Research Article

Willingness of Medical Students to Participate in the Response to Covid-19 Pandemic in Sudan, 2020

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Abstract

Introduction: Coronavirus disease 2019 is a pandemic crisis affecting all aspects of life. The health workers are making effort to decrease the impact of this disease on people. But With the increasing number of cases throughout the world there should be an equal response to ease this threat. For that our study aims to assess the willingness of medical students to be involved in COVID-19 management.

Methods: Institutional based cross-sectional study was conducted at 12 medical schools in Sudan, randomly selected by cluster sampling method and, from each, 60 students were conveniently chosen to fill the self- administered online questionnaire. The information collected contained demographic data, knowledge, attitude and practice toward Covid-19, source of information and willingness to participate. Ethical clearance was obtained from University of Khartoum Community Medicine department.

Results: A total of 198 male and 424 female students has participated in this study. 74.4% of the students mentioned that their main source of information was social media including study groups. The majority (81.4%) of the students were willing to participate in COVID-19 response efforts while the main cause of

refusal was to avoid getting infected. There is significant association between willingness of medical students to participate to contain COVID-19 and state of residence and the overall score of attitude.

Conclusion: Most of the students were willing to participate in COVID-19 management and most commonly in health education/awareness raising. Medical faculties and Ministry of Health should make use of medical student and involving them in the efforts to contain COVID-19.

Keywords: COVID-19; Students; Management; Participate; Willingness; Attitude; Knowledge; Practice; Response; Pandemic

1. Introduction

Coronaviruses are known to cause respiratory diseases in humans, it's symptoms and signs ranging from mild flu to severe respiratory illness, some countries reported epidemics caused by two genotypes of the virus named Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) [1]. The symptoms of COVID-19 include fever, tiredness, dry cough, aches and pains, nasal congestion, runny nose, sore throat and diarrhea. The symptoms might be mild and exaggerated to severe difficulty in breathing, some individuals may not develop any symptoms although they are infected, nearly one in every six patients may develop serious illness [1]. Coronaviruse disease 2019 is a new infectious respiratory disease caused by the most recently discovered coronavirus, it emerged in December 2019 in Wuhan, China [2]. The virus mainly attacks the respiratory system and other systems with an incubation period ranging between 6_41 days and a median of 14 days depending on the host age and immunological status, patients with COVID-19 showed higher leukocyte numbers and increased levels of plasma pro-inflammatory cytokines, COVID-19 showed bilateral ground glass opacities on CT scans and unique features of infiltrates in the upper lobe of the lung associated with increasing dyspnea and hypoxemia, additionally patients with COVID-19 may develop gastrointestinal symptoms and diarrhea [3].

The spread of covid-19 is through coughing or exhalation of infected people, the respiratory droplets of infected people contaminate any surface so touching contaminated objects and surfaces increases the spread through hands. Several therapeutic drugs have been tried as a treatment for COVID-19, however none was proven to be effective. Remedsvir had been tested as a treatment but trials concluded that it just shortens the duration of symptoms and the time of recovery [4]. Many trials for COVID-19 vaccine were going on but most them stopped at the second stage and not tested on humans. Recently, promising vaccines being developed by the University of Oxford and expected to be in the market by 2021 [5]. Up to date, 25 July 2020 the confirmed cases of covid-19 worldwide are 15,177,447 cases and deaths are 636,711. In Sudan there were 11,302 confirmed cases and 715 deaths [6]. The most effective control and protective measures are to wash hands frequently and avoid coughing without facemasks and maintain a distance of one meter at least from people who are coughing or sneezing. Individual should avoid toush to eye, mouth, and nose and seek medical care if they experience any symptoms [7]. COVID-19 pandemic has been an increasing threat to the whole humanity including the first line of defense in medical field. Medical students are not excluded from the response and they should have definite role in controlling the wide spread of COVID-19.

