

Impact of COVID-19 pandemic on blood donation during 1st wave in India: Understanding regular blood donors and non-blood donor's perspective, attitudes, and practices



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ABSTRACT

Background: COVID-19 is an emerging and rapidly evolving situation globally, and it poses additional burden for emergency health care services especially the transfusion medicine and the need of an hour to safeguard our regular blood donors. **Aim and Objectives:** The study aims to find out the proportion of COVID-19 infection among blood donors and non-blood donors (NBDs) and to assess their behavioral risk factors that predispose to COVID-19. **Materials and Methods:** A case-control study was conducted among regular blood donors and non-blood donors at the department of transfusion medicine attached to tertiary care hospital with an objective to find out the proportion of COVID-19 status and the risk factors associated with its occurrence. **Results:** Total of 834 participants involved in our study. Accordingly, we found the proportion of COVID-19 to be 9% among regular blood donors and 2% among NBDs. A significant association was noted with regular going out, co-morbidities, B positive blood group and perceived stress as the risk factors in regular blood donors. Moreover, among NBDs maintaining social distancing and regular washing of hands/ use of sanitizers were significant factors. **Conclusions:** The novelty of this study helps to remake our policies concerned mainly on the protection of our potentially emergency service providers against COVID-19 infection.

Key words: Attitude; COVID-19; First wave; Knowledge; Non-donors; Practices; Regular blood donors

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INTRODUCTION

SARS-CoV-2 (COVID-19) has been the emerging infection throughout the world in the past 1 year.¹ The blood transfusion services have been disrupted in 23% of countries as per WHO global pulse survey.² As per World Health Assembly resolution WHA63.12 adequate and reliable supply of safe blood can be assured by a stable base of regular, voluntary, unpaid blood donors and to work toward the goal of self-sufficiency.³ However, when compared to the developed countries, developing

countries have never been able to reach the goal of self-sufficiency.⁴ While globally the rate of blood donation declined drastically during the pandemic, the requirement for blood remained constant in developing countries. The rate of blood donation in the country amounts to only 1% of the population, and the pandemic only compounded the issue.⁵ India faced a huge shortage of blood due to strict Lockdown measures, social distancing norms, cancellation of various blood drives, and low donor turnout due to COVID-19 pandemic. Various Studies during this pandemic period reported fear of contracting COVID-19 as a

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primary deterrent for donating blood apart from Lockdown measures imposed to minimize disease transmission.⁶⁻⁸ COVID-19 pandemic added to the existing crisis of blood donation services stressing on the need to adopt to new policies for the protection of blood donors. As this became a major cause of concern, the Ministry of Health and Family Welfare and the National Blood Transfusion Council issued guidelines for safe donation of blood during the ongoing pandemic for the safety of both donors, and the drive organizers.⁹ The guidelines emphasized the continuity of supply of safe blood and recommended reinstating both outdoor and in-house donations, in compliance with social distancing standards, biomedical-waste disposal rules, and infection control guidelines.

Aims and objectives

Therefore, an attempt has been made to take up this questionnaire-based study with aims and objectives to know the impact of COVID-19 on blood donation during first wave and to understand perspective of a voluntary regular blood donor (VRBD) and non-blood donor (NBD). On identification of these factors, we can ameliorate and implement strategies for blood donor motivation, recruitment and retention of donors in times of crisis.

MATERIALS AND METHODS

Study design

A case-control, hospital-based study adjusted by matching with age among the voluntary blood donor group and NBD group.

Study setting

Transfusion medicine department, tertiary care hospital attached to medical college located at Hyderabad, India.

Study participants

VRBDs in the age group of 19–40 years (both males and females) who has donated blood at the blood center between April to September 2020, fulfilling the accepted criteria of regular voluntary blood donors (RVBD) as per the definition provided by the National AIDS Control Organization guidelines (NACO) were included.

Operational definition

As per NACO guidelines, a voluntary non-remunerated blood donor who has donated at least 3 times, the last donation being within the previous year, and continues to donate regularly at least once per year are defined as regular blood donors has been considered for our study.¹⁰

NBDs were defined as those who have never ever donated blood. Age criteria were adjusted by matching with age among the RVBD.

Trends of blood donation observed at our institute blood bank are briefed in figure 1.

Study period

October–December 2020.

Sample size

Taking the proportion of 50% as it is unknown; the sample size was calculated using the formula n (each group) = $(p_0q_0 + p_1q_1) (z_{1-\alpha/2} + z_{1-\beta})^2 / (p_1 - p_0)^2$ we get 384; to overcome non response we have included 417 in each group.

