience.^[31] These factors could be discussed during the recruitment of medical students as volunteers. Compared to dental students, more medical students would volunteer because they felt that they are capable of doing so if given the opportunity, if adequately trained to do so and if provided with adequate PPE. Medical students perceived that students as volunteers can assist the doctors and work under their supervision and that volunteering during a pandemic is a form of experience and education for students. Medical students also believed that they have adequate knowledge of COVID-19, the preventive strategies and the use of PPE.

Table 8: Opinions of medical and dental students on the settings where they can serve as volunteers during coronavirus disease-19 pandemic

Settings	Year		Course		Gender	
	5 th year <i>n</i> =79, <i>n</i> (%)	6 th year <i>n</i> =332, <i>n</i> (%)	Medicine <i>n</i> =336, <i>n</i> (%)	Dentistry <i>n</i> =74, <i>n</i> (%)	Male <i>n</i> =154, <i>n</i> (%)	Female <i>n</i> =257, <i>n</i> (%)
Case management of COVID-19 patients‡	21 (26.6)	73 (22.0)	82 (24.3)	12 (16.2)	45 (29.2)	49 (19.1)
Under the instruction and supervision of certified doctors in hospital setting*	69 (87.3)	249 (75.0)	265 (78.0)	53 (71.6)	123 (79.9)	195 (75.9)
Telemedicine unit/phone triage to schedule appointment and reduce patient's visit to the hospital†	69 (87.3)	285 (85.8)	297 (88.1)	57 (77.0)	133 (86.4)	221 (86.0)
Supporting mental health of COVID-19 patients, their contact and the survivors through phone calls‡	57 (72.2)	204 (61.4)	211 (62.6)	50 (67.6)	110 (71.4)	151 (58.8)
Helping support groups such as the hypertensive and diabetic patients as well as expectant mothers through telemedicine/phone calls*‡	52 (65.8)	139 (41.9)	161 (47.8)	30 (40.5)	91 (59.1)	100 (38.9)
Virtual education and counselling of the community members on prevention and control of COVID-19‡	66 (83.5)	250 (75.3)	264 (78.3)	52 (70.3)	129 (83.8)	87 (72.8)
Surveillance activities such as contact tracing of patients and their contacts	55 (69.6)	265 (79.8)	260 (77.2)	60 (81.1)	124 (80.5)	196 (76.3)
Surveillance activities such as active case search in the communities and hospitals	51 (64.6)	234 (70.5)	239 (70.9)	46 (62.2)	110 (71.4)	175 (68.1)
Working with research groups on COVID-19 research activities	54 (68.4)	238 (71.7)	246 (73.0)	46 (59.5)	119 (77.3)	173 (67.3)
Collection and distribution of medical supplies to healthcare workers and hospitals	58 (73.4)	191 (57.5)	210 (62.3)	44 (59.5)	101 (65.6)	153 (59.5)
Development of information, educational and communication materials such as info grams and posters*	58 (73.4)	191 (57.5)	208 (61.7)	41 (55.4)	100 (64.9)	149 (58.0)
Organisation of support/donation and distribution of materials such as face mask to the community members	53 (67.1)	234 (70.5)	233 (69.1)	54 (73.0)	114 (74.0)	173 (67.3)
Virtual tutoring and training of younger medical students*	52 (65.8)	280 (84.3)	276 (81.9)	56 (75.7)	121 (78.6)	211 (82.1)

* $P<0.05$ Chi-square test year of study, † $P<0.05$ Chi-square test course of study, ‡ $P<0.05$ Chi-square test gender. COVID: Coronavirus disease

Although dentists and physicians have different scopes of practice, their training shares many similarities. Hence, dental professionals and students are very important human resources in the COVID-19 pandemic response.^[32] The curriculum in dental schools should include competencies in pandemic and disaster relief. Voluntary medical work should be made a part of community dentistry curriculum.^[32,33] Considering the course of the study, we did not observe any significant difference in all the statements on attitudes and perceptions about volunteering during the COVID-19 pandemic in the multiple logistic regression model. Male students in this study would volunteer because they believed that they are capable of doing so, but only if they will be compensated while female students were more likely to volunteer even if they are not compensated but only if their parents will support it. Male students were more likely to volunteer due to moral and professional obligations. This finding is similar to the study amongst medical students in Brazil.^[13] Male gender has a higher disposition to take a risk in the health and safety domain, whereas females are more prone to develop anxiety and stress disorders as well as worse perceptions about their quality of life, health and skills.^[34,35] Female students may also have pressure to attend to family needs and thus may require parental approval to volunteer. On the contrary, female medical students were more likely to volunteer than their male counterparts in China.^[26]

Majority of the male students than female students were of the opinion that medical students can be involved in case

management of COVID-19 patients. In Vietnam, volunteer male and female students were trained by the Medical University in collaboration with the Department of Health and Centre for Disease Control and they were mobilised to support the epidemiological investigation of cases through contact tracing, counselling of people through the telephone, collection of samples from suspected cases, importing data into the computers and research.^[36] A higher proportion of medical students in the penultimate year of the study compared to those in the final year were of the opinion that medical students can volunteer and work under the supervision of certified doctors in hospital settings. In Germany, final-year students have been working in hospitals since the pandemic began with 35.0% of them assisting doctors in the treatment of COVID-19 patients during their placements.^[30] It is important for the medical students who are willing to volunteer their service during the COVID-19 pandemic to be adequately trained and work within their level of competence. Compared to dental students, majority of the medical students were of the opinion that medical students can volunteer in telemedicine unit or phone triage to schedule an appointment and reduce patients' visit to the hospital during the COVID-19 pandemic. Dental students in Canada helped to screen individuals at the point of entry to the hospitals and assisted the frontline workers at the drive-through testing centres. They also helped in managing phone calls, online dissemination of information and research.^[37] Dental students have roles to play during public health emergencies.

Certain limitations of this study should be recognised. The study focussed on the two public universities in Lagos, Nigeria; the findings may be different when all the regions of the country are considered. The lower response rate amongst students of LASUCOM in this study is also a recognised limitation even though the reasons for this were uncertain. However, the result can be applied to medical and dental students in a similar context. The cross-sectional design of this study does not permit a causal conclusion to be drawn. However, this survey was conducted while the COVID-19 pandemic was evolving in Nigeria and the findings provided useful information for making a decision and planning the roles of medical students during public health emergencies.

CONCLUSION

Medical and dental students are willing to make significant contributions in the response to COVID-19 but would require adequate training and protection. The pandemic offers novel learning opportunities for them as they perceive their involvement as a form of educational experience. There is a need to train medical and dental students and to provide adequate PPE for them to function as volunteers during the COVID-19 pandemic. These findings could be useful in guiding the recruitment of medical students as volunteers during public health emergencies. The national emergency plan for a pandemic response should include policies and protocols that specify medical student's roles and the coordinating mechanism between the universities and public health authorities.

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Conflicts of interest

There are no conflicts of interest.

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