ORIGINAL ARTICLE

Awareness, Perception, and Practices Towards Blood Donation Among Undergraduate Health Science Students of India During the COVID-19 Pandemic

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Abstract To assess the awareness, perception, and practices of health science students towards blood donation during the COVID-19 pandemic. This cross-sectional study was done among the undergraduate medical, dental, physiotherapy, and audiology, speech and learning pathology students in May 2021. A self-administered questionnaire designed using Google Doc was used for data collection. Out of the 461 participants, only 171(37.1%) knew that Coronavirus was not transmitted through blood transfusion. Only 125(27.1%) participants knew that a minimum of 14 days is required before a donor who tested positive for COVID-19 can donate blood. As many as 339(73.5%) participants expressed their willingness to donate blood during the current pandemic. Having donated blood in the past ($p = 0.001$), having vaccinated with COVID-19 vaccines ($p = 0.029$), having taken both the vaccine doses ($p = 0.0499$), and absence of anaemia ($p = 0.0159$) were associated with willingness to donate blood during the pandemic. Only 83(18%) participants had donated blood after the onset of the pandemic. Out of the rest 378, 106(28%) participants did not donate blood due to the fear of getting infected with Coronavirus. Absence of chronic co-morbidities ($p = 0.0288$) was associated with the history of having donated blood after the onset of COVID-19 pandemic among the participants. Awareness of participants regarding certain key issues related to blood donation and COVID-19 were found lacking. Counselling services to alleviate fears associated with blood donation and awareness sessions to remove misconceptions are required among students to improve blood donation practices.

Keywords Blood donation · Health science students · Awareness · Perception · Practice

Introduction

The ongoing COVID-19 pandemic has disrupted health care and community operations worldwide. It has led to a shortage of essential medicines, equipment for personal protection, hospital beds, and health care personnel [1]. However, another lifesaving component that has not been adequately projected is the shortage of blood donations leading to a global shortage in the blood supply [1, 2].

The drop in voluntary blood donors has been reported in several European and Asia studies following the COVID-19 outbreak [3–6]. Number of stakeholders involved in managing blood centres and blood transfusion services have raised concerns regarding maintaining the safety of restrained gathering and social distancing during blood donation activities [7].

A number of other measures must be practised to ensure safety in the blood donation procedure during the current circumstances. The staff, donors, and visitors need to wear facemasks throughout, and utmost care needs to be taken to screen donors to ensure that people with any symptoms suggestive of illness are prevented from donating blood [7–9]. According to the Occupational Safety and Health Administration guidelines, staff at the blood donation

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centres need to also wear gloves and change gloves and wash hands between contacts from one donor to another. After each donor has vacated the station, disinfection procedures must be practiced consistently before setting the station for the new donor. All the equipment required for the blood donation process needs to be sterilized, and most of these should preferably be of a single-use type. [9] A gap of at least 6 feet needs to be ensured in the donors' waiting area and between blood donation cots during the bleeding procedure [7, 10].

All the donors need to ensure that a gap of at least 14 days is to be maintained after a positive COVID-19 test result [11]. Blood and its components collected from the donor within 14 days of disease onset need to be recalled [12].

Hence, several safety precautions must be ensured at blood donation centres to avoid COVID-19 transmission. The anxiety associated with the fear of getting infected with Coronavirus due to these concerns has been reported to be a major deterrent to the altruistic behaviour of blood donation [3, 4]. Added to this, the curbs in movement following a nationwide lockdown and the social distancing advised for preventing COVID-19 spread are being interpreted by the public as to not congregate for blood donation opportunities [1, 7, 13].

On the other hand, the pandemic has created a situation wherein adequate blood reserves are required for its control. Neutralizing antibodies in convalescent plasma donated by patients who recently recovered from this disease has been found to reduce the viral load and improve the prognosis among severe COVID-19 patients [14].

Thus with day to day rise in the number of active patients with COVID-19, the requirement of blood supplies and donated plasma for case management has become a global concern [11, 15]. The shortage of blood has affected the management of patients with other illnesses too. It has threatened the life of patients dependent on blood transfusion as a life-saving measure. This comprises patients with Thalassemia, ones who are critically ill, and accident victims [7]. Shortage of blood has also resulted in the postponement of elective surgeries [16].

