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# Blood donation in different regions of Saudi Arabia: acceptance and rejection

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**Abstract**--Background: Regular blood donations are crucial for hospitals to keep a sufficient supply of all blood types on hand. For this study we compared the no of rejected donors to total donors, to compare no of rejected male to female, and to most frequent cause of rejection in six different centers around Saudi Arabia. Methods: This cross-sectional study analyzed data from Saudi donors at six different sites between January and December of 2019. The results of male and female blood donors, as well as rejected donors from the same geographic region, were compared using SPSS analysis. Results: Males were significantly larger than females' donors and the number of accepted donors was significantly larger than rejected donors ( $P < 0.0001$ ; respectively). Low blood pressure and lack of sleep were the two most prevalent causes of rejection (12 %). Recent travel to malaria area was the second-most common cause of rejection (12%). The Hijama and tattoos (12%) played a role in the refusal. Only 5% of the donors who had convulsions were refused. Conclusion: In conclusion, the vast majority of the Saudi blood donors were men. Finding out the causes of rejection will help in donation process.

**Keywords**---blood donation, donor rejection, Saudi Arabia

## Introduction

Blood is a major vital component of the human body. Blood donation has become a vital part of any health care institution since it cannot be generated artificially and can only be received from human resources [1,2]. In surgical operations, trauma, Hematological illnesses, and pregnancy-related issues, the blood given might be utilized [3]. There's no way to keep blood indefinitely, and there's no way to make it synthetically. In order to keep up with the demand for blood in any community, healthy persons must donate their blood on a regular basis [4]. Most blood donors are volunteers, replacement donors, or paid donors, according to the World Health Organization (WHO) and the International Federation of Red

Cross and Red Crescent Societies. A right proportion of donated blood is received from family donors. To ensure that blood is always available when it is required, the WHO recommends that nations develop their own blood donation systems, structures, and processes. Furthermore, the WHO reports that countries with high incomes have a higher rate of blood donation, whereas those with low incomes have a lower rate (31.5 and 5 donations per 1000 people, respectively) [5,6].

All of Saudi Arabia's blood transfusion services are handled by hospital-based blood banks, including donor recruiting, infectious agent testing, plasma preparation and distribution, and storage (Packed RBCs, fresh frozen plasma, platelet concentrate, cryoprecipitate, and filtered products) [7]. There was no longer any need for Saudi Arabian hospitals to import foreign-blooded donors after 1981. This growing need for blood cannot be met with the current supply of donors [3].

Regional research released in Saudi Arabia in 2016 demonstrated a good attitude toward blood donation among Saudis. However, Saudi Arabians' willingness to donate blood is woefully underrepresented [8–10]. Currently, replacement donors (relatives, friends, and co-workers) and volunteer donors both provide blood [11]. People's desire and ability to donate blood is influenced by a variety of circumstances. There is a strong correlation between the demographic statistics of the donor population and their sex, age and educational attainment [12–14]. Studies have indicated that the better informed a person is about blood donation and its importance, the more likely they are to be a blood donor in the past [15,16].

Using specified criteria, a person's fitness to give blood or blood components is assessed through the process of donor selection. Donating blood involves a number of steps, including completing an application, providing background information, completing a questionnaire, having an interview with the prospective donor, and receiving informed consent [17]. So that, blood donors' characteristics and demographics are vital to acquire a clear image of donor structure and guide recruiting and retention initiatives, as well as offer benchmarks for measuring the effectiveness of these efforts [18].

A further issue is that of rejection of deferral [of blood donation]. If a donor's risk of contracting an infectious illness is higher due to their social or medical habits or because of their travel to areas where exposure to an infectious disease is a worry, they may be denied the opportunity to donate blood [19]. A lack of sleep, stress, low blood pressure, drug usage, hypertension and anaemia, to name just a few—have been linked to deferrals in other studies [20,21]. According to varied donor registration methods and donor selection criteria (or lack thereof), overall deferral rates vary substantially between nations, ranging from less than 1% to over 37%. The median is 12% [22,23].

Donor deferrals in the region have only been the subject of a few studies so far, and none of them focused on the demographics of the donor population. So that, the aim of this study was to compare no of rejected donors to total donors, to

compare no of rejected male to female, and to most frequent cause of rejection in six different centers around Saudi Arabia.

## **Method**

### **Study design and data collection**

This cross-sectional study included data analysis of all retrospectively attendance records of blood donors presenting themselves for donation at the Blood Bank in different six Saudi Arabia regions (Jeddah, Riyadh, Jazan, Hial, and Sharqiyah) between January 2019 and December 2019 and then analyzed. The data included the number of total donors, numbers of males and females' donors, and number of rejected donors.

### **Data analysis**

Data were expresses as number or mean +/- standard error of mean and analyzed by IBM SPSS Statistics for Windows, version 23 (IBM SPSS, IBM Corp., Armonk, N.Y., USA). Shapiro – Wilk test was used to evaluate normal data distribution. Frequency and percentage were used to describe categorical variables. Paired student's "t" test was used to compare male and female or blood donors and rejected donors of the same area. P-values of <0.05 were considered statistically significant. Figure was performed by GraphPad Prism software version 9 (GraphPad Software, La Jolla, CA, USA).

