



Assessing Knowledge, Attitudes, and Practices of Blood Donors in India during the Covid-19 Pandemic: A KAP Analysis Study

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Authors' contributions

This work was carried out in collaboration among all authors. Conceptualization and methodology was done by authors PK and RK. Original drafting review and editing was done by authors PK, RK and SR. Authors SK, RJ and BB gave the final approval of the version to be published. All authors read and approved the final manuscript.

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ABSTRACT

Background: An awareness of knowledge, attitudes, and practices (KAP) of blood donors towards COVID-19 pandemic is essential to avoid blood inventory crisis. It is therefore necessary to gain a perspective on the impact of COVID-19 on attitude of blood donors and an understanding of the key aspects of their motivation.

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Methods: A prospective longitudinal study was conducted at The Department of Immunohematology and Blood Transfusion at a tertiary care teaching hospital in India over four months spanning over December 2021 to March 2022. The chi-square analysis was performed to evaluate the relationship of knowledge, attitude & practices of donors with their demographic parameters. A p-value of less than 0.05 was considered significant at a confidence interval (CI) of 95%.

Results: A total of 632 donors were included in the study and assessed for donor attitude and fear factors related to blood donation during COVID-19 pandemic. The mean age of the study population was 31 years. In terms of donor attitude, most common positive attitude was that they “would donate blood in the blood center where mask and sanitizer are available for all staff and blood donors”. Most common negative attitude was that “they had been in close contact with a patient who had a respiratory infection, so they should not donate blood”. Among the demographic variables, residential status, education & donation frequency showed a significant ($p < 0.05$) association with donor attitude factors while its association with age and gender was found to be statistically insignificant ($p > 0.05$).

Conclusions: Adequate sharing of information and proper communication of the precautionary measures at blood centers to contain the spread of covid-19 infection and effective counseling would help in motivating and retaining blood donors. Interventions should be implemented directed at donor population to create awareness and neutralize the myths associated with blood donation during COVID-19 pandemic.

Keywords: KAP; covid-19; fear factor; donor attitude; blood donor; counseling.

ABBREVIATIONS

KAP : Knowledge Attitude Practice
SPSS : Statistical Package for Social Science
PAF : Positive Attitude Factor
NAF : Negative Attitude Factor
NBTC : National Blood Transfusion Council
SBTC : State Blood Transfusion Council
WHO : World Health Organization

1. INTRODUCTION

Blood transfusion services are an indispensable part of health care in all medical disciplines, as they play a vital role in saving lives of patients with bleeding disorders, accidents, surgeries, inherited/acquired hematological diseases and malignancies [1]. Voluntary, non-remunerated blood donors are the basis of safe and adequate supply of blood and blood components [2]. The job of recruiting voluntary blood donors remains one of the major challenges for any blood transfusion services. Since 2019, Wuhan, China, has been the source of the severe acute respiratory illness, also known as COVID-19/Corona virus disease [1]. The effectiveness of vaccines and specific treatments for COVID-19 has not yet been established [2]. The continuous flow of blood to a blood centre depends heavily on blood donation [3]. This emerging pandemic, along with widespread lockdown and curfews, dealt a severe blow to the blood transfusion services. The numbers of potential donors were often reduced due to the strict selection criteria

that were imposed to ensure the safety of the blood supplies. In addition to this, the blood centres found it difficult to recruit new donors and retain them to arrange a regular blood supply for needy people. Blood transfusion services asked frequent voluntary blood donors to top off the blood centre's stock when there was a shortfall. Multiple facets of one's perspective toward life were impacted by the COVID-19 pandemic [4–8]. This is important to identify any change in blood donor attitude towards blood donation. Corrective actions can be taken once the problem is identified. Survey based studies are instrumental in reaching out to wider population in an anonymous way to explore the attitude related issues vis-à-vis a condition in questions like that of blood donation during COVID-19 [9-10]. The study aimed to analyze the knowledge, attitudes and practices of donors towards blood donation in a pandemic setting and to find their association between the demographic factors, aiding in mobilizing and retaining voluntary blood donors. A study on the knowledge, attitude and the practice of the donors may prove to be useful in implementing successful blood donation programme. As far as we are aware, there is a dearth of literature in our state concerning the knowledge, attitudes, and practices (KAP) of blood donors during the COVID-19 pandemic.

