

Analysis of the most common causes of blood donor deferral in northern Jeddah: a single-center study

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Purpose: We aimed to conduct a retrospective study in order to statistically analyze the commonest causes for blood donor rejection in northern Jeddah, Kingdom of Saudi Arabia according to the American Association of Blood Banks. This will help in developing better strategies to minimize the loss of treasured blood donors.

Subjects and methods: A sample of 500 rejected donors was randomly selected from a single blood bank between October 2016 to May 2017. The evaluation of blood donors was according to the personal history questionnaire and a medical examination done before the blood donation proceeded.

Results: The causes of deferral were categorized into three main categories: personal factors, medical examination and medical history. The most common personal cause of deferral was lack of sleep (29 [5.80%]); however, the most common medical examination cause of deferral was low blood pressure (68 [13.60%]). Concerning the medical history, the commonest cause was cupping (58 [11.6%]).

Conclusion: Low blood pressure (13.6%), cupping (11.6%) and less hours of sleep in the night prior to donation (5.8%) were the major causes of rejection in this study. Similarities and variations between the commonest causes of blood donor rejection may be due to the differences and similarities in the geographic area and in the cultural, educational and socioeconomic factors.

Keywords: cupping, donor questionnaire, blood transfusion, safe blood

Introduction

Blood donation is considered as an important life-saving practice in medicine, especially in cases of medical emergency.¹

The need for blood is universal; however, millions of patients who may need transfusion do not have timely access to safe blood, and there is a major imbalance between the developing and developed countries in access to safe blood. Safe blood transfusion is a major concern that needs the application of science and technology to blood processing and testing, as well as social efforts to promote blood donation by sufficient numbers of volunteers who are healthy and are at low risk of infections that can be transmitted to the recipients of their blood.²

The WHO Global Database indicated that >92 million blood donations are collected annually from 164 different countries around the world. Around 1.6 million units were discarded due to the presence of infections such as hepatitis B and C, HIV, herpes and syphilis. In addition, at least 13 million donors were deferred due to having the risk of infection that could be transmitted through blood, a preexisting medical disease or

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anemia.³ Due to this, blood donor selection is a cornerstone for blood transfusion safety, designed to safeguard the health of both donors and recipients.⁴ Blood donor eligibility is determined by medical interview, based on national guidelines for donor selection.⁵

The key tool for blood donor selection would be a “donor questionnaire” that would assess a donor’s health and history that would help assess if the donor has any risk for having infection that could be transmitted by blood and furthermore has no suitable screening test. After that, a confidential interview is conducted between the donor and a member staff to ensure that all questions are answered relevantly.³

Many studies have been conducted around the world concerning the causes for blood donor deferral, such as in Brazil, Turkey, India, Singapore, Dubai and Dammam, which is in the eastern region of Kingdom of Saudi Arabia.^{6–11} Another study was conducted in the southern region of Jeddah; however, no study was carried out in the northern region of Jeddah, Kingdom of Saudi Arabia.¹² In this study, we aimed to analyze the commonest causes for blood donor deferral in northern Jeddah, Kingdom of Saudi Arabia.

Subjects and methods

This cross-sectional study was conducted at King Abdullah Medical Complex, a major hospital in northern Jeddah, Kingdom of Saudi Arabia between October 2016 to May 2017. Ethical approval was obtained from the Directorate of Health Affairs, Department of Medical Research and Study, Jeddah. Data were held confidentially. This study was conducted in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments in humans. Informed consent was not needed because the study was conducted retrospectively. Data were collected from the records in the blood bank and then analyzed. About 400 donors came to apply for donation per month, including both Saudis and non-Saudis. About 20% of them underwent rejection. A sample of 500 deferred donors was selected; all were Saudis. Data were entered using Google Forms and then further analyzed by Microsoft Excel. Data were presented as numbers and percentages. The evaluation of all blood donors who came to apply for donation was done according to a questionnaire that included questions of personal history of behaviors, traveling and medical conditions. After that, the intended blood donor underwent a medical examination consisting of weight, height, vital signs and hemoglobin level. The American Association of Blood Bank’s guidelines and the blood bank’s guidelines were used for either selection or rejection.

All the donors were educated and the process of donation was fully explained to them. The donors were confidentially requested orally about certain risk behaviors, history of traveling and many other conditions that would eventually affect the recipient’s safety. All this was done to make sure of the donor’s eligibility.

