ORIGINAL ARTICLE

Indonesian Journal of Blood and Transfusion (*IDJBT*) 2024, Volume 2, Number 2 : 21-24
P-ISSN: 3032-7520

PUBLISHED BY
THE INDONESIAN SOCIETY BLOOD TRANSFUSION PHYSICIAN

Percentage of negative rhesus blood donors based on blood group, gender, type of donor, and age in Tangerang City Blood Collecting Center in 2022

Dinda Octavia Rachma[1*], Nur Azam[1], Tubagus Rifai[1], David H. Sidabutar[1], Oman Jumansyah[1]

[1]Tangerang City Blood Collecting Center, Banten, Indonesia

*Corresponding author:
Dinda Octavia Rachma; Tangerang City Blood Collecting Center, Banten, Indonesia;
menejemenmutu@gmail.com

Received: 2024-04-12
Accepted: 2024-06-25
Published: 2024-07-20

ABSTRACT

Introduction: The availability of blood is highly dependent on blood donors. According to the WHO, 100% of blood fulfillment should come from voluntary donors. From blood donation data for 2016, the distribution of blood donors based on rhesus blood type shows that negative rhesus is a rare blood type, only 0.1% of total blood donations in Indonesia. Approximately 1.2% of Indonesia's population has negative rhesus blood type. Therefore, every blood collecting center must have negative rhesus donor data that can be called up at any time if needed. Tangerang City is one of the blood-collecting centers that is responsible for fulfilling the need for blood products. This research aims to identify the percentage of negative rhesus blood donors in the entire blood donor population at the Tangerang City blood collecting center.

Methods: The type of research used is descriptive research with a quantitative approach, using secondary data obtained from the blood donor management information system (SIMDONDAR) from January to December 2022. The sampling technique used was purposive sampling, which was then processed using the statistical program for social science (SPSS).

Results: A total of 53,323 blood bags were obtained from donations from January to December 2022, both from voluntary donors and replacement donors. From the total donation data of 53,323 donors, only 125 donors (0.23%) of rhesus-negative blood were obtained from blood donation activities in the site and mobile units. Most of the donors have blood type O negative rhesus (39.2%), were male (72%), were voluntary donors (98.4%), and were donors with an age range of 25-44 years old (48.8%)

Conclusion: Each blood collecting center is expected to have a system for handling requests with rare blood groups such as Rhesus Negative; donors can be willing to be called at any time to the Tangerang City blood collecting center.

Keywords: blood collecting center, blood donor, blood type, rhesus negative.
Cite This Article: Rachma, D.O., Azam, N., Rifai, T., Sidabutar, D.H., Jumansyah, O. 2024. Percentage of negative rhesus blood donors based on blood group, gender, type of donor, and age in Tangerang City Blood Collecting Center in 2022. *Indonesian Journal of Blood and Transfusion* 2(2): 21-24.

INTRODUCTION

Blood as a therapeutic product must comply with the quality management system of the blood collecting center as a blood supply unit to ensure its quality and safety and to minimize the potential for bacterial or other microorganism contamination. Blood transfusion services, as one of the health efforts in the context of curing disease and restoring health, really need the availability of sufficient, safe, easily accessible, and affordable blood or blood components for the community.[1]

Availability of blood is highly dependent on blood donors. According to the WHO, 100% of blood fulfillment should come from voluntary blood donors. In 2016, as much as 91.8% of total blood donations came from voluntary blood donors, while some blood collecting centers had difficulty getting voluntary blood donors and were forced to meet their blood fulfillment through substitute donors from family donors (8%) or paid donors (0.2 %). From blood donation data, the distribution of blood donors based on rhesus blood type is known that rhesus negative is a rare blood type, only 0.1% of total blood donations in Indonesia.[2]