2. MATERIALS AND METHODS

The Department of Immunohematology and Blood Transfusion at a tertiary care teaching

hospital National Institute of Medical Science, Jaipur, India provided ethical permission for this study, and blood donors provided written (electronic) informed consent before it could be carried out.

2.1 Study Design

This study used an online survey-based questionnaire to conduct a prospective longitudinal study on blood donors.

2.2 Study Population

Repeat blood donors who have donated blood either in the blood centre or blood donation camps within the geography of India were included in the study. Repeat blood donor is defined as a blood donor who has donated at least once [11]. Inclusion criteria for participants were repeat blood donors with age more than 18 years and were willing to give written consent. Exclusion criteria for the participants were first time donors and professional/paid donors.

2.3 Sample Size Determination and Sampling Technique

To determine the required sample size for study, a single population proportion formula was used as denoted below.

$$n = \frac{Z_{\alpha/2} \times p(1-p)}{d^2} = \frac{(1.96) \times 0.5(1-0.5)}{(0.05)^2} = 384$$

Where $z_{\alpha/2} = 1.96$ at 95% confidence interval, $p = 50\%$ because there was no previous study, $d = 5\%$ which was tolerable error between the sample and true population. Considering 5% non-response rate ($384 \times 5\% = 19$), the final sample size was calculated to be 403. The study participants were selected randomly from the blood donors in the blood bank.

2.4 Survey Mode

The questionnaire was launched online after obtaining approval from the Institutional Ethics Committee. The following were the modes of circulation, which were used: a) E-mails b) Instant messaging services like WhatsApp, telegram) Social networking sites (viz. Facebook; LinkedIn; Twitter)

2.5 Duration of the Survey

From the day of its online launch on the aforementioned platforms, the survey remained

open for participation and submission of replies for 90 days or until the required sample size was reached, whichever came first. After that, the survey was blocked and no more answers were taken. The link to "Submit another response" at the end of the questionnaire was disabled in order to prevent repetitive responses to the questionnaire being submitted by anyone.

2.6 Questionnaire Flow

The survey was painstakingly created from scratch and validated for frequent blood donors. Donor informed consent was signed prior to the start of the questionnaire. The questionnaire was broken up into two sections. Demographic data, educational background, and past blood donations were all included in the first section. The second section featured a questionnaire about a COVID-19 fear-related questionnaire in first half, while the second half included donors' attitude about blood donation during the COVID-19 pandemic. A pilot study was conducted on 10% blood donors with varying levels of education to evaluate understanding of the questionnaire and to verify that any necessary adjustments can be made at this time before moving forward. Every question in every segment was compulsory. All respondents were required to complete the sections on informed consent and demographic information. Each respondent was then automatically routed to the appropriate areas based on the responses they had provided. All respondents were given instructions to complete the survey's comments section. The statistical analysis only included data from repeat blood donors.

2.7 Data Storage, Management & Security

The data management was done remotely and stored in a cloud storage facility owned by principal investigator in a secured manner with limited access and password protected.

2.8 Statistical Analysis

The analysis was done by using MS-Excel and statistical package for social science (SPSS) 23.0. All tests were two-sided and were done keeping $p < 0.05$. The normality of data was assessed by Kolmogorov-Smirnoff test and as per the data distribution parametric test was also done for quantitative data and non-parametric tests were used for qualitative data.

3. RESULTS

During the study period from 20 December 2021 to 20 March 2022 survey questionnaire was sent to approximately 8000 whole blood donors electronically. Out of 8000, only 1610 donors responded to the donor Questionnaire survey. Out of 1610, 42 were professional donors and 936 were first-time blood donors, which were excluded from the study. Remaining 632 repeat blood donors were included in the study and were assessed for fear factors and attitude factors related to blood donation during COVID-19 pandemic (Fig. 1).

Out of 632 participants, 256(40.50%) donors were from 18-25 years of age group, 332(52.5%) were in 26-40 years of age group, 35(5.5%) were in the age group of 41-55 years of age group and 09 (1.40%) of the donors were in the >55 years of age group. 561(88.8%) were males and 71(11.2%) were females. Furthermore, 284(45%) participants were from rural population and 348(55%) from urban background. 331(52.7%) were married and 301(47.3%) were unmarried (Table 1).