The uncertainty and conservation of medical colleges and institutions range from forbidding student's contact with COVID-19 patients to recruitment of the students for hospital-based learning and participation in control of the pandemic, the American association of medical colleges recommended locally medical students should not be able involved in any direct patients care activities unless there is a critical health care workforce need. The association suggests that the role of medical students during the pandemic can be divided into five domains: providing the latest updates about Covid-19 through phone calls system, child care assistance for medical staff on call, research, volunteering in sample taking for suspected cases, direct patient care in hospitals and clinics [8]. In Sudan the federal ministry of health recruiting volunteers of medical students in the testing and isolation centers. Universities, student's associations and NGOs involved medical students in preparing sanitizers and personal protective equipment beside provision of awareness campaigns and providing the information of latest updates about the pandemic [9]. Medical students are capable to provide unpaid medical assistance, testing, raising awareness, helplines, logistic assistance, and the triage that not calculated on their educational credits [10]. The scaling up increase of COVID-19 positive patients needs a huge response from different sectors including the medical students. This study aims to identify and determine the knowledge and willingness of medical students to participate in response to COVID-19 pandemic in Sudan.

2. Methodology

2.1 Study design

We adopted an institution-based cross-sectional study design to assess the willingness of medical students to participate in response to COVID-19 pandemic in Sudan.

2.2 Study area

The study was conducted at Faculties and Schools of Medicine in Sudan. In Sudan there are more than 50 public and private schools and they are distributed over the 18 states.

2.3 Study population

The study population is medical students currently studying at Sudanese medical schools/ faculties. Both male and female medical students who at semi-final and final classes in both public and private schools were included.

2.4 Sample size

The sample size was found be 763 by the following equation and multiplied by 2 (to weight for the design effect): n=Z*Z*p*q/e*e (Where n= sample size, Z= standard normal deviate = 1.96, p= the expected proportion of interest (proportion of medical students who are willing to participate in response to COVID-19 = 0.5, q= 1-p, and e= is the random sampling error = 0.05).

2.5 Sampling methods

Cluster sampling technique was applied to slect eligible schools and students. The cluster is the faculty/ school with cluster size of 60 students. Twelve clusters were randomly selected (sample size / cluster size i.e. = 763\ 60 ~= 12 clusters). In each selected faculty, all students in final and semi-final level will were be asked to participate. In case only 60 or less students participate during the specified period, the investigators took all of them. In case more than 60 students participated during the specified period, the investigators took 60 of them randomly.

2.6 Data collection

Data was collected through structured self-administered online questionnaire structured developed by the authors. Data was transferred from the online platform to excel sheet and then to Statistical Package for Social Sciences (SPSS version 25) software for cleaning and analysis. The dependent variable is willingness to participate and the independent variables are socio-demographic data (age, gender and the residential location either in Khartoum state or outside Khartoum state), academic year, university, university sector, knowledge, attitude and practice of COVID-19 self-assessment and sources of information about COVID-19.

2.7 Statistical analysis

Descriptive statistics for socio-demographic characteristics, source of information about COVID-19, willingness to participate in pandemic control, causes of not willingness to participate and additional variables was presented using frequency table. Percentages of the response were calculated according to the number of the respondents per response with respect to the number of total responses to the question. The score of knowledge, attitude and practice self-assessment were expressed as mean and standard deviation. We used chi-square test to calculate the univariate association between dependent and independent variables . Further test of association was performed using binary logistic regression. All tests were two-tailed, with a significance level of $p < 0.05$.

2.8 Ethical consideration

Ethical approval was obtained from the Department of Community Medicine in the Faculty of Medicine - University of Khartoum. Informed consent was taken from each participant before filling in the questionnaire. Participants were ensured that, their particulars will be kept anonymous and their responses will be used for the purpose of this study.

3. Result

3.1 Socio-demographic data

The total number of the participants was 622,; 198 of them were male (31.8%) and 424 were female (68.2%).The mean (±SD) age of the participants was 23 (± 2) years. A total of 312 of the participants were final year medical students (50.2%) while 310 were semi-final year students (49.8%). The participants were from 12 different universities/medical schools that distributed over different states of Sudan. socio-demographic data were descriped in Table (1).

3.2 Self-assessment of knowledge, attitude and practice of medical students

Participants were asked to self-rate their knowledge, attitude and practice related to COVID-19 using a scale of 1-5 scale, where 5 match highest level and 1 match lowest level. The mean (±SD) score of knowledge was 2.87 (± 0.91), the mean score of attitude (±SD) was 3.08 (± 1.05), and the mean score of practice (±SD) was 1.92 (± 0.83).