Results

This study was conducted on 500 selected Saudi deferred blood donors. Most of those who were rejected were males (428 [85.6%]) and the rest were females (72 [14.4%]), as shown in Table 1. Their ages ranged from 16 to 76 years, with most of them aged between 21 and 25 years (119 [23.8%]), as shown in Table 2.

The deferral of blood donors was categorized under three main categories: personal causes, causes due to significant medical examination and other causes due to a donor’s history. Table 1 also illustrates that 236 (47.20%) were deferred due to significant medical examination, 213 (42.60%) due to significant history and only 51 (10%) were rejected due to personal issues.

Concerning the personal causes for deferred blood donors, the commonest was that the intended blood donor was not getting enough sleep in the night prior to donation (29 [5.80%]), as shown in Table 3.

Regarding the examination causes for rejection, the commonest was that the donor had low blood pressure (68

Table 1 Gender distribution and categories of causes of deferral

Gender	No. deferred (%)
Male	428 (85.6)
Female	72 (14.4)
Category of causes of deferral	No. deferred (%)
Personal causes	51 (10%)
Examination causes	236 (47.20%)
History causes	213 (42.60%)

Table 2 Age ranges of the deferred donors

Age ranges in years	No. deferred (%)
16–20	38 (7.6)
21–25	119 (23.8)
26–30	99 (19.8)
31–35	87 (17.4)
36–40	68 (13.6)
41–45	34 (6.8)
46–50	19 (3.8)
51–55	20 (4)
56–60	12 (2.4)
62–76	4 (0.8)
Total	500 (100)

Table 3 The personal causes for blood donor deferral

Personal Causes	No. of deferred (%)
Less sleep hours	29(5.8)
Old age	8 (1.6)
No vein	6 (1.2)
No ID	3 (0.6)
Young age	3 (0.6)
Didn't come back	2 (0.4)
Total	51 (10%)

Table 4 The examination causes for blood donor deferral

Examination causes	No. deferred (%)
Low blood pressure	68 (13.6)
Low hemoglobin	54 (10.8)
High hemoglobin	35 (7)
High blood pressure	28 (5.6)
High pulse	22 (4.4)
Low weight	14 (2.8)
Low pulse	7 (1.4)
Fever	3 (0.6)
Increased weight	3 (0.6)
Palpitations	1 (0.2)
Fainted during blood pressure measurement	1 (0.2)
Total	236 (47.20%)

[13.60%]), followed by low hemoglobin (54 [10.80%]), high hemoglobin (35 [7%]) and high blood pressure (28 [5.6%]), as shown in Table 4.

A donor's previous history of some personal behaviors, medical conditions or even traveling was also taken in to consideration as a cause of refusal. The most frequent was that the donor had undergone cupping (58 [11.6%]), followed by antibiotic ingestion (32 [6.4%]), dental causes (18 [3.6%]) and having undergone an operation (16 [3.2%]), as shown in Table 5. Least causes of rejection in this study included infectious disease such as malaria (2 [0.4%]), hepatitis (2 [0.4%]), sexually transmitted diseases (2 [0.4%]), hepatitis B virus antibodies (1 [0.2%]) and HIV (1 [0.2%]). There were other deferral causes such as history of having a nonmarital sexual relation (3 [0.6%]), tattoo in the past 3 months (1 [0.2%]), visited Africa 1 (0.2%) and visited Sudan less than a year ago (1 [0.2%]), all of which increase the risk of exposure to various infectious diseases. Other least common purposes in this category are mentioned in Table 5.

Discussion

Billions of blood groups and their products are transfused every year all around the world. In the USA, about 13.6 million units of red blood cells and whole blood were transfused in 2013.¹³ Donors who come to the blood bank have

