

Assessment of Standard Operating Procedures (SOPs) Preparing Hygienic Condition in the Blood Donation Centers during the Outbreak of COVID-19

Saeed Mohammadi^{1,2}, Seyed Morteza Tabatabaei Yazdi³, Sahar Balagholi³, Saeid Saremi³, Rasul Dabbaghi³, Shirin Ferdowsi³, Peyman Eshghi⁴

¹Research Institute for Oncology, Hematology and Cell Therapy, Tehran University of Medical Sciences, Tehran, Iran

²Cell Therapy and Hematopoietic Stem Cell Transplantation Research Center, Tehran University of Medical Sciences, Tehran, Iran

³Blood Transfusion Research Center, High Institute for Research and Education in Transfusion Medicine, Tehran, Iran

⁴Pediatric Congenital Hematologic Disorders Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Corresponding Author: Peyman Eshghi, Pediatric congenital Hematologic disorders research center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Tel: (+98)-21- 2222-7021(-9)

E-mail: P.Eshghi@tmi.ac.ir

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ABSTRACT

Background: The coronavirus disease 2019 (COVID-19) outbreak has led to an alteration in hygienic conditions. In this situation, improving standard operating procedures (SOPs) in blood donation centers is critical. The purpose of this study was the assessment of SOPs in the blood donation centers during the outbreak of COVID-19 by regular blood donors as external audits.

Materials and Methods: Regular donors were selected as external inspectors in 31 provinces of Iran. The questionnaire containing 10 closed questions was provided to assess the hygienic SOPs of blood transfusion centers in the prevention of COVID-19 transmission. Comparison and evaluation of questionnaires were conducted by assigning an importance coefficient (IC) score to each question.

Results: Assessment of SOPs in blood donation departments by regular donors in 31 provinces of Iran showed that 18 centers (58.1%) received IC scores >10 (Strong performance), seven centers (22.6%) received the range of IC scores between 7-10 (acceptable performance), and six centers (19.4%) received IC scores <7 (poor performance). The difference in IC scores between provinces was not statistically significant.

Conclusion: This study confirms that the assessment of blood donation centers through regular blood donor inspection is a reliable method to identify the strengths and weaknesses of blood transfusion center services and ultimately leads to corrective intervention and improvement of hygienic SOPs to prevent COVID-19 transmission.

Keywords: Blood donors; Coronavirus disease 2019; Standard operation procedure

INTRODUCTION

The outbreak of coronavirus disease 2019 (COVID-19) has led to an alteration in hygienic conditions particularly in medical centers^{1,2}. The main challenge for blood centers is ensuring the safety of blood donors and providing an adequate blood supply. In the Iranian Blood Transfusion Organization (IBTO), since the beginning of the COVID-19 pandemic, a station for measuring body temperature and mask distribution was established to protect blood donors. Disinfecting materials were provided, and social distancing was set up between chairs in the reception area and blood collection beds. Direct transmission of the respiratory droplet during speaking and coughing and reaching the droplet to the mucosa is the most common way of transmitting COVID-19. Moreover, hand contact with contaminated surfaces can lead to indirect transmission of the COVID-19 virus between individuals^{3,4}. COVID-19 RNA has been identified on different surfaces, especially in medical environments⁴, thus the cleanliness of the environment and the professional training of health workers are very effective in preventing the transmission of COVID-19².

In the outbreak of viral diseases such as severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS), and COVID-19 with the potential of transmission through blood component⁵⁻⁷, policies for crisis management is critical to prevent unexpected event in blood transfusion centers⁸. In this situation, the improvement of hygienic standard operating procedures (SOPs) in the blood donation department as the first step of blood collection practice is critical for the safety of the blood donors and blood supply. One of the reliable processes used to improve operating procedures in each organization is customer-centric evaluations as external audits. The purpose of this study was the assessment of hygienic SOPs in the blood donation centers by regular blood donors as external audits during the outbreak of COVID-19. In this study, we focused on regular blood donors for two reasons: 1) according to the principle of customer orientation, attention to the donor concern should be given priority, and the conflict of interest of blood transfusion centers should be

eliminated, 2) in a critical situation and increased need for specialized personnel in blood transfusion centers, the use of the regular blood donor as the local inspector is reliable. This is the first study of its kind conducted in the Iranian Blood Transfusion Organization (IBTO).