Therefore, maintaining adequate stock of blood supply is a paramount concern during the ongoing pandemic. Reliable blood reserves can be ensured if there is regular blood donation practice among the eligible population. There have been reports of misconceptions about the transmission of COVID-19 among blood donors that have affected the blood donation rate [1]. There have also been concerns about minimal opportunities to donate, and concerns like feeling unfit to donate blood among university students in prior studies [17, 18]. Therefore, the current focus should be on building a sustainable platform for blood donors by improving awareness of its importance and correcting misconceptions. This should be equally complemented with an effective program for voluntary blood donors [19].

Health professional students form a potential pool of eligible blood donors [19]. Therefore, it is essential to study their motivation toward blood donation and how it has been impacted during the phase of this widespread illness. Therefore, this study was done to assess the awareness, perception, and practices of health science students towards blood donation during the ongoing COVID-19 pandemic.

Materials and methods

This cross-sectional study was done among undergraduate Medical, Dental, Physiotherapy, and Audiology, Speech and Language Pathology students of a Private University in Mangalore city of South India. The institutional ethics committee approved the study protocol and the study questionnaire. The Deans of the respective institutions gave permission. The study was conducted in May 2021 during the peak of the second COVID-19 wave, when several social restrictions and lockdown measures were in full swing.

In a study in Kangra, India [20], among medical students, 22.9% had donated blood in the past. Based on this finding, using the formula $Z\alpha^2pq/d^2$, the sample size comes to 323 at 95% confidence interval and 80% power. Adding 10% to incorporate non-response rate, the final sample size was taken as 355 participants. Only participants aged 18 years or above were included in this study. Non-consenting participants were excluded from this study. A self-administered questionnaire designed using Google Doc was used for data collection. It was content validated with the help of faculty members from the Department of Medical Education. It was further pilot tested among five students from each of the disciplines. After a few minor modifications following the pilot study, the final questionnaire was circulated among the students using WhatsApp.

The study information sheet and the consent form were at the questionnaire's start. Participants not consenting had the option to decline participation, leading to the submission of an empty questionnaire.

The questionnaire was semi-structured and was prepared using a review of related literature available from online sources. The first section of the questionnaire inquired about the basic demographic details of the participants. Other information such as underlying co-morbidities, history of allergic disorders, medication history, whether suffered from COVID-19 in the past and history of having

taken single or both doses of COVID-19 vaccines were also enquired.

Each of the other three sections enquired about awareness, perception, and practices towards blood donation among the participants.

Deferral from blood donation was taken as at least 14 days for those who tested positive for COVID-19 [21]. The minimum time gap between blood donations was taken as 3 months [22]. The period up to which individuals who received a COVID-19 vaccine can donate convalescent plasma was taken as 6 months [21]. Height and weight were self-reported by the participants. Body mass index (BMI) was categorized as per the Asia–Pacific classification [23].

Submitted responses were extracted from Google forms to MS Excel and were then transferred to IBM SPSS for Windows version 25.0, Armonk, New York for data analysis. The Chi-square test and Fisher's Exact test were used for testing association. The significance level was set at 5 percent.

The Cronbach's alpha value of the reliability of the questionnaire was found to be 0.868, indicating good internal consistency.

Results

Out of the total 461 participants, 364(79%) were MBBS, 79(17.1%) were BDS, 10(2.2%) were BPT, and 8(1.7%) were BASLP students. The mean age and standard deviation of the participants were 21.9 ± 1.6 years. Majority of them were females [279(60.5%)] and were native of urban areas [381(82.6%)]. 356(77.2%) participants were from nuclear, 70(15.2%) were from joint, and 35(7.6%) were from three generation families.

Only 171(37.1%) participants knew that the Coronavirus is not transmissible through blood transfusion. Only 125(27.1%) participants knew that a minimum of 14 days is required before a donor who tested positive for COVID-19 can donate blood (Table 1). Awareness regarding good practices to be followed by donors prior to donating blood such as taking sufficient rest, avoidance of alcohol consumption, avoidance of smoking, drinking plenty of water, taking iron supplements, and taking multi-vitamin supplements was known to 379(82.2%), 385(83.5%), 365(79.2%), 409(88.7%), 209(45.4%) and 189(41%) participants respectively.