Approximately 1.2% of Indonesia's population has negative rhesus blood type. Therefore, every blood collecting center must have negative rhesus donor data that can be called up at any time if needed.[3] Rhesus blood group system is the most clinically significant blood group after the ABO blood group system. Rh D antigen is one of the most common antigens besides A antigens and B antigens on the surface of red blood cells.[4]

Based on research conducted by Irawati in 2014 about the Indonesian rhesus-negative (RNI) community in meeting the need for rhesus-negative blood, it was stated that the RNI community was beneficial in reducing the general public's concern about the need for rhesus-negative blood due to interactions between members, with the result possibility of getting rhesus negative blood more quickly.[5]

Tangerang City is one of the blood-collecting centers that is responsible for fulfilling the need for blood products. A total of 53,323 blood bags were obtained

from donations from January to December 2022, both from voluntary donors and replacement donors. This research aims to identify the percentage of blood donors with a negative rhesus blood group, both voluntary and substitute donors, in the entire blood donor population at Tangerang City Blood Collecting Center in January-December 2022.

METHODS

Study Design

This research uses descriptive research with a quantitative approach. It was conducted using secondary data obtained from the blood donor management information system (SIMDONDAR) used by Tangerang City Blood Collecting Center from January to December 2022.

Study Population

The population in this study were all donors who donated blood both on site and in mobile unit activities. The sample in this study were donors with negative rhesus blood group using a purposive sampling technique. The purposive sampling technique is a sampling technique that is carried out based on the consideration of the researcher who considers that the desired elements already exist in the members of the sample taken.[6]

Data Analysis

The data obtained from the SIMDONDAR system were exported into Microsoft Excel and then processed and analyzed using SPSS version 20. Descriptive statistics such as frequency and percentage are used to summarize the characteristics of negative rhesus donors at Tangerang City Blood Collecting Center, which will be presented in tables.

Table 1. Characteristics of donors based on blood group

Blood Group	Frequency	Percentage (%)
A-	39	31.2
AB-	13	10.4
B-	24	19.2
O-	49	39.2
Total	125	100.0

Source: Secondary Data of Tangerang City Blood Collecting Center 2022

Table 2. Characteristics of donors based on gender

Gender	Frequency	Percentage (%)
Male	90	72.0
Female	35	28.0
Total	125	100.0

Source: Secondary Data of Tangerang City Blood Collecting Center 2022

Table 3. Characteristics of donors based on type of donor

Type of Donor	Frequency	Percentage (%)
DP	2	1.6
DS	123	98.4
Total	125	100.0

DS: voluntary blood donors; DP: replacement/family blood donors
Source: Secondary Data of Tangerang City Blood Collecting Center 2022

Table 4. Characteristics of donors based on age classification

Age Classification (years old)	Frequency	Percentage (%)
17-24	19	15.2
25-44	61	48.8
45-64	45	36.0
Total	125	100.0

Source: Secondary Data of Tangerang City Blood Collecting Center 2022

RESULTS

Research data collection was carried out on June 26, 2023, using the system used by the Tangerang City Blood Collecting Center (SIMDONDAR). The research was taken from the total donation data of 53,323 donors; only 125 donors with negative rhesus (0.23%) were obtained from blood donation activities in the site and mobile units. The data used in this study included the number of blood donors with negative rhesus based on blood type, gender, type of donor, and age classification.

Based on **Table 1**, it is known that 125 negative rhesus donors donated at Tangerang City Blood Collecting Center. The majority of negative rhesus blood donors were O Rh neg (O-) as many as 49 donors (39.2%), while the least were AB Rh negative (AB-) as many as 13 donors (10.4%). Thirty-nine donors (31.2%) had blood type A negative rhesus, and 24 donors (19.2%) had blood type B negative rhesus.

Based on data from **Table 2**, most negative rhesus donors who donated blood in January-December were male, with as many as 90 donors (72%). Thirty-five negative rhesus blood donors (28%) in this study were female.

Based on **Table 3**, out of 125 negative

rhesus donors, the majority were voluntary blood donors (DS), as many as 123 donors (98.4%). Meanwhile, 1.6%, or only 2 donors, were replacement or family blood donors (DP).