3.3 Sources of information about COVID-19

Around two-thirds of students (69.1%) have read WHO case definition of COVID-19 while 43.3% of students have read the Federal Ministry of Health definition of COVID-19. Social media including student groups was the most common source of information mentioned by 74.4% of the participants. The others source of information recognized by the participants were; Websites of WHO, CDC …..etc (67%), ministry of health (53.1%), Television (48.4%), Scientific publications (27.7%) and the participant faculty/school/university (15.3%) as mentioned in Table (3).

3.4 Willingness to participate

A total of 506 (81.4%) of students willing to participate in effort in response to COVID-19 (Figure 1). The most common preferred area of voluntary participation (Table 4.) was health education/ awareness raisingin (56.6%), followed by research (36.2%), working at call centers (33.6%), working at isolation centers for non-cases (27.2%), sterilization (22.5%), working at treatment centers (19.1%), and contact tracing (16.9%). About 15% of the students said that they were participated in response to epidemic before, and 16.9% said that they have been trained in infection control.

3.5 Factors related to Willingness to participate in effort to contain COVID-19

Multiple binary logistic regression analysis on factors associated with willingness to participate in effort to contain COVID-19 (Table 5), revealed that the state of residence was significantly associated with willingness of medical students to participate in effort to contain COVID-19 (OR=0.541 ; 95% CI: 0.335 -0.873). Other factors including sex, sector, university, academic year, receiving infection control training and the overall score of knowledge, attitude and practice all showed no statistically significance association with willingness to participate.

Item		**Frequency (n=622)**	**Percent**
Sex	Male	198	31.8
	Female	424	68.2
Academic year	Final year	312	50.2
	Semi-final year	310	49.8
Universities	Public	428	68.8
	Private	191	30.7
States	Khartoum state	370	59
	Other States	252	40.5

Table 1: Sociodemographic characteristics of medical students.

Knowledge	**Mean Score**	**SD**
I have enough knowledge about COVID-19 situation (cases, deaths and spread) worldwide	2.70	1.10
I have enough knowledge about COVID-19situation (cases, deaths and spread) in Sudan	3.18	1.21
I have enough knowledge about the transmission of COVID-19	3.38	1.10
I have enough knowledge about the diagnosis of COVID-19	2.62	1.15
I have enough knowledge about the clinical features of COVID-19	3.11	1.10
I have enough knowledge about the case management of COVID-19	2.27	1.09
I have enough information about COVID-19to share in public	2.77	1.16
Attitude	**Mean Score**	**SD**
I am capable to deliver messages about COVID-19 to public	2.82	1.20

I feel I should take a role in response to any epidemic	2.87	1.25
I feel I should take a role inresponse to COVID-19	2.91	1.22
I feel my faculty should have a role in response to any epidemic	3.29	1.27
I feel my faculty should have a role in response to COVID-19 pandemic	3.32	1.25
I feel my students association should have a role in COVID-19 pandemic	3.17	1.24
Practice	**Mean Score**	**SD**
I encourage volunteering for response to COVID-19	3.16	1.26
My faculty/school/university involved in response efforts to COVID-19	2.55	1.27
I am currently involved (or previously involved)in response efforts to COVID-19	1.73	1.08
I had been involved previously in response efforts to control corona related viruses	1.46	0.93

Table 2: Mean of self-rating of knowledge, attitude and practice of medical students regarding COVID-19 pandemic, Sudan 2020.

Sources of information		**Frequency (n=622)**	**Percent**
Self directed	Read WHO case definition of COVID-1	430	69.1
	Read the ministry of health definition of COVID-19	269	43.2
Media	Social media including student groups	463	74.4
	Websites	417	67.0
	Television and Radio	301	48.4
Others	Ministry of Health	330	53.1
	Scientific publications	172	27.7
	My faculty/school/university	92	15.3

Table 3: Sources of information the medical students have about COVID-19 in Sudan 2020.