On the basis of education, majority of the participants were categorized as graduate 368(58.2%), followed by below graduate 165(26.1%) and postgraduate 99(15.7%). On the basis of occupation, 154(24.4%) participants were health care professionals, 350(55.4%) were non health care professionals and 128(20.3%) were unemployed (Table 1).

On the basis of type of blood donation, 146(23%) were those donors who donated blood only on voluntary basis, 178(28.2%) donated only on replacement basis and 308(48.7%) donated blood on voluntary as well replacement basis. On the basis of donation frequency, 366(57.9%) donors were those who donated blood 2-5 times in their life, 229(36.3%) of the donors were those who donated blood 6-10 times in their life and 37(5.8%) of the donors were those who donated blood more than 10 times in their life (Table 1).

601(95%) were vaccinated, 31(5%) were unvaccinated for COVID-19. Among participants who had been vaccinated, 56 (9.3%) took single dose and 545(90.7%) had both jabs. 133(21%) participants acquired COVID -19 infections, 475(75.2%) were not infected with COVID-19 and 24(3.8%) participants were unaware about their COVID-19 infection status. We found that families of 92(14.5%) participants suffered with COVID-19 infections.

Fear factors: The two most common fear factors for blood donation during COVID -19 pandemic were uncertainty about the sanitization of blood bank and fear of visiting hospital during COVID-19 Pandemic. They were reported by 61.9% and 58.4% of the participants respectively.

Third and fourth most common factor for not being able to donate blood was fear of contracting COVID-19 during blood donation (41.5%) and fear of post COVID-19 complications (37.5%) respectively. Other fear factors were fear of unvaccinated blood center staff (32.6%), fear of weakening of the immunity after blood donation (14.6%) and transmission of COVID-19 to the patients through blood (14.9%). This data has been summarized in Table 2.

391(62%) of the participants reported either one or more than one reason (fear related reason) for not being able to donate blood whereas a little less than half, 240 (37.9%) of the participants did not mention any fear. Out of 391 donors who had fear related to blood donation during COVID -19 pandemic, 92 donors had 2 fears, 204 donors had 3-5 fears, and 95 donors had more than 5 fears factors. Significant mentioning is that not even a single participant reported the presence of a single fear alone (Fig. 1).

Attitude assessment: We studied donor attitude towards blood donation during COVID-19 pandemic. The factors studied were positive attitude, negative attitude and neutral attitude that impacted blood donation during COVID-19 pandemic, summarized in Table 3.

Positive attitude: The most common positive attitude factor (PAF) with 94.9% of donors agreed was "I would donate blood in the blood center where mask and sanitizer are available for all staff and blood donors", Second most common PAF with 77.5% of donors agreed was "if I had suffered with COVID-19 and if required I would donate plasma for treatment of COVID-19 patient". Third most common PAF with 74.7% of donors agreed was "I can encourage /motivate my relatives and friends to donate blood easily if needed", fourth most common PAF with 66% of donors agreed was "I am available for blood donation any time when needed" and 63.8% of donors agreed to "I am aware of shortage of blood because of pandemic situation and I would encourage people around me to donate blood in ongoing pandemic". The percentage of positive attitude among all the responses was 48.7 %.(Fig. 1).

Table 1. Demographic parameters of donors enrolled in the study

Demographics of participants	Number of participants	Percentage
Age (year)		
18–25	256	40.50%
26–40	332	52.5%
41-55	35	5.5%
>55	09	1.40%
Gender		
Male	561	88.8%
Female	71	11.2%
Residence		
Urban	348	55%
Rural	284	45%
Marital status		
Unmarried	301	47.3%
Married	331	52.7%
Educational status		
Postgraduate	99	15.7%
Graduate	368	58.2%
Below graduation	165	26.1%
Profession		
Health care professional	154	24.4%
Non-health care professional	350	55.4%
Unemployed	128	20.3%
Type of donor		
Replacement	178	28.2%
Voluntary	146	23%
Both	308	48.7%
Frequency of blood donation		
2-5 times	366	57.9%
6-10 times	229	36.3%
>10 times	37	5.8%