As many as 359(77.9%) participants felt that the lack of blood donation by people during the current COVID-19 pandemic is leading to the shortage of blood for the patients. As many as 339(73.5%) participants expressed their willingness to donate blood during the current pandemic. The majority [271(79.9%)] thought so to help severely ill COVID-19 patients requiring blood components. 70(15.2%) were not sure, and the rest 52(11.3%) participants were not willing to donate blood during the current circumstances. Out of these 52 participants, 35(67.3%) felt so due to the feeling that social distancing measures are not adequately practiced at the blood donation centres (Table 2).

As many as 100(21.7%) participants had donated blood at any time in the past. The most common reasons for not donating blood among the rest 361 participants were age below 18 years [39(10.8%)], and lack of opportunity to donate blood [35(9.7%)]. 378 (82%) participants had not donated blood after the onset of the COVID-19 pandemic. Among them, 106 (28%) had not donated blood due to the fear of getting infected with Coronavirus (Table 3).

The other narrative comments given by participants were: awareness regarding the importance of blood donation needs to be propagated among people, particularly during the COVID-19 pandemic (by 4), blood donors after every blood donation need to be appreciated with non-monetary rewards (by 1), full aseptic precautions at hospitals need to be ensured during the COVID-19 pandemic for the safety of the blood donors (by 1), all voluntary blood donors need to register their names at the blood banks so that the donors can be informed as and when the need of blood arises (by 1), and people need to be made aware that donating blood is a safe procedure with no adverse effects provided the donors fulfill the eligibility criteria for blood donation (by 1).

Chronic co-morbidities were present among 40(8.7%) participants. Majority of them had allergic disorders (among 23), followed by anaemia (among 7), followed by asthma (among 6), and epilepsy (among 3) in addition to other co-morbidities. 101(21.9%) participants reported history of allergy to any substance. Blood thinners and anti-cancer drugs were taken by 2 participants each.

410(88.9%) participants were vaccinated for COVID-19. The most common vaccines taken by them were Covishield [373(91%)] and Covaxin [34(8.4%)]. Moderna, Pfizer, and Sinopharm was taken by 1(0.2%) participant each.

Having donated blood in the past, having been vaccinated with COVID-19 vaccines, having taken both the vaccine doses, and absence of anaemia were associated with willingness to donate blood during the current pandemic among the participants (Table 4).

Male participants and those without chronic co-morbidities donated blood significantly more in the past in comparison to others. Absence of chronic co-morbidities was associated with a history of having donated blood after the onset of the COVID-19 pandemic among the participants (Table 5).

Table 1 Awareness of participants regarding issues concerning blood donation during the COVID-19 pandemic (n = 461)

Awareness regarding	Number	Percentage
Coronavirus is transmissible by blood transfusion		
No	171	37.1
Minimum duration of postponement of blood donation for a donor who tested positive for COVID-19		
14 days	125	27.1
Deferral time for donors who were vaccinated with an inactivated viral vector vaccine or other RNA based vaccines		
There is no deferral time	21	4.5
Individuals who received a COVID-19 vaccine can donate convalescent plasma		
Yes, they can	182	39.5
If yes, within how many months? (n = 182)		
6 months	13	7.1
COVID-19 patients after complete recovery have plasma antibodies that can help other patients with life-threatening COVID-19		
Yes	306	66.4
Awareness regarding the frequency of blood donation		
Once in 3 months	20	4.3
Blood donors need to be screened for COVID-19		
No need	36	7.8

Table 2 Perception towards blood donation among the participants during the COVID-19 pandemic (n = 461)

Perception towards	Number	Percentage
Lack of blood donation by people during the current COVID-19 pandemic is leading to a shortage of blood for patients		
Yes	359	77.9
Willingness to donate blood during the current pandemic if the need arises		
Yes	339	73.5
*Reasons stated for expressing willingness towards blood donation during the current pandemic (n = 339)**		
To help severely ill COVID-19 patients requiring blood components	271	79.9
Being physically fit with good blood count	199	58.7
To meet blood requirements at various health facilities	124	36.6
Inspired by other blood donors who are friends or relatives	55	16.2
*Reasons stated for not expressing willingness towards blood donation during the current pandemic (n = 52)**		
Lack of social distancing measures at blood donation centres	35	67.3
Blood donation makes one feel physically weak	32	61.5
Fear of acquiring infection with COVID-19	24	46.1
Lack of trust in aseptic measures practiced at the blood donation centres	22	42.3
Blood donation should be promoted among people during the prevailing COVID-19 pandemic		
Yes	376	81.6
Willingness to promote blood donation drive among family members and friends		
Yes	364	79.0

*Multiple responses

Discussion

The need to improve awareness regarding blood donation among health science students features among the list of recommendations framed by the World Health Organization [17]. They being a young population, constitute an eligible group for donating blood.