MATERIALS AND METHODS

Data were collected from April 5th to April 20th, 2020. Regular blood donors were selected as external inspectors referring to blood donation centers in 31 provinces of Iran with the following criteria: 1) The highest number of blood donations, 2) Sufficient knowledge of the blood donation process, and 3) The high social representation. It is necessary to mention that the terms first time, repeated, and regular blood donors are defined by the Iranian Blood Transfusion Organization (IBTO). First-time donor is a person who succeeds in donating blood for the first time; repeated donor is a person donating blood in the past but not in the preceding 12 months; and a regular donor is a person who has donated twice or more within a period of 12 months.

During the period of study, a total of 52,943 regular donors referred to blood donation centers. The questionnaire containing 10 closed questions (yes/no questions) was provided to donors with the mentioned criteria to assess the SOPs of 31 provinces of blood transfusion centers (PBTCs) in the prevention of coronavirus transmission (Table 1). For a positive answer to each question, an importance coefficient (IC) (0.75- 1.5) was considered based on current SOPs (Table 1). Finally, the sum of the IC was considered the total score for each province. Approximately 60% of donors answered the questions.

The general design of different parts of the blood donation department in all PBTCs is similar to Figure 1 in Tehran province. According to Figure 1, the donor goes through positions 1 to 9 for blood donation in the donation department.

Table 1: The questionnaire designed to assess the hygienic operation procedure of 31 PBTCs

			IC ^a
1. Is there a stand disseminating the required information on corona virus at the entry available?			
Yes	No	Note	0.75
2. Is the poster disseminating the required information on corona virus installed?			
Yes	No	Note	0.75
3. Is there a confidential condition provided at the registration desk and is there a glass divider with the appropriate height between the registration staff and the blood donor?			
Yes	No	Note:	1
4. Are hand sanitizers available and accessible to blood donors and staff at the registration unit, examination room, and the refreshment room?			
Yes	No	Note	1.2
5. Are the measures taken to observe the seating distances (sitting on alternate seats) in the waiting lobby and blood donation unit?			
Yes	No	Note	1.5
6. Does the bed arrangement allow the appropriate space in the blood donation unit?			
Yes	No	Note	1.5
7. Are the masks properly distributed in blood donation department?			
Yes	No	Note	1.2
8. Is there overcrowding in blood centers?			
Yes	No	Note	1.5
9. Is the sanitation level in blood donation departments favorable?			
Yes	No	Note	1.2
10. Is the staff encounter behavior toward blood donors satisfactory?			
Yes	No	Note	1.5
a. Importance coefficient (IC) Considered for each question			