Sampling method

Simple random sampling was adopted by picking random numbers enlisted in the available registry of VRBDs at our department and NBDs were taken from general population using snow ball technique of known contacts of our team.

Data collection tool

Data were collected after taking the contact details from the registry maintained with the blood center. All the participants were contacted on phone and explained about the importance of the study. Google forms were entered by the trained team of Community Medicine and Transfusion Medicine. The following details were enlisted such as socio demographic variables; History of COVID-19, following COVID-19 appropriate behavior such as frequency of social movement, maintenance of social distancing, maintaining respiratory etiquette and hand hygiene. The questions related to COVID-19 appropriate behavior was 4-item self-reported instrument with a 4-point Likert scale rated from “very often” to “never” which was self-developed and validated after pilot testing on 20 subjects. The higher the score the greater the chances of risk of acquiring COVID-19 infection. The internal consistency between the items in the scale was calculated using reliability analysis and Cronbach’s alpha value was 0.726.

The second item psychological stress during COVID-19 pandemic was assessed using by PSS-4 scale which is economical and simple instrument to assess current perceived levels of stress in the last 1 month. Subjects’ responses are measured on a five-point scale (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often). Scoring was obtained by summing across all four items. Items 2 and 3 require reverse coding. The score ranges from 0-16 where the higher score was indicating the higher perceived stress. This was developed by Sheldon Cohen in the year 1983 and its free to use the scale universally.¹¹ Stress control activities, history of comorbidities such as diabetes, hypertension, immunosuppression, cardiac disease, and others were also elucidated. Their willingness to donate blood and other components were also assessed

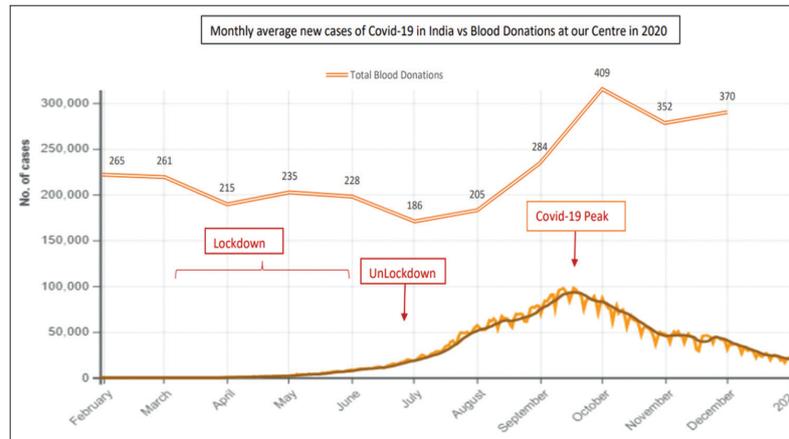


Figure 1: Monthly average new cases of COVID-19 in India versus total blood donations during 2020 at our blood center
 Source: Wikipedia https://en.wikipedia.org/wiki/Statistics_of_the_COVID-19_pandemic_in_India accessed on 25-04-2021

through questionnaire (Annexure 1). At the end of the questionnaire donors were informed regarding deferral periods for donation due to COVID-19, guidelines for Convalescent plasma donation, and the participants were asked to have a virtual tour of blood center premises via link available on YouTube to know the operational changes implemented to protect the donors. The participants were informed regarding SARS-CoV-2 antibody testing which was additionally performed. Informed consent was obtained by telephonic conversation. Institutional ethical committee clearance was obtained with IEC No. ESICMC/F0266/2020.

Statistical analysis

Data were entered in Microsoft excel 2010 and analyzed. Descriptive statistics such as proportions and mean + standard deviations were interpreted. Independent t test analysis was used to predict various factors on comparison between regular blood donors and NBDs with P value to be significant at <0.05. To predict the strength of association Chi-square and odds ratio was calculated by modifying in to 2x2 table for categorical variables between regular blood donors and NBDs.

RESULTS

The number of regular blood donors contacted by our trained team were 454, of whom 28 were not willing to participate and 9 of them were not sure of the responses provided, so they were excluded and the required 417 were included in regular blood donors group. NBDs contacted were 421, of whom 4 have not given their consent and so were excluded. Thereby a total of 834 participants were included in the study with equal number in each group.

The participants were categorized based on sociodemographic profile and distributed according to

age, sex, marital status, education, and occupation in both groups (Table 1).