Table 2. Fear factors affecting blood donation during covid-19 pandemic

S. N.	Fear Factors	Agree	Disagree	Not sure
1	I am afraid of contracting COVID-19 during blood donation.	262 (41.5%)	348 (55.0%)	22(3.5%)
2	I am afraid of Blood donation as it can cause weakening of my immunity during COVID-19 pandemic	92(14.6%)	485(76.7%)	55(8.7%)
3	I am afraid of blood donation as I can transmit COVID-19 to patients through my blood	94(14.9%)	492(77.9%)	46(7.2%)
4	I am afraid to go to hospital for blood donation because of fear of COVID-19.	369(58.4%)	255(40.3%)	8(1.3%)
5	I am afraid of blood donation because I am not sure of sanitization in blood center	391(61.9%)	213(33.7%)	28(4.4%)
6	I am afraid of blood donation because not sure of blood center staff vaccination for COVID-19	206(32.6%)	381(60.3%)	45(7.1%)
7	I am afraid of blood donation because of fear of severe post COVID-19 complications	237(37.5%)	345(54.6%)	50(7.9%)

Table 3. Donors Attitude towards blood donation during COVID-19

S.N.	Attitude factors	Agree	Disagree	Not sure
Positive Attitude Factors				
1	I am available for blood donation anytime	412(65.2%)	177(28.0%)	43(6.8%)
2	If I had suffered with COVID and recovered and if required I would donate plasma for the treatment of COVID patient	490 (77.6%)	119(18.8%)	23(3.6%)
3	I would encourage people around me to donate blood especially during COVID pandemic	403 (63.8%)	163(25.8%)	66(10.4%)
4	I can encourage relatives/ friends for blood donation if needed during COVID pandemic	472 (74.7%)	115(18.1%)	45(7.1%)
5	I would donate blood in the blood center where mask and sanitizer are available for all staff and blood donor	600 (94.9%)	32(5.1%)	0(0%)
Negative Attitude Factors				
6	I have been close contact with patient having respiratory problems related to COVID-19, still I can donate blood	522 (82.6%)	94(14.9%)	16(2.5%)
7	I will donate blood only for my relatives	231 (36.6%)	370(58.5%)	31(4.9%)
8	I believe that blood donation is not safer in hospital as compared to outdoor blood donation camp	296 (46.8%)	315(49.8%)	21(3.4%)
9	I can go to blood bank without facemask to donate blood during COVID pandemic	96(15.2%)	530(83.9%)	6(0.9%)
Neutral Attitude Factors				
10	If I am having mild breathing problems and I had to donate blood because of peer presure I would later call and inform blood center	530 (83.9%)	92(14.5%)	10(1.6%)
11	I had breathing releated issue 1 month back and I am fine now so I can donate blood	245(38.8%)	367(58.0%)	20(3.2%)
12	I should disclose fever or any respiratory problem correctly prior to blood donation irrespective of my covid status.	574 (90.8%)	49(7.8%)	9(1.4%)