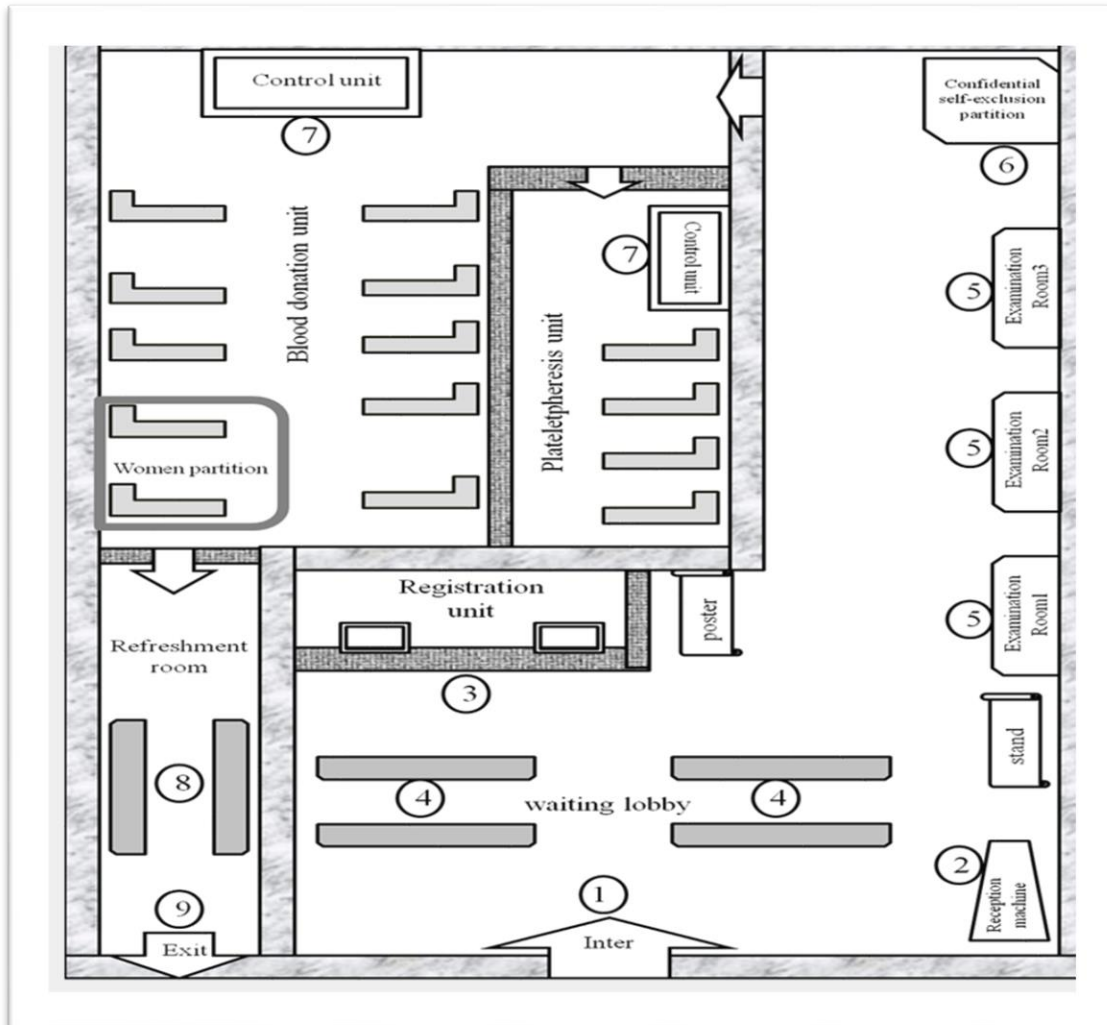


Figure1. Different parts of blood donation department in Tehran province

Statistical analysis

Frequencies and percent of descriptive data were analyzed by descriptive statistic. Data with normal distribution analyzed by parametric tests, and data with abnormal distribution were analyzed by nonparametric test. A P-value of less than 0.05 indicates that a difference is significant. All Statistical

analyses were carried out with SPSS software (version 22).

RESULTS

Analysis of the questionnaires obtained from 31 centers revealed that six questions received >80% positive response, of which "sanitation in blood centers" and "staff encounter behavior" had the maximum satisfaction percentage (100% and 97%, respectively). On the other hand, four questions received <80% positive response and "mask distribution among blood donors" had the minimum satisfaction percentage (45%). The mean of positive response (satisfaction) was 25.39 (82%), and these values were 9.44 (30%) for the negative response (dissatisfaction). The difference was statistically significant (P-value: 0.002) (Table 2); questions sorting based on positive and negative answers are shown in Figure 2.

A classified comparison of importance coefficient between 31 blood transfusion centers demonstrates that 18 centers (58.1%) received scores >10 (Strong performance), seven centers (22.6%) received the range of scores between 7-10 (acceptable performance), and six centers (19.4%) received scores < 7 (poor performance). (P-value= 0.3) (Figure3). Moreover, the result showed that six provinces obtained the maximum IC score (12.1), and one province obtained the minimum IC score (5.2). The difference in IC scores among provinces was not statistically significant (P-Value: 0.4) (Table 3).