Just over one-third of the participants in this study knew that Coronavirus is not transmissible through blood and blood products. This indicates inadequate awareness

Table 3 Blood donation practices among the participants (n = 461)

Practices	Number	Percentage
Donated blood in the past		
Yes	100	21.7
Reasons for not having donated blood so far (n = 361)*		
Was below 18 years of age and hence was not eligible	39	10.8
Lack of opportunities	35	9.7
Due to anaemic status in the past	34	9.4
Due to underweight status	12	3.3
History of donating blood after the onset of COVID-19 pandemic		
Yes	83	18.0
Reason for not donating blood after the onset of COVID-19 pandemic (n = 378)*		
Due to fear of getting infected with Coronavirus	106	28.0
Lack of opportunities	22	5.8
Due to lockdown	8	2.1

*Multiple responses

Table 4 Factors associated with willingness to donate blood during the current COVID-19 pandemic among the participants

Factors	Willingness to donate blood during the current pandemic		Total	Chi-square value, *p* value
	Yes(%)	No/Not sure(%)		
Coronavirus is transmissible by blood transfusion				
No	133(77.8)	38(22.2)	171	
Yes/Not sure	206(71.0)	84(29.0)	290	$X^2 = 2.514$, $p = 0.113$
Having donated blood in the past				
Yes	87(87)	13(13)	100	
No	252(69.8)	109(30.2)	361	$X^2 = 11.896$, $p = 0.001$
Current status of anaemia				
Yes	2(28.6)	5(71.4)	7	
No	337(74.2)	117(25.8)	454	$p = 0.0159$
COVID-19 vaccine				
Taken	308(75.1)	102(24.9)	410	
Not taken	31(60.8)	20(39.2)	51	$X^2 = 4.791$, $p = 0.029$
Total	339	122	461	
Number of doses of COVID-19 vaccines taken so far				
One	86(68.8)	39(31.2)	125	
Two	222(77.9)	63(22.1)	285	$X^2 = 3.846$, $p = 0.0499$
Total	311	102	410	

among students regarding the transmission of COVID-19. Awareness was however not associated with their perception towards willingness to donate blood. Even then, it becomes essential to correct this misconception among the health science students so that they provide correct information to others. Communication promotes a positive blood donation attitude and helps sustain the blood donor program by encouraging the first donation and repeat donations thereafter [24].

About three in four participants in this study expressed their willingness to donate blood during the ongoing pandemic. The majority wanted to donate blood to help COVID-19 patients with severe illnesses who require blood components. Similar observations were made in a study done in USA [19] where 91% of medical students expressed their willingness to donate blood, despite the pandemic. This reflects strong altruism among young medical students to donate blood in times of medical emergencies. In another study done in Sudan, majority of

Table 5 Factors associated with the history of having donated blood in the past/after the onset of COVID-19 among the participants

Factors	Donated blood in the past		Total	Chi-square value, p value
	Yes(%)	No(%)		
Gender				
Males	58(31.9)	124(68.1)	182	
Females	42(15.1)	237(84.9)	279	$X^2 = 18.333, p < 0.001$
Presence of chronic co-morbidities				
Yes	3(7.5)	37(92.5)	40	
No	97(23.0)	324(77.0)	421	$p = 0.0254$
Total	100	361	461	

Factors	Donated blood after the onset of the COVID-19 pandemic		Total	p value
	Yes(%)	No(%)		
Presence of chronic co-morbidities				
Yes	2(5.0)	38(95.0)	40	
No	81(19.2)	340(80.8)	421	$p = 0.0288$
Total	83	378	461	

participants (63.4%) were willing to donate blood during the pandemic if they got regular invitations. Other reasons stated for agreeing to blood donation in the same study were: control of the pandemic (52.4%), provision of better transportation facilities (29.6%), and provision of incentives for donating blood (6.5%) by the participants [25]. Provision of donor transportation facilities, switching sites for blood collections, and scheduling appointments for blood donations feature among the suggested measures by the WHO to ensure safety during blood donation [12].