Based on data from **Table 4**, out of 125 negative rhesus donors, the majority of donors based on age classification were donors between 25 and 44 years old, as many as 61 donors (48.8%). Forty-five negative rhesus blood donors (36%) in this study are donors between 45 and 64 years old, and 19 donors (15.2%) are donors between 17 and 24 years old.

DISCUSSION

The term blood group system refers to the type of antigen (Ag) found on red blood cells whose specificity is determined by the genes on the chromosomes. The term type of blood group refers to the specificity of the results of the reaction of red blood cells to certain types of antisera.[1]

As of December 2022, it is known that there are 44 blood group systems representing more than 354 antigens on the surface of erythrocytes that are registered by the International Society of Blood Transfusion (ISBT).[7] However, the blood group examination carried out in each Blood Collecting Center until now is ABO and Rhesus (Rh) blood groups. For examination of the Rh system, only the D antigen is examined.[8]

In contrast to the ABO system, the main Rh antigen is found exclusively on erythrocytes (absent on leukocytes and platelets) and not on tissue cells or in a soluble form in body fluids, such as saliva. The five main types of Ag are Ag D, C, E, c, and E. One type of Ag Rh, namely Ag D, is highly immunogenic (triggers the formation of antibodies). Ag Rh has the function of maintaining the integrity of the red blood cell membrane.[9]

According to Yunus et al. (2022), antigen D is the most critical rhesus antigen because it is very antigenic compared to other rhesus antigens. A person is classified as rhesus (Rh) positive or negative based on the presence or absence of the D antigen. Rh positive is when a person who has inherited the D gene and whose red blood cells express the D antigen. Meanwhile, Rh negative is when a person who does not inherit the D gene and whose erythrocytes do not express the D antigen.[9]

According to its name, weak D antigen (D^{u}), this blood group variation occurs because not much Ag D is expressed, resulting in a weak agglutination reaction with an anti-D reagent.[1] Weak D examination must be done to determine the rhesus in the donor. Only negative rhesus blood donors with negative, weak D can be given to patients with negative rhesus blood groups.[3] Meanwhile, a negative rhesus blood donor with a positive weak D should be considered a positive rhesus blood type. This is done to avoid transfusions to patients with negative rhesus so that alloimmunization reactions do not occur in patients.[1]

The Indonesian Rhesus Negative Community (RNI) is a community that is purely engaged in the social sector (non-profit) which was formed based on rhesus blood similarity and high dependence among fellow owners of rhesus negative blood so that if one day one of the owners needs a transfusion it can be resolved quickly.[5]

Most negative rhesus donors who donated blood in January-December 2022 in this study were male. Male blood donors have fewer donor requirements than female blood donors. The small number of female blood donors is because females have more requirements to donate blood than men.[10]

The majority of blood donors in this study were voluntary blood donors. According to Regulation of the Minister of Health of the Republic of Indonesia (Permenkes) No. 91 of 2015, based on donor motivation, family or substitute donors are one of the types of donors allowed besides voluntary donors.[3]

Based on age classification, most negative rhesus blood donors in this study were donors aged 25-44 years old. For female donors, the recommended age is 17-55 years, while for males, it is in the range of 17-60 years. However, it is possible that people over 60 years old can donate blood by looking at their medical history and conditions when they are going to donate blood, provided that donors can donate blood again 6 months after the previous donation.[11] This study is limited to providing information on the percentage of negative rhesus blood donors based on blood group, gender, type of donor, and age. It is limited to the Tangerang City blood collecting center and is only conducted within one year. Long-term research and relationships between the variables may be conducted in the future.