Table 5 A donor's history, which caused deferral

History	No. of deferred (%)
Cupping	58 (11.6)
On Antibiotic	32 (6.4)
Dental procedure	18 (3.6)
Operation	16 (3.2)
Injection in past 8 weeks	7 (1.4)
Growth hormone	6 (1.2)
Donated in past 8 weeks	6 (1.2)
Asthma	6 (1.2)
Aspirin	4 (0.8)
Leukemia	4 (0.8)
Travelled outside Saudi Arabia recently	4 (0.8)
Dizziness	3 (0.6)
Allergy	3 (0.6)
On insulin	3 (0.6)
Chest pain	3 (0.6)
Sexual relations (non-marital)	3 (0.6)
On medications	3 (0.6)
Heart/lung disease	2 (0.4)
Donated one month ago	2 (0.4)
Eczema	2 (0.4)
Diabetic	2 (0.4)
Malaria	2 (0.4)
Hepatitis	2 (0.4)
Sexually transmitted disease	2 (0.4)
Tattoo in the past 3 months	1 (0.2)
Visited Africa	1 (0.2)
Donated 2 units in past 16 weeks	1 (0.2)
Common cold	1 (0.2)
Bone/skin grafting	1 (0.2)
Post-cesarean section since 10 months	1 (0.2)
Psychiatric pills	1 (0.2)
Used needles	1 (0.2)
Drugs	1 (0.2)
Plasma injection	1 (0.2)
Transplantation	1 (0.2)
Hepatitis B Virus (HBV) antibodies	1 (0.2)
On hormones	1 (0.2)
Visited Sudan less than a year ago	1 (0.2)
Deferred previously	1 (0.2)
Prison	1 (0.2)
Wounds on hand	1 (0.2)
Human Immunodeficiency Virus (HIV)	1 (0.2)
On Anticoagulant	1 (0.2)
Sick	1 (0.2)
Total	213 (42.60%)

“altruistic intentions”, and they believe themselves as healthy entities, though some of these contributors may be unfit to donate blood. Hence, it is the duty of the blood bank centers to recognize these unfit donors and defer them provisionally or permanently.

In our study, it has been found that 11.6% were refused to donate due to cupping. Similarly, Abdelaal et al¹² found that

7.3% were refused due to cupping. The widespread practice of cupping reflects the religious beliefs of the Saudi population in the fact that cupping can manage a variety of diseases.¹⁶

It has also been found in our study that 5.80% were deferred due to less hours of sleep at night. Abdelaal et al¹² also found that inadequate sleep was one of the commonest causes of deferral (6%). This may reflect the unhealthy sleeping habits in the Saudi population, as also concluded in previous studies done specifically in Jeddah and generally in the Middle East.^{15,18}

Our study showed that 13.6% were rejected due to low blood pressure. Similarly, Abdelaal et al¹² reported 12% were rejected due to the same cause. The low blood pressure could be due to the anxiety experienced prior to donation. Various studies have shown that low blood pressure is associated to anxiety.^{14,17}

Low hemoglobin as a cause of blood donor refusal accounted for 10.8% in this study. This is similar to that reported in other studies done in Turkey, India, Singapore, Dubai and Dammam, especially among females.⁷⁻¹¹ This could be due the menstrual loss of blood in the childbearing age group and consumption of low-iron diet.

In a study which was also conducted in Jeddah, Abdelaal et al¹² illustrated that deferral due to high hemoglobin was 0.4%, which was not as common as what has been found in our study, which showed 7% rejection due to high hemoglobin. They were mostly males, and their hemoglobin levels ranged from 17 to 21 g/dL. The reason why high hemoglobin was not reported as a cause of deferral in the previous study done in southern Jeddah may be due to the differences between the criteria of both centers for donor deferral. Since smoking is more common among males than females, a possible cause of high hemoglobin levels in males could be smoking, as concluded in multiple previous studies conducted in the years 2016, 2012 and 1990.²⁰⁻²³

Other studies showed slight differences in the commonest deferral causes, such as a study that was done in the USA that reported sore throat or having a cold or high temperature as the common causes of deferral, which were not much significant in our study.¹⁹

Unlike the findings of this study, a study that was conducted in Singapore showed that infectious diseases such as hepatitis, recent infection with measles and recent sexual activity which increased the risk of sexually transmitted diseases were major causes of blood donor deferral.⁹ Sexually transmitted diseases are generally low in Kingdom of Saudi Arabia compared to that in other countries worldwide, which

is due to religious teachings;²⁷ however, there are higher risks of being exposed due to traveling abroad.²⁴

People were rejected due to history of visiting Africa or Sudan particularly, mainly because they are known endemic areas for malaria and HIV.^{25,26} There was a study done in Sudan that showed an incidence of 9 million episodes of malaria and 44,000 deaths, all in the year 2002.²⁵

The similarities and variations seen between studies conducted on causes of blood donor rejection may be due to the different geographic areas and the cultural, educational and socioeconomic factors.

Conclusion

Low blood pressure (13.6%), cupping (11.6%) and less hours of sleep in the night prior to donation (5.8%) were the major causes of rejection in this study. Similarities and variations between the commonest causes of blood donor rejection may be due to the differences and similarities in the geographic area and in the cultural, educational and socioeconomic factors.

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Disclosure

The authors report no conflicts of interest in this work.

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