### **Discussion**

The total number of participants in this study was 90703. They were mostly from Riyadh (n= 44249, 48%) then Jeddah (n= 14513; 16%) and least from Jazan (n= 5270). The total number of males was 87597 and female was 3106. The total numbers of blood donors were 84389 and rejected donors were 73781. The total number of participants, male, female, accepted donors and rejected donors of different regions was shown in Table 1 and Figure 1. The mean number of males in this study in different rejoins was significantly higher than females ( $P < 0.0001$  for all) (Table 2). The mean number of accepted donors in this study in different rejoins was significantly higher than rejected donors ( $P < 0.0001$  for all) (Table 3). 73781 (87.43 %) of the 84389 possible donations were subsequently deferred throughout the research period. Blood donors were rejected for a variety of reasons, the most common of which were personal, medical examination-related, and the donor's history. The explanation for each deferred blood donation was the same. Participants deferring their blood donation due to various personal reasons were most found to be lacking adequate sleep the night before their donation (12 %).

Rejection was most often caused by the donor having low blood pressure (12%), low haemoglobin (12%), and low weight (12%), as well as high temperature (9%). Other rejection factors on examination were tattoos in the last three months and Hijama (12 %; respectively), all of which increase the risk of exposure to numerous infectious diseases.

Refusal was also based on a donor's history of certain personal behaviours, physical issues, or even travel. Twelve percent of the donors had recently taken different drugs (12%), had recently been to a location where malaria was prevalent (12 %), had previously had surgery (11 %), and followed by taken growth hormone (8 %). Donors who had convulsions (5 %) were among the least likely to be rejected in this research.

A scarcity of research studies on blood donation and its relationship to sociodemographic characteristics among persons who have never gone to a blood bank is a problem, but it is still the best way to understand the low rates of blood donation and lead donor recruitment activities in this community [24–27]. Based on the WHO global report, data of blood donation among the Saudi population in 2013 showed that whole blood donors were 10–19.9 per 1000 population, and of them, 25–49.9% were volunteer donors [22]. Our study revealed the prevalence of blood donation among 93.03% of the study participants and the mean number of accepted donors in different rejoins was significantly higher than rejected donors. Riyadh provided almost 48% of the accepted donors. In Riyadh, Al-Fouzan [28] observed similar rates, while Baig et al. [29] discovered a lower incidence of donation, with a proportion of 19 %. In addition, in study conducted in Riyadh in 2016 by Al-Mutairi et al. [9] greater responses were found. Internationally, the prevalence of donation was also variable, as similar findings of ~30% were observed in Brazilian study among the general population in Pelotas [30]. The public of Pakistan was also investigated on the factors that influence blood donation, and 25 percent were found to be donors [31], compared to 68.8% in Jordan [32]. Research participants might be at fault for these discordant results.

Sociodemographic factors such as sex can have a significant impact on blood donation. Despite the fact that just 30 percent of the world's population donates blood, barely 10 percent of blood donations come from women in some countries [33]. Interestingly, In the current study, the mean number of males in different rejoins was significantly higher than males.

The present study found that 12 % of blood donors rejected to donate because of low haemoglobin levels. It's a finding in line with others, particularly among women, that has been made in Turkey, India, Singapore, Dubai, and Dammam [42–45]. Although the numbers vary according on the donors' demographics, deferrals owing to haemoglobin levels below the set limitations have been observed in various studies to be far more prevalent among women [46–48]. In addition, menstrual blood loss in women of reproductive age and a diet deficient in iron may be to explanation [20]. To ensure that women may continue to donate blood freely without fear of harming their health, we suggest that short-term procedures should be undertaken to prevent and/or rectify the iron deficit caused by whole blood donations in women.

Deferrals due to low weight accounted for 12 % of the total donors' participants in the current study. deferral was also attributed to undernutrition, which may represent the general health of the community. Many rejected donors can be re-entered into the donation pool after effective care of anaemia and low weight [19].

Our research also reported that 12% of participants were rejected because of insufficient night-time sleep. This came in accordance with AlNouri et al. [20] who reported that insufficient sleep was another prominent reason of rejection. According to previous studies done especially in Jeddah and in the Middle East, Saudi Arabians have poor sleeping habits [49,50].

Approximately 12 % were rejected for having low blood pressure in the present study. According to Abdelaal et al., 12 % of participants were rejected for the same reason [51]. Anxiety about donating can be to blame for the low blood pressure. Low blood pressure has been linked to anxiety in a number of studies [52,53].