CONCLUSION

Most of the negative rhesus donors in this study have blood type O negative rhesus (39.2%), were male (72%), were voluntary donors (98.4%), and were donors with an age range of 25-44 years old (48.8%). Based on the study's results, it is hoped that the blood supply for rare blood groups such as negative rhesus will always be fulfilled so that there are no obstacles or delays that can interfere with the transfusion process to patients. Each Blood Collecting Center is expected to have a system for handling requests with rare blood groups, such as negative rhesus, in connection with the Indonesian Rhesus Negative Community and or other communities that have been formed between donors form an interaction so that when there is a request regarding a negative rhesus blood product, donors can be willing to be called at any time to Tangerang City Blood Collecting Center.

DISCLOSURES

CONFLICT OF INTEREST

There is no conflict of interest.

ETHICAL CONSIDERATION

All procedures were approved by the Health Research Ethics Commission of Tangerang City blood collecting center.

FUNDING

No funding.

AUTHOR CONTRIBUTIONS

Each author contributed to this study.

REFERENCES

1. Maharani EA, Noviar G. Imunohematologi dan Bank Darah. Jakarta: Kementerian Kesehatan Republik Indonesia; 2018.
2. Wardah, Direktorat Pelayanan Kesehatan Primer. Pelayanan Darah di Indonesia. Infodatin Pusat Data dan Informasi Kementerian Kesehatan RI. 2019.
3. Kementerian Kesehatan RI. Peraturan Menteri Kesehatan Republik Indonesia Nomor 91 Tahun 2015 tentang Standar Mutu Pelayanan Transfusi Darah [Internet]. Jakarta: Kementerian Kesehatan Republik Indonesia; 2015. Available from: https://peraturan.bpk.go.id/Details/116661/permenkes-no-91-tahun-2015
4. Kanko TK, Woldemariam MK. Prevalence of Rhesus D negativity among reproductive age women in Southern Ethiopia: a cross-sectional study. BMC Womens Health. 2021;21(1):161. Available from: https://doi.org/10.1186/s12905-021-01315-3
5. Irawati ND. Jaringan Sosial Komunitas RNI dalam Memenuhi Kebutuhan Darah Rhesus Negatif (Studi Deskriptif pada Komunitas Rhesus Negatif Indonesia (RNI) di Surabaya). J Online Sosiol Fisip Unair. 2014;3(1):1–11.
6. Surahman, Rachmat M, Supardi S. Metodologi Penelitian [Internet]. Jakarta: Pusdik SDM Kesehatan; 2016. Available from: https://ebook.uimedan.ac.id/home/penulis/dTVhLytoVFQ4ZlR6L0FSYlVIREJ4dz09
7. International Society of Blood Transfusion. Red Cell Immunogenetics and Blood Group Terminology [Internet]. ISBT. Available from: https://www.isbtweb.org/isbt-working-parties/rcibgt.html
8. Merizka E, Herlina H, Suzane M. Kesadaran Pengetahuan terhadap Golongan Darah Berdasarkan Status Ekonomi Keluarga di SMA Muhammadiyah 23 dan SMUN 44 Jakarta. Syukur J Inov Sos dan Pengabdi Kpd Masy. 2019;2(1):62–8. Available from: https://journal.uhamka.ac.id/index.php/syukur/article/view/2961
9. Yunus R, Atmaja RFD, Harun H, Cahyono JA, Purnama T, Purwati R, et al. Immunohematologi dan Bank Darah. PT. Global Eksekutif Teknologi; 2022.
10. Purwanti RD. Persentase Pendonor Darah Sukarela dan Pengganti Berdasarkan Golongan Darah, Usia dan Jenis Kelamin di UDD PMI Kabupaten Blora pada Tahun 2022 [Internet]. 2023. Available from: https://repository.poltekkes-smg.ac.id/index.php?p=show_detail&id=34652
11. Rosidah, Twistiandayani R, Vauzyana I, Yazid EA. Perbedaan Kadar Hemoglobin Sebelum dan Sesudah Donor Darah dengan Pemeriksaan Metode POCT (Point of Care Testing). J Penelit Multidisiplin. 2022;1(1):56–60.