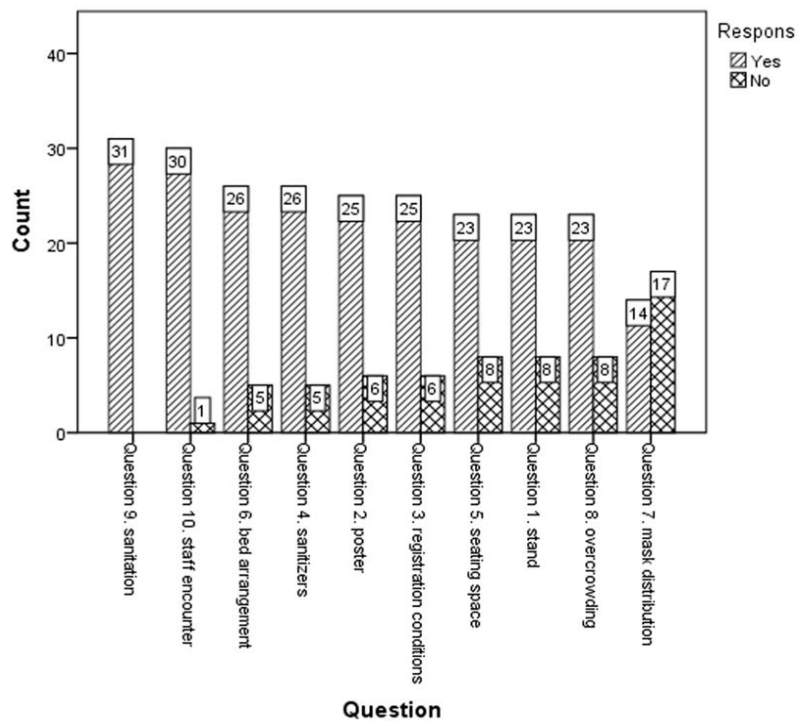


Figure 2. Questions sorting based on positive and negative answers

Table 2: Frequency and percentage of recorded responses from 31 provinces

Question	Yes	NO
Question 1. stand	23(74%)	8(26%)
Question 2. poster	25(80%)	6(20%)
Question 3. registration conditions	25(80%)	6(20%)
Question 4. sanitizers	26(84%)	5(16%)
Question 5. seating space	23(74%)	8(26%)
Question 6. bed arrangement	26(84%)	5(16%)
Question 7. mask distribution	14(45%)	17(55%)
Question 8. overcrowding	23(74%)	8(26%)
Question 9. sanitation	31(100%)	0(0%)
Question 10. staff encounter	30(97%)	1(3%)
Mean	25.39	9.44
SD	3.96	4.76
P Value	0.002	
questions sorting based on positive answers	<u>Question9</u> > Question10> Question6, Question4> Question2, Question3> Question1, Question5, Question8> Question7	