As many as 11.3% of participants in this study were not willing to donate blood during the current pandemic. The most common reason being concern regarding inadequate social distancing measures at blood donation centres. Such concerns need to be alleviated among students by reassuring them of the various safety precautions being implemented at the blood donation centres.

In the present study, factors associated with willingness to donate blood during the current pandemic among the participants were: history of having donated blood in the past, absence of anaemia, having taken the COVID-19 vaccine, and having taken both COVID-19 vaccine doses. This was different from the findings of the study done in USA, where having donated blood in the past was not associated with the present willingness to donate blood during the current pandemic [19].

In relation to the practice of donating blood, as many as 82% participants in the present study did not do so after the onset of the COVID-19 pandemic. The most common reason for this being the fear of getting infected with Coronavirus, followed by the lack of opportunities to donate blood. This meant that counselling services and

more opportunities need to be given by the blood banks to improve the participation of medical students in blood donation activities during the current pandemic. In other studies, reasons for lapse from blood donation during the ongoing pandemic were: to avoid Coronavirus infection (60.6%) [25], time constraints (40.2%) [25], transportation problems (32.5%) [25], inconvenience to travel to the blood donation centre (6.1%) [25], medical ineligibility (6.5%) [25], inconvenient timings of the blood bank centre (4.2%) [25], concern about their personal safety (3%) [19], and fear of needles or blood (1.2%) [25]. The various donation-related fears might adversely affect the recruitment and retention of donors. Mass media can play an important role here by removing misconceptions and reaffirming the safety of the blood donation procedure among the donors to maintain an adequate blood supply [1]. Blood collection centres also need to ensure minimum donor exposure while procuring blood [1]. The presence of mobile blood collection units might be a solution to address transportation problems causing barriers to blood donation [25].

To enhance the involvement of medical students as donors, in campus blood donation drives need to be organized by following all COVID-19 appropriate preventive measures. This will ensure accessibility among donors despite the restricted mobility imposed by the lockdown [1]. A registry needs to be prepared with a list of all interested students, and it needs to be shared with the local blood banks. This will ensure adequate opportunities to donate blood [19]. Added to this, regular notifications need to be given to students through social media, WhatsApp, and emails about upcoming blood donation events [19].

Social media networks were reported to be an effective medium for sharing blood donation requests by Abbasi et al. [26].

In studies done in Saudi Arabia [6] and China [4], 39.5% and 67% reductions were seen in the number of blood donors after the COVID-19 outbreak. In the European study, half of the blood donors declared that they had donated less than usual frequency after the pandemic onset. Participants in the European study who anticipated high risk of infection and those who were adherent to COVID-19 appropriate behaviour like social distancing measures were significantly less likely to donate blood. History of more blood donation activities in the recent 2 years, young age and participants employed in educational or health sectors were more likely to donate blood during the current crisis [27]. In the present study, the absence of chronic comorbidities among the participants was associated with the history of having donated blood after the onset of the COVID-19 pandemic.

Conclusion

Awareness of participants about certain key issues related to blood donation and COVID-19 was lacking. However, three-fourths of them expressed their willingness to donate blood. More than 80% of the participants had not donated blood after the onset of the pandemic. This was mainly because of the fear of getting infected with Coronavirus. Hence, counselling services and awareness sessions are required among students to improve their blood donation practices. The factors identified to be associated with willingness and reluctance to donate blood in this study are relevant in the context of this pandemic. These need to be addressed to improve blood donation in the setting.

Limitations

There is a possibility of not disclosing information related to the perception and practices towards blood donation among the participants in this study.

Declarations

Conflict of interest The authors declare that they have no competing interests.

Ethics Approval This was obtained from the institutional ethics committee with reference number IEC KMC MLR 05–2021/179 dated 20th May 2021 and was in accordance with the 1964 Helsinki declaration.

Informed Consent Written informed consent to participate was taken from the participants.

Data Protection, Confidentiality and Privacy The participants were informed that the data generated as a part of this study would be used for research purposes only. Complete anonymity of the information provided was ensured to them.

Consent to Publish The participants were also informed that the data generated as a part of this study would be used for publication.

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