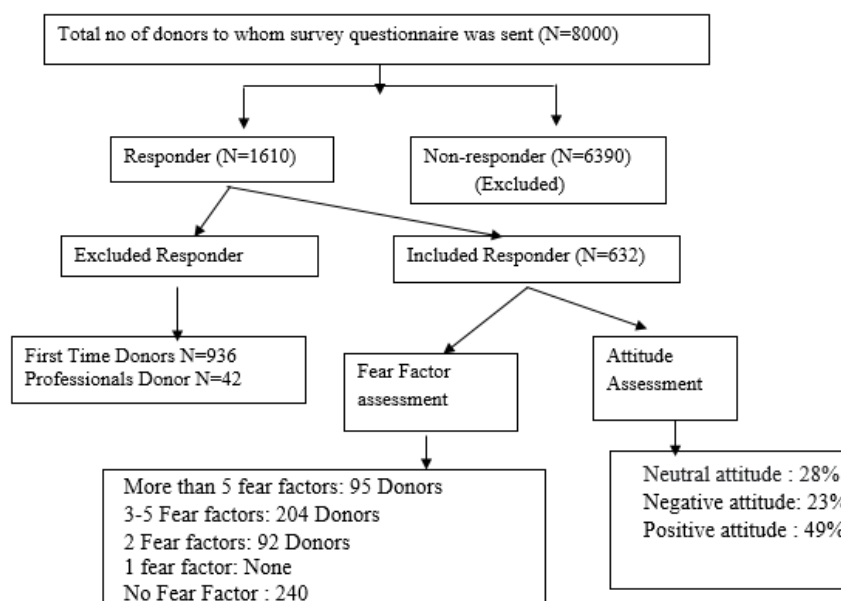


Fig. 1. Flow diagram of the research study

Negative attitude: The most common negative attitude factor (NAF) with 82.6% of donors agreed was have been in close contact with patient having respiratory infection so I should not donate blood". Second most NAF with 46.8% of donors agreed was "I believe that blood donation is not safer when done at hospital-based blood centre compared with those at blood donation camp outside hospital", and 36.6% of donors agreed to "I will donate blood only for my blood relatives or close relatives". The percentage of negative attitude among all the responses was 23.5% (Fig. 1).

Neutral attitude: The most common neutral attitude factor with 90.8% of donors agreed was "I should disclose fever or any respiratory problem correctly prior to blood donation irrespective of my COVID-19 status". 83.9% of donors agreed to "If I am having mild breathing problems and I had to donate blood because of peer pressure I would later call and inform blood center", and 38.8% of donors agreed to "I had breathing related issue 1 month back and I am fine now so I can donate blood". The percentage of neutral attitude among all the responses was 27.6% (Fig. 1).

The data of whole study is summarized in the flow chart depicted in Fig. 1.

4. DISCUSSION

Blood components play a vital role in healthcare, serving as an indispensable resource for various medical treatments. The robustness of this resource depends on several key factors, with daily blood collection and utilization being paramount. Unlike many medical supplies, blood cannot be artificially manufactured, making voluntary blood donation the sole source for maintaining a consistent blood supply.

The emergence and rapid spread of the COVID-19 pandemic posed an unprecedented challenge to blood transfusion services and the overall management of blood resources. This crisis led to a severe reduction in available blood supply, triggering an urgent need for immediate action to ensure adequate access to this life-saving resource [12, 13]. During the COVID-19 pandemic, blood centers faced an ongoing challenge in securing an adequate blood supply to meet the growing demand. Lockdowns and social distancing measures significantly reduced the number of blood donations in our region, despite the issuance of guidelines by

organizations like the National Blood Transfusion Council (NBTC) and State Blood Transfusion Council (SBTC) to ensure safe blood donation practices [14].

To address this issue, various strategies were implemented, including the issuance of donor passes to facilitate donations during lockdowns, conducting blood donation camps with strict hygiene measures and limited attendance, and organizing mobile blood donation campaigns. Despite these efforts, the blood supply still fell short of meeting the demand during the pandemic [14].

The present study was done on repeat blood donors to find out a few very interesting observations that related to the psychology of the blood donor to examine the association between blood donation and COVID-19 fear, to improve the recruitment and retention of repeat blood donors during the COVID-19 pandemic.

Majority of the participants were from age group 18-40 years of age. Based on gender, majority were males, which is similar to gender distribution reported by the World Health Organization (WHO) and from other Asian countries [15,16]. Presence of single fear was not noted in any of the study participants, and 38% did not provide any answer to any of the fear's items in the questionnaire, where as it was 45% by a similar study done by Sachdev et al [17]. This is the pool of participants that either did not have any fears or did not respond due to reasons out of scope of this survey.

The background psychology of the lack of trust in sanitization and safety protocols of blood centres was the most common fear found in the blood donors (61.9%). Second most common fear (58.4%) was the fear of visiting hospital during COVID-19 Pandemic and the similar results were also found by recent study conducted on donors during COVID-19 pandemic from India [17,18]. We found that 41.5% of the participants were afraid of contracting COVID-19 during blood donation and this is in concurrence with the study conducted in Saudi Arabia [19]. Whereas the other studies from India, Sudan and The People's Republic of China had 25%, 61% and 81% fear of contracting COVID-19 during blood donation respectively [17, 20, 21]. In our study, Fear of weakening of the immunity after blood donation was found in 14.5% of the participants. Previous studies have also identified similar results [21].