Malaria is one of the most important transfusion-transmitted infections worldwide. Donors who have had malaria in the past, or who have travelled to or lived in malarial regions in the past, will be prohibited from donating blood indefinitely or for a certain length of time [54]. The results of the present study showed that 12 % donation was deferred because they had recently been to a location where malaria was prevalent. Malaria's deferral rate in the past five years (2006-2010) was 22.84 percent of total donor deferral and 4.2 percent of all donors, according to the research by Hindawi and his colleague's [55]. More than 90% of malaria-deferrals were because of travel to and residence in malaria endemic areas [54].

Donation was deferred in the current study due to recent medication ingestion, which was a major contributing factor. Due to a rise in the usage of therapeutic drugs in the general population, similar outcomes have been seen [56]. Structure and qualities of drugs vary greatly, ranging from analgesics and antibiotics that only have a short-term effect to growth hormones that have a long-term effect. Among potential blood donors, the use of medications is prevalent and projected to grow as many of them are on long-term therapy [57]. The number of potential blood donors will be drastically reduced if they are barred from participating. The concentration, pharmacologic characteristics, metabolites, and medication interactions all have a role in the final decision to delay [58].

Studies on the reasons of blood donor rejection have shown both commonalities and differences, which may be attributable to geographical differences and cultural, educational, and socioeconomic variables.

Table 1  
Total number of participants all over 12 months

Areas	Total participants	Gender		Donors	
		Male	Female	Accepted donors	Rejected donors
Riyadh	44249	42794	1455	41337	35263
Asir	11728	11562	166	11396	8949
Sharqiyah	6851	6738	113	6625	5581
Jazan	5270	5158	112	5046	4751
Hial	8092	8041	51	7990	7926
Jeddah	14513	13304	1209	11995	11311
Total	90703	87597	3106	84389	73781

Table 2  
Compare mean of male versus female donors in different areas

Area	Male	female	Significance
Riyadh	3566.17±137.54	121.25±26.21	<i>P</i> <0.0001
Asir	963.50±31.39	13.83±2.06	<i>P</i> <0.0001
Sharqiyah	561.50±32.23	9.42±1.98	<i>P</i> <0.0001
Jazan	429.83±15.03	9.33±1.77	<i>P</i> <0.0001
Hial	670.08±11.44	4.25±0.51	<i>P</i> <0.0001
Jeddah	1108.67±43.17	100.75±10.21	<i>P</i> <0.0001

Table 3  
Compare acceptance with rejection of donors in different areas

Area	Accepted donors	Rejected donors	Significance
Riyadh	3444.75±129.98	2938.58±127.23	<i>P</i> <0.0001
Asir	949.67±31.75	745.75±22.78	<i>P</i> <0.0001
Sharqiyah	552.08±31.78	465.08±24.91	<i>P</i> <0.0001
Jazan	954.17±32.00	392.75±15.12	<i>P</i> <0.0001
Hial	665.83±11.33	660.50±11.52	<i>P</i> <0.0001
Jeddah	999.58±38.33	942.58±37.84	<i>P</i> =0.004

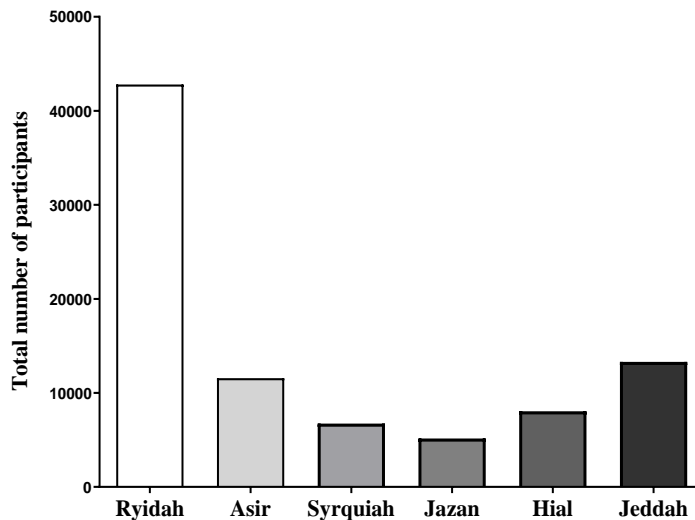


Figure 1: Total number of participants all over 12 months.

## Conclusion

As a result of the findings from this study, it can be concluded that male blood donors dominated female donors. This suggests that Saudi males are more eager and able than Saudi females to donate blood for the greater good. It is imperative to increase the number of women donors by removing obstacles that prevent them from doing so. Moreover, increasing the number of men who donate regularly, in line with their higher propensity for voluntarily providing blood, as well as an improvement in their well-being as donors as a result of these measures.

The deferral rate is average, and the reasons are comparable to those seen in other emerging countries with high incomes. As a crucial tool for ensuring blood safety, determining the pattern of donor deferral can help guide the creation of blood policy. In fact, determining the reasons for donor deferral will lead to a higher rate of donor return and retention. For donors who have been placed on a temporary hold, greater accessibility and more frequent invites are essential [19,59,60]. In addition, cultural, educational, and socioeconomic inequalities may explain some of the observed similarities and discrepancies among the most prevalent reasons for blood donor rejection.

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