The mean age group among VRBD group was 31.249±6.578 years and among NBD group was 27.588±6.875 years. Majority of the participants in VRBD group were married (62.4%) while in NBD group was unmarried (61.9%). Of the 834 participants enrolled in the study, 776 (93%) were male and 58 (7%) female. Based on education, the majority of participants (63%) were graduates and above.

Proportion of COVID-19 history among regular blood donors (Cases) and NBDs (Controls)

On analysis of data, history of COVID-19 infection was elicited among 37 (9%) VRBD and 9 (2%) NBD. Among the VRBD group, high proportion of COVID-19 infection was found in those with the blood group of B Positive 12 (32.4%) followed by A Positive 10 (27%), and O Positive 9 (24.4%) which was found to be statistically significant (Chi-square 19.828 and P=0.003); Whereas among NBDs, it was found equally among A positive 4 (44%) and B Positive 4 (44%) and 1(12%) in AB Negative group without any statistical significance (Chi-square 3.076, P=0.799). There was no statistical significance established with other socio demographic variables such as age, gender, education, and occupation of the participants.

COVID-19 appropriate behavior (practices) among VRBDs and NBDs

COVID-19 appropriate behavior was assessed between VRBD and NBD using independent t-test (mean scores±standard deviations), where VRBD group were significantly associated with regular social movement (P=0.00001), wearing masks (P=0.0001) and following hand hygiene (P=0.0000001). While NBD group were significantly maintaining social distancing (P=0.002) (Table 2).

Perceived stress among regular blood donors and NBDs

Practice of stress controlling activities (cycling/walking, yoga and meditation) was observed among 197 (47.2%) of VRBD and 145 (34.8%) of NBD. Higher Perceived stress scores were found in VRBD in comparison to the NBD and was found to be statistically significant (P=0.00000011) (Table 3).

History of tobacco usage and alcohol consumption was found among 204 (49%) VRBD and 162(39%) NBD. History of comorbidities was elicited among 18 (4.3%) VRBD and 7 (1.6%) NBD. Among VRBD common co-morbid conditions were diabetes mellitus 13 (72%) and hypertension 5 (28%), while among the NBD were diabetes mellitus 3 (43%), hypertension 2 (28.5%), and thyroid disorders 2 (28.5%). Association of either of the comorbidities and COVID-19 status was found significant among regular blood donors (Figure 2).

Among the study participants 386 (92.6%) VRBD and 202 (48.4%) NBD were willing for future blood donations. 7.4% of VRBD stated fear of contacting Covid-19 as a deterrent factor for blood donation.

Table 1: Sociodemographic characteristics among regular blood donors and NBDs

Sociodemographic variables	VRBDs (n=417)	NBDs (n=417)
Mean Age	31.249±6.578	27.588±6.875
Sex		
Males	412 (88.9)	364 (87)
Females	5 (1.1)	53 (13)
Marital status		
Married	260 (62.4)	159 (38.1)
Unmarried	157 (37.6)	258 (61.9)
Education		
Uneducated	14 (3.4)	10 (2.4)
Up to 10 th standard	62 (14.9)	88 (21.1)
Up to 12 th standard	74 (17.7)	61 (14.6)
Graduate	215 (51.5)	207 (49.6)
Post graduate	52 (12.5)	51 (12.2)
Occupation		
Government employees	9 (2.1)	12 (2.9)
Health care workers	25 (6)	22 (5.3)
Business	34 (8.2)	54 (12.9)
Self employed	66 (15.8)	66 (15.8)
Private	261 (62.6)	176 (42.2)
Others	22 (5.3)	87 (20.9)

NBDs: Non-blood donors, VRBDs: Voluntary regular blood donors

DISCUSSION

COVID-19 pandemic has impacted globally on health care resources and blood transfusion services, that relied on regular blood donors was severely curtailed due to strict lockdown measures imposed and fear of acquiring COVID-19 infection. Most of the donations that occurred during the pandemic were by altruistic donors who came forward to donate blood based on blood center generated/online requests. Our study provides a unique opportunity to compare the proportion of COVID-19 infection among VRBD and NBD during the first wave of COVID-19 pandemic; to assess their behavioral risk factors that predispose to COVID-19 and their willingness to donate blood in future.