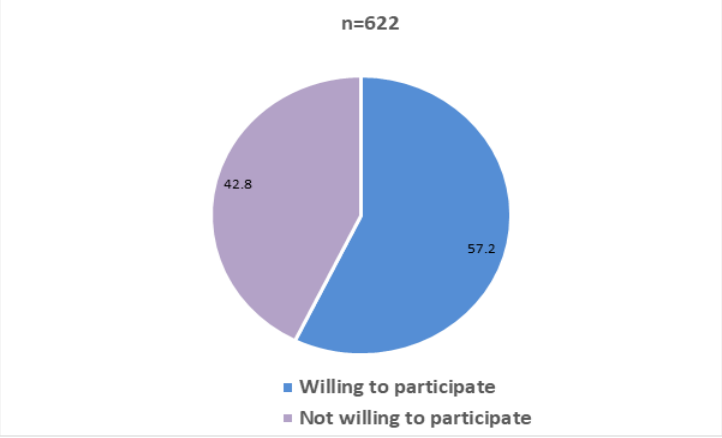

Figure 1: Willing of medical students to participate in the response to COVID-19, Sudan 2020.

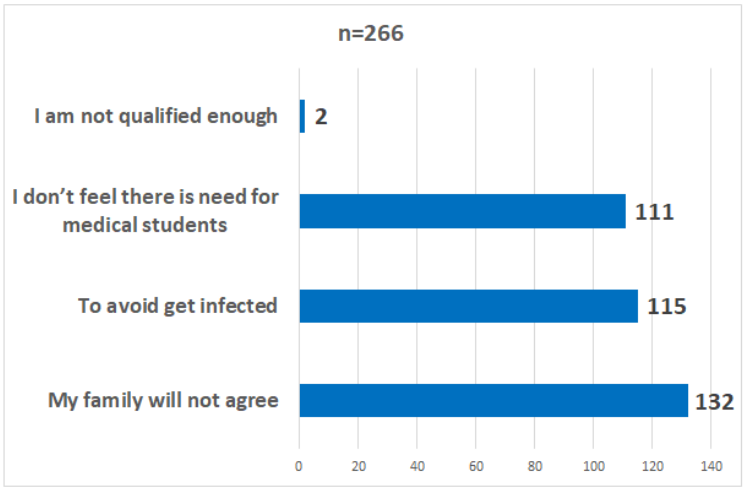

Figure 2: Number distribution of medical students by causes of not willing to participate in response to COVID-19 in Sudan.

Preferred sites	**Frequency(n=525)**	**Percent**
Call centers	209	33.6
Health education/awareness raising	352	56.6
Contact tracing	105	16.9
Treatment centers	119	19.1
Isolation centers	169	27.2
Research	225	36.2
Sterilization	140	22.5

Table 4: Preferred sites of medical student for voluntary participation in response to COVID-19 in Sudan 2020.

Factors	**P-value**	**OR (95%CI)**
Sex (male)	0.587	0.883 (0.563,1.384)
Academic year (final year students)	0.696	0.921 (0.607,1.395)
Sector (public)	0.167	0.702 (0.425,1.159)
Receiving infection control training	0.131	0.611 (0.323,1.158)
University (Khartoum university)	0.826	0.932 (0.496,1.750)
State (Khartoum state)	0.012*	0.541 (0.335,0.873)
Knowledge	0.492	1.2229 (0.689,2.167)
Attitude	0.066	0.578 (0.322,1.038)
Practice	0.508	0.855 (0.538,1.359)

Table 5: Results of multiple binary logistic regression analysis on factors associated with willingness to participate in effort to contain COVID-19 among medical students in Sudan.

4. Discussion

COVID-19 is an emerging problem which has affected all the people worldwide in different aspects like education, economic and psychology. For that involving all the resources you have and the defense lines including medical student is one of the essential steps to contain this pandemic. While in this, 81.4% agreed to participate in efforts to control COVID-19, they choose to work in araes not in a direct contact with patients but as health educators or in call centers therefore they will not consume limited personal protective equipment (PPE) and they will be safe from getting infection. In addition, this study revealed that the main reason for student not to participate is to avoid getting infected. Some authors emphasized that medical students are just learners and not an essential for diagnosing, treating and preventing COVID-19 [11]. Describing medical student's role as an excrescent patient care and non-essential hospital personnel which will lead to increasing exposure and transmission more over exhaustion of already limited personal protective equipment (PPE). Another reason mentioned is that they will face a struggle if they got infected because they will not be paid and they are not covered by the occupational Safety and Health Act.