There are other interesting findings like the most common fear factor among male was sanitization status of the hospital and blood center, whereas most common fear factor among females was weakening of immunity because of blood donation. Most common fear factor for both age groups (18-25 years and >25 years) was sanitization status of the hospital and blood center, but worth mentioning is that the frequency of fear factor was more in young population (18-25 years) in comparison to the old population (>25 years) [22].

The motivational factor for blood donation due to shortage of blood during COVID-19 pandemic was found in 63% of the participants, previous studies from India on blood donors have also found the similar findings (27.8%) [23]. This can be explained by the fact that the participants in our study were only repeat donors who were already motivated and other factor was huge sample size of our study. Present study found that 5% of the participants were not willing to donate blood in the blood centre where mask and sanitizer were not available for all staff and blood donors, and these findings are in accordance with other study (11%) on blood donors [24].

Some interesting findings of the study were that urban people were more willing for blood donation and convalescent plasma during COVID-19 Pandemic than the people from rural background. In view of convalescent plasma donation 77.5% of the participants agreed to donate convalescent plasma for the treatment of COVID-19 patients. Similar findings were also observed in Almiki et al. (77%) and Mahapatra et al (68%) [20,25]. The reason for those who were not willing to donate had internal fear of weakened immunity, and chances of getting infected again, less knowledge and some unknown fear factors. Participants were also asked about the favorable place for donating blood during covid-19 pandemic. In present study more than half (49.8%) of the participants responded that blood donation camp as a favorable site for donating blood rather than hospital during COVID-19 Pandemic. Similar finding was also observed from the previous study from Saudi Arabia, in which they have concluded that 65% participants were in favor of blood donation in mobile vans/camp rather than hospital [20]. This can be explained by the fact that during COVID-19 people were very much afraid of travelling and public transport to reach hospital as well as risk of getting COVID-19 from Hospital.

In our study 37% participants agreed to donate blood only for close relatives, and the results of our study are concurrent with Tripathi et al [23]. In which they conclude that the most common reason for the current donation was a family member/ friend's need of blood (57.9%). The reason for this in Indian scenario was, streamlined inventory in blood centres, as well as fear among general population to step out of home during COVID-19 so they agreed to take risk for their close relatives only. In our population usual trend is to donate blood to close relatives in need unlikely to voluntary blood donation [26].

The majority of 83.8% donors were willing to inform the blood center if they developed symptoms or was diagnosed/ infected with COVID-19. This is in concurrence with the study conducted in India in which they concluded that 70% of the donors were willing to inform for the same [23].

5. CONCLUSION

Based on the online survey results, the speculation is that donors may anchorage fear of infection and panic for their safety, discouraging blood donation. There are some non-responders too, who did not respond to the fear items and they should be the primary target for intervention to enhance blood donation during pandemics of respiratory infections like influenza or viruses that cause severe acute respiratory syndromes like the novel corona virus of 2019. Interventions should be implemented on the donor population to neutralize the fear factors associated with blood donation during COVID-19 pandemic. Building the donor confidence and neutralizing donor fear factor by making them understand the fact that COVID-19 does not spread primarily by the process of blood donation, and therefore, there is no fear of transmission to patients on blood transfusion, Sanitization of blood center and strict supervision of all the safety and hygienic measures, provision of mask for blood donor and blood center staff, mobile blood donation camp facilities that are available for donation at the donor's propinquity. These measures should be implemented to augment blood donation during COVID-19 pandemic.

6. LIMITATION OF THE STUDY

The survey questionnaire was distributed to contributors at random via online mode, which may have a confounding influence on survey

results, despite best attempts being taken to reach out to the greatest number of participants for an acceptable representation. Due to changes in daily life brought on by the epidemic, the participants' responses may have been prejudiced. A survey was given to about 8000 donors, but only 1610 responded, citing the worry that the things couldn't be ornamented as their reason. The survey's modest sample size could still be a drawback. The anxiety that has crept into everyone's psychology since the COVID-19 outbreak began could possibly have an impact on the study's findings.

Finally, the findings only apply to the local population and might not be serotype-able globally.

CONSENT AND ETHICAL APPROVAL

The written or electronic informed consent was obtained from all the donors who participated in the study. The study was approved by Institutional Ethics Committee (IEC) [NIMSUR/IEC/2021/163]

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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