History of COVID-19 was found to be more among the regular blood donors (9%) on comparison with NBDs (2%). There is a wide variation of seroprevalence among blood donors varying from 2.7% to 37%, which could be explained by studies carried out over a varied period of time.¹²⁻¹⁴ According to their biological factors distribution, age and blood group were considered where we have observed that mean age of occurrence of infection was at the mean age of 31.21±5.44 years among regular blood donors compared to NBDs where the mean age was 26.222±7.013 years. There was no significant association with age, gender and level of education. Contrast to our study Filho et al., in Rio de janerio among voluntary blood donors found proportion of COVID-19 as 4% with higher risk among younger participants, those without formal education, increased social movement and not following social distancing.¹⁵ On comparison within blood groups, COVID-19 status was found to be more among B positive followed by A positive and O positive among regular blood donors whereas among NBDs it was highest among A positive followed by B positive and AB Negative. Ellinghaus et al., in their case control study among Italians and Spanish epicenters found higher risk of COVID-19 in blood group A compared with other blood groups (odds ratio, 1.45; 95% CI, 1.20–1.75; P=1.48×10⁴) and a protective effect in blood group O as compared with other blood groups (odds ratio, 0.65;95% CI, 0.53–0.79; P=1.06×10⁵).¹⁶ While Leaf et al., USA, found higher risk of Covid-19 with B positive blood group (42.7%) among Black non-Hispanics, A positive blood group (38%) among

Table 2: Mean scores of COVID-19 appropriate behavior among regular blood donors and non-donors

COVID appropriate Behaviour/measure	VRBDs (n=417)	NBDs (n=417)	P value
Regular social movement	2.043±0.913	1.468±0.627	0.00001
Maintaining social distancing	1.170±0.430	1.460±0.579	0.002
Wearing masks	4.820±0.437	4.532±0.646	0.0001
Hand hygiene	1.367±0.539	1.132±0.415	0.0000001

NBDs: Non-blood donors, VRBDs: Voluntary regular blood donors

Table 3: Comparison of total perceived stress score among regular blood donors and NBDs

Perceived stress score (Total)	Regular blood donors	NBDs	P value
	3.940+3.996	0.539+1.359	0.00000011

NBDs: Non-blood donors

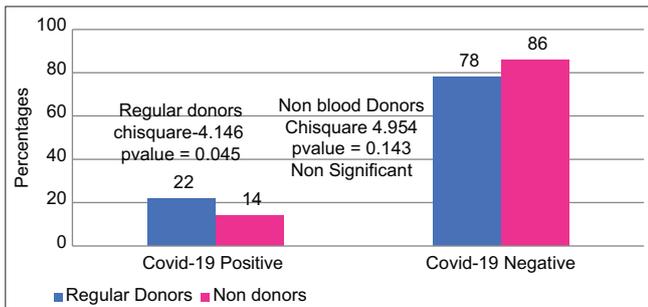


Figure 2: Association of comorbidities and COVID-19 status among the regular blood donors and non-blood donors

White non-Hispanics, AB positive blood group (12.4%) among Asian non-Hispanics.¹⁷

Role of COVID-19 appropriate behavior was also stressed in our study with statistically significant factors such as maintaining social distancing among NBD. Moreover, among VRBD regular social movement and perceived stress played significant role thereby focusing on altruistic nature of the blood donors. Kim et al., mathematical model demonstrated the importance of these COVID-appropriate measures in reducing and delaying COVID-19 pandemic outbreaks.¹⁸

Association of addictions such as tobacco and alcohol usage with increased risk of COVID-19 infection was found significant in our study. Brake et al., also explained increased susceptibility to COVID-19 by tobacco usage which is related to an up regulation of the angiotensin-converting enzyme-2 receptor.¹⁹ Molina et al., stated that alcohol usage causes immunosuppressing effects, violation of COVID-19 appropriate behavior and increase in impulsive behavior.²⁰

Our study also found highest proportion of those willing for blood and other component donation among regular blood donors compared to NBDs while VRBD stated fear of contacting COVID-19 as a deterrent factor for blood donation. Similar responses were elicited by Masser et al., in their UK respondents where the main motivation to donate was altruism from adversity, sense of pay-it-back and pay-it-forward reciprocity, moral and civic duty while barriers to donating were donation fears, lack of trust in institutions, fear of re-infection, risk to self and social stigma attached

to COVID-19. Of these, generic fears were the biggest barrier with a fear of needles being a particular deterrent.^{8,21}

Limitations of our study

We might require to determine the level of antibodies which can be taken up in future studies.