Students at Harvard Medical School believed that medical student could participate in responding to the COVID-19 pandemic. They formed COVID-19 Medical Student Response Team, the basic goal ant the imapct which they wish is to stop needless mesiry from COVID-19. The Medical student Team contain two educational commision which provide medical education about COVID-19 for both medical and non-medical people and two activism commisions which provide volunteers who help health care workers and lessen the burden on them.During 5 days more than 500 medical students from Harvard Medical School alone joined the Response Team which indicate the strong will of these medical students to take role in COVID-19 pandemic reduction. The medical students who have volunteered their main assit was to help in childcare or grocery for health worker.The above mentioned study is correlated with this study in two points; the first is the strong willingness of medical student to take role in COVID-19 pandemic and the second is that the student participation is confined to non-direct patient care [12].

The association of American Medical College (AAMC) in the early days of the pandemic prevented medical student to take part in activities involving direct contact with cases.With time they realized that the reaction of medical students to this disruption has been fascinating. Their willingness to be in service and inovativeness are thrilling which assure the results in this study were the majority of medical students who participated showed a strong will to participate in COVID-19 pandemic control. So the AAMC released a guidance to participation of medical students depend on availability of PPE and COVID-19 testing availability. Our findings are similar to a survey done in 2019 at the National University of Ireland, Galway, demonstrating that 59% of participants were willing to volunteer in the event of an infectious crisis [13]. Most participants agreed that medical students should be encouraged to volunteer in a pandemic. In this study the attitude of student about COVID-19 was found to be high this finding is opposite to what has been found by Gouda and colleagues where the minority of students believed that they were prepared in terms of their current skills and experience [13]. Moreover student's knowledge about COVID-19 was found to be above average while the practice is average these findings are different in other works which highlight

that although the willingness to particpate is found , the knowledge and skills needed is not found which lead to more risk among both patients and students.

In addition to a study done in Belgium emphasized that medixal students are not conscious about the complications which company providing care to COVID-19 patients so they are not in place to take charge [13]. In the concern of knowledge, attitude and practice this study confirmed that medical student who participated had above average knowledge, high attitude and average practice. These results were consistent with study conducted out in Uganda where they concluded that the majority have good knowledge and positive attitude while half has a good practice [14]. The majority of medical student who has participated in this study had preferred to volunteer in non-patient contact services while at Aalborg University in Denmark final year medical students were drilled and placed to work in patient contact service as temporary residents, ventilator therapy assistants or nursing assistants [15]. This was based on the fact that this will contribute to medical student learning and will fulfill the student desire to help and their meaningful communion to care of patients or to reinforce clinicians in the frontline. Scientists from Switzerland, Australia and Canada uphold that medical students should be influenced to participate to the healthcare needed for this crisis, and learn from it [15]. This supports the idea behind this study.

5. Conclusion

The Mmajority of students stated that they are willing to participate in COVID-19 pandemic and the most common site area they are willing to participate in is provision of Hhealth aEducation and /A awareness raising campaigns. On the other side student who are not willing to participate almost half of them indicated that reason is to avoid getting infected. A quarter of the students confirmed that they participated in response to epidemic before. The majority of the participant mentioned that their main source of information is social media including student groups. The mean score of knowledge is average, for attitude is high, while for practice is low. The study showed that there is significant association between willingness of medical students to participate in effort to contain COVID-19 and state of residence and the over all score of attitude. Involvement of medical students in controlling of efforts to contain COVID-19 pandemic as a health educator, call center, contact tracing, treatment and isolation centers, research and sterilization should be considered by their faculties and by the ministry of health. Recruiting of medical students who are willing to participate and training them to fit in the role they would like to participate in. This could be enhanced by E establishing of Medical Student Response Team in every state with syncing with Federalpropoer coordination with Ministry of Health.

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Conflict of Interest Statement by Authors

Authors declare no conflict of interest in this research. There is no involvement of any organization or entity with any financial or non-

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