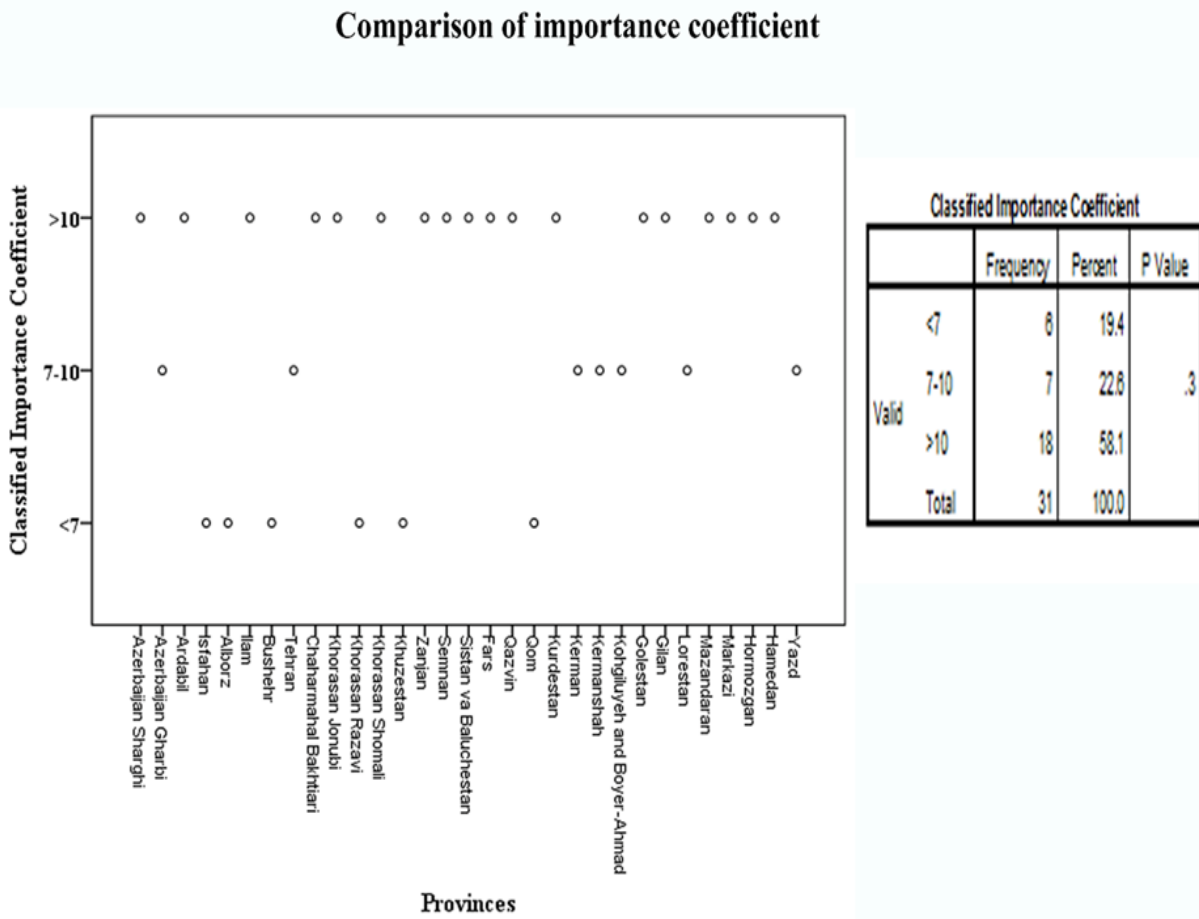


Figure3. A classified comparison of importance coefficient between 31 blood transfusion centers demonstrates that 18 centers (58.1%) scored >10, 7 centers (22.6%) received the range of scores between7-10, and 6 centers (19.4%) received scores <7. (P-value = 0.3)

Table3: Sorting of province based on achieved importance coefficient score

	Provinces	Question stand	Question poster	Question registration conditions	Question sanitizers	Question seating space	Question bed arrangement	Question mask distribution	Question overcrowding	Question sanitation	Question staff encounter	IC
		1-	2-	3-	4-	5-	6-	7-	8-	9-	10-	
1	Mazandaran*	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	12.1
2	Markazi*	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	12.1
3	Hormozgan*	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	12.1
4	Golestan*	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	12.1
5	Kurdistan*	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	12.1
6	Sistan va Baluchestan*	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	12.1
7	Chaharmahal Bakhtiari*	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	12.1
8	Khorasan Shomali	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	11.35
9	Azerbaijan Sharghi	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	10.9
10	Ardabil	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	10.9
11	Semnan	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10.9
12	Fars	Y	Y	Y	Y	N	Y	N	Y	Y	Y	10.9
13	Qazvin	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	10.9
14	Hamedan	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	10.9
15	Ilam	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	10.6
16	Khorasan Jonubi	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	10.6
17	Zanjan	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	10.6
18	Gilan	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	10.6
19	Kermanshah	Y	Y	Y	N	Y	Y	N	Y	Y	Y	9.7
20	Yazd	Y	Y	Y	N	Y	Y	N	Y	Y	Y	9.7
21	Lorestan	N	N	Y	Y	Y	Y	N	Y	Y	N	9.4
22	Azerbaijan Gharbi	N	Y	N	Y	Y	Y	N	Y	Y	Y	9.15
23	Kerman	N	N	N	Y	Y	Y	N	Y	Y	Y	8.1
24	Kohgiluyeh and Boyer-Ahmad	N	N	Y	Y	N	Y	N	Y	Y	Y	7.9
25	Tehran	Y	Y	Y	Y	Y	N	N	N	Y	Y	7.9
26	Qom	Y	Y	N	Y	Y	N	N	N	Y	Y	6.9
27	Khuzestan	N	N	N	Y	N	Y	N	Y	Y	Y	6.9
28	Khorasan Razavi	Y	Y	Y	Y	N	N	N	N	Y	Y	6.4
29	Isfahan	Y	Y	N	N	N	N	N	Y	Y	Y	5.7
30	Bushehr	N	N	N	N	N	Y	Y	N	Y	Y	5.4
31	Alborz [#]	N	N	Y	N	Y	N	N	N	Y	Y	5.2
	Mean											9.74
	Max*											12.1
	Min [#]											5.2
	Range											6.9
	SD											2.20
	P											0.4