CONCLUSIONS

We have found the VRBD were at significant risk due to regular social movement, perceived stress with comorbidities, and individuals with Blood group B positive; however, the same was not noticed with NBD due to maintaining social distancing, washing hands/use of sanitizers. A two-pronged approach should be implemented to retain VRBD and strategies to motivate NBD during crisis times. To safeguard our regular blood donors, we would recommend stress reducing strategies, adopting COVID-19 appropriate behavior, the management of comorbidities and counselling services to prevent the occurrence of COVID-19 infection. Further implementing donor retention strategies like appreciating VRBD during blood donations and on special occasions will help to retain donors that will motivate 1st time donors as well. Motivating NBDs requires targeted strategies directed to change donation behavior through campaigns to evoke altruistic behavior during crisis, reassure donors of the safety measures in place through social media and incentivized with COVID-19 antibody tests.

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Authors Contribution:

SRC- Concept and design of the study; **SB-** Statistical analysis, Interpreted the results; reviewed the literature, manuscript preparation and drafting; **RKB-** coordination; **UR-** Revision of draft

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ANNEXURE-1

Blood safety and COVID-19 pandemic: Risk assessment among regular blood donors and Non Blood donors

Questionnaire- for research purpose only

1. Place of Residence:
2. Age
3. Gender
4. Marital Status
5. Educational status
6. Occupation/Profession
7. Number of previous blood/platelet donations
8. Last donation date
9. If donated earlier, Hemoglobin during last Blood donation
10. How are you feeling today?
 - Good
 - Sick/Unwell
11. Do you have habit of taking any of the following?
 - Regular Smoking
 - Occasional/social smoker
 - Regular Alcoholic
 - Occasional/Social alcoholic
 - Any other substance abuse
 - Nil
12. Do you have any of the following health problems
 - Diabetes
 - Hypertension
 - Endocrine disorders
 - Others
13. Are you on any Medication?
 - Yes
 - No
14. How frequently are you going out during this pandemic?
 - All the time
 - Most of the time
 - Rarely
 - Not going out
15. How frequently are you maintaining social distancing to protect yourself and people around you during this pandemic
 - All the time
 - Most of the time
 - Rarely
 - Not maintaining social distance
16. Do you agree that Maintaining Social distancing is important during the current pandemic?
 - Strongly disagree
 - Disagree
 - Neutral
 - Agree
 - Strongly Agree

17. How frequently are you wearing Mask/face shields to protect yourself and people around you during this pandemic
- All the time
 - Most of the time
 - Rarely
 - Not using masks
18. Do you agree that it is very important to wear masks while in public places during the current pandemic?
- Strongly disagree
 - Disagree
 - Neutral
 - Agree
 - Strongly Agree
19. How often you wash your hands or sanitize?
- All the time
 - Most of the time
 - Rarely
 - Not using Sanitizer
20. In the last month, how often have you felt that you were unable to control the important things in your life?
- 0- Never
 - 1- Almost Never
 - 2- Sometimes
 - 3- Fairly Often
 - 4- Very Often
21. In the last month, how often have you felt confident about your ability to handle your personal problems?
- 0- Never
 - 1- Almost Never
 - 2- Sometimes
 - 3- Fairly Often
 - 4- Very Often
22. In the last month, how often have you felt that things were going your way?
- 0- Never
 - 1- Almost Never
 - 2- Sometimes
 - 3- Fairly Often
 - 4- Very Often
23. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
- 0- Never
 - 1- Almost Never
 - 2- Sometimes
 - 3- Fairly Often
 - 4- Very Often
24. Do you follow any stress control activities?
- Meditation
 - Yoga
 - Walking/Cycling
 - Any other activities
 - None

25. Have you been under quarantine or isolation in last 3 months
 Yes
 No
26. Have u ever been tested positive for Covid-19
 Yes
 No
27. If Yes, Date of Covid-19 Positive diagnosis: _____
28. If tested positive anytime, did you get your negative test done ?
 Yes
 No
29. If YES, Date of negative test report _____
30. Did you have any of the following Covid19 -related symptoms in last 3 months/post blood donation
 Fever
 Sorethroat
 Headache/Bodyaches
 Cough
 Difficulty breathing
 Other symptoms
 No symptoms
31. If yes Date of onset of symptoms: _____
32. Have you been hospitalized in last 3 months/post blood donation.
33. Have any of your close contacts tested positive for Covid.
 Yes
 No
34. Did any of your close contacts develop any of the following Covid19 -related symptoms in last 3 months ?
 Fever
 Sorethroat
 Headache/Bodyaches
 Cough
 Difficulty breathing
 Other symptoms
 No symptoms
35. Have any of your close contacts been hospitalised in the last 3 months ?
36. Are you willing become a plasma donor for any other Covid patients who are in need.
 Yes
 No
37. If No, Reason for not willing to donate ?
 Becoming weak after donation
 Fear of losing all antibodies after donation
 Any other: _____