DISCUSSION

Our study demonstrated that the implementation of SOPs to prevent COVID-19 transmission in the blood donation centers in 18 provinces had led to a score of >10, which show that SOPs are implemented correctly in most provinces. The results also showed that seven provinces received a range of scores between 7-10, which was acceptable scores. These results provide valuable information on the identification of poorly performing provinces in the implementation of SOPs, leading to greater focus and closer monitoring of these areas (6 provinces with scores less than 7). Moreover, detailed analysis of questioners in each province can lead to troubleshooting and effective corrective actions. Regular blood donors were selected because of their sufficient knowledge of the blood donation process. These donors can compare hygienic condition in the blood donation centers before and after the pandemic. Moreover, the assessment method of blood transfusion centers in the partnership with regular blood donors is in line with principles of client orientation. This method is considered a novel assessment tool practiced by regular donors as permanent customers of blood transfusion centers. The feedback reflected from the external assessments can play a significant role in quality and quantity improvement of the operations of blood centers in the critical situation, improving the quality and safety of blood supply. The findings of the present research showed that regular donors were eager to participate in the assessment of blood donation centers. It seems that the correct selection of the regular blood donors considering the criteria like academic achievements, awareness about the donation procedure, and the high social representation can play a vital role in the effective assessment of operation procedures. The improvement of operational procedures in blood transfusion services satisfies the customer and leads to blood donor recruitment and retention⁹. More investigation of the questionnaires obtained from 31 centers revealed that selected donors had the maximum satisfaction percent from the "sanitation in blood centers" and "staff encounter behavior" questions (%100 and 97%, respectively),

showing that operational procedures have been most effective in implementing cleanliness of blood donation space and training staff to have professional behavior in critical situations.

Furthermore, the highest level of displeasure was related to the mask distribution among donors. Although the IBTO distributed masks in the beginning of COVID-19 in all centers, the shortage of masks in the early days of the pandemic created an imbalance in the demand and supply. However, due to the importance of masks in preventing the spread of disease¹², this problem must be addressed quickly with proper resource management.

The results also showed that there was a high percentage of dissatisfaction with "stand", "sitting space", and "overcrowding" questions. It is necessary to mention that changing the infrastructure in many blood transfusion centers is impossible, leading to limited space to display posters and sitting places. It seems that the crowd management with blood donation staff and the transfer of donors to the outdoor space leads to effective space management and reduces the possibility of disease transmission¹³⁻¹⁵.

The current study is limited by a small sample size and a lack of prior research studies on the topic. However, this research can provide a comprehensive guide to the use of blood donors as an external inspector for the assessment of blood transfusion operation, especially in critical situations.

CONCLUSION

The study confirms that the assessment of blood donation centers through regular blood donor inspection is a reliable method to identify the strengths and weaknesses of blood transfusion center services, ultimately leading to corrective intervention and improvement of hygienic SOPs to prevent COVID-19 transmission.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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