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Profile of female blood donors in the blood transfusion units of Dr. Sardjito Central General Hospital Yogyakarta

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ABSTRACT

Introduction: Blood transfusion has been widely used in various medical services due to its benefits. Blood transfusion units (UTD) in Indonesia remain to experience a shortage of 972,552 blood units, or amounted to 18.8%. The percentage of female donors in Indonesia is 27.5%, while that of male donors is 72.5%. This large difference in proportion is caused by various erroneous assumptions, including that women are considered to have donated blood naturally every month through the menstrual process. This study aims to prove the low proportion of female donors and discovering the profile of female donors in the Blood Transfusion Unit (hereinafter referred to as UTD) of Dr. Sardjito General Hospital (hereinafter referred to as RSUP Dr. Sardjito) Yogyakarta.

Methods: This descriptive study utilized data from 62,221 blood donors in 2017–2019 taken from the donor database of the UTD of RSUP Dr. Sardjito Yogyakarta.

Results: Female donors at RSUP Dr. Sardjito in 2017-2019 reached 13,873 (22.3%) donors, 71.6% of them having an age range of 17-30 and 38.31% of them having blood type O. Rhesus positive was found in 99.58% of donors, while rhesus negative was found in 0.42% of donors. Female donors with a Hb range of 12.5-14 g/dL reached 69.16%, while those with a Hb range of 14.1-15.5 g/dL reached 26.97%. Whole blood component was found in 99.97% of donors, and voluntary donor status was found in 94.25% of donors.

Conclusion: The proportion of female donors is much smaller than that of males, with the majority being whole-blood donors. The most common blood type found in female donors is O, and the highest age range is 17 to 30. The highest Hb range is 12.5-14 g/dL. Most of them are voluntary donors.

Keywords: Female donors, blood transfusion units of RSUP Dr. Sardjito Yogyakarta.
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INTRODUCTION

Human blood is a vital, essential, and irreplaceable element of human life. Blood transfusion is considered to be able to save human lives and has been widely used in various medical services such as surgery, severe trauma, severe anemia, hematological malignancies, and pregnancy complications. The primary source of blood and blood components is blood donors, while the obligation of a blood bank or blood transfusion unit is to provide sufficient and safe blood for the community.[1] Accordingly, the data collection process, including the sex and delivery status of the donors, is very important, even though the utilization of the data in guiding transfusion practices varies by product and has changed over time.[2]

The sex of the donor remains a widely debatable matter in various parts of the world, especially regarding female donors because they pose a higher risk of developing anemia than male donors. One of the causes of anemia in women is the physiological adaptation in pregnancy in the form of plasma volume expansion that is greater than the increase in red blood cell mass, causing hemodilution and anemia. Other causes include a decrease in the number of iron reserves due to menstruation, blood loss during childbirth, and less consumption of iron-containing foods.[3] Women are also more likely to have leukocyte antibodies induced by previous exposure to alloantigens. Such exposure to aloe occurs either through pregnancy, blood transfusion, or organ or stem cell transplantation.[4]

Wise et al. stated that transfusion-related acute lung injury (TRALI), which is the most common cause of transfusion-related death, has been proven to correlate with female donors.[5] Evidence of an increased risk of TRALI consistently makes New Zealand stipulate that only men are allowed to donate blood, while Australia prohibits pregnant, recently pregnant, and lactating women from donating blood.[6,7] This increased risk of TRALI also makes the American Association of Blood Banks (AABB) stipulates that a plasma donor must be a man or a woman who has never been pregnant with an additional requirement to undergo a human leukocyte antigen (HLA) test. This restriction also applies to all blood products that have HLA antibodies, such as apheresis platelets and whole blood.[2]

Data from the Ministry of Health of the Republic of Indonesia in 2016 stated that 72.5% of blood donations came from

male donors, and only 27.5% came from female donors. Meanwhile, based on the annual report of 281 UTDs in Indonesia in 2016, it was found that Indonesia remained to experience blood shortages of 972,522 blood bags which equals 18.8% of the total blood bags needed. According to WHO guidelines, the need for blood is at least 2% of the total population.[8] For these reasons, the role of female donors is very important to achieve sufficient blood needs in Indonesia. The large proportion of differences between male and female donors is caused by various erroneous assumptions, including that women are considered to have donated blood naturally every month through the menstrual process and that women have bled a lot during pregnancy and childbirth, as well as cultural problems where women are dependent on men.[1]

The main focus of this study is female donors, who have an important role in meeting the need for blood in Indonesia, but their participation in blood donation remains very low. In addition, the many misconceptions about female donors also cause the low proportion of female donors in various places. This study aims to prove the low proportion of female donors and observe the profile of female donors in the UTD of RSUP Dr. Sardjito Yogyakarta. The results of this study are expected to help health planners ans serve as a basis for developing strategies to increase women's participation in blood donation.

METHODS

This is a descriptive study using data from the donor database of the UTD of RSUP Dr. Sardjito Yogyakarta. The inclusion criteria include male or female donors aged 17-79 years with a Hb level ranging from 12.5-17.9 g/dL and meeting other criteria for donor selection specified in the Regulation of the Minister of Health of the Republic of Indonesia Number 91 of 2015 concerning Blood Transfusion Service Standards. The exclusion criteria include donors with incomplete data and/or canceled as donors for any reason. The statistical analysis was performed using SPSS version 22, and the results were presented in tabular form. This study has received ethical approval from the Ethics Committee of the Faculty of Medicine, Public Health and Nursing, UGM (No: KE/FK/1021/EC/2020).

RESULTS

In this study, there were 62,221 blood donor subjects consisting of 48,348 (77.7%) male donors and 13,873 (22.3%) female donors. The median age of the donors was 29 years, with an age range of 17-79 years. The largest age group was 17-30 years and amounted to 32,842 (52.8%) donors. The most common blood type was O which was found in 23,996 (38.6%) donors, while the least blood type was AB which was found in 4,618 (7.4%) donors. The most common rhesus was rhesus D positive, which was found in 61,937 (99.5%) donors. The median donor hemoglobin was 14.9 g/dL, ranging from 12.5-17.9 g/dL. The whole blood component was higher, taken from 61,614 (91.3%) donors, than the apheresis component, taken from 607 (1%) donors. Most of the donors, amounting to 56,801 or 91.3%, had a voluntary status (Table 1).

The highest age range for female donors was 17 – 30 years, amounting to 9,934 donors (71.61%), followed by 31–40 years, amounting to 1,938 donors (13.97%), 41-50 years, amounting to 1,380 donors (9.95%), 51-60 years, amounting to 598 donors (4.31%), and > 60 years, amounting to 23 donors, amounting to 0.16% (Table 2). Blood type O is the most common blood type found in 5,315 female donors (38.31%), followed by blood type B found in 4,189 female donors (30.20%),

Table 1. Subject characteristics (n = 62,221 subjects).

Variables	N (%)
Sex	
Male	48,348 (77.7%)
Female	13,873 (22.3%)
Age (years)*	29 (17-79)
- 17-30	32,842 (52.8%)
- 31-40	13,980 (22.5%)
- 41-50	10,326 (16.6%)
- 51-60	4,685 (7.5%)
- > 60	388 (0.6%)
Blood type	
- A	14,826 (23.8%)
- B	18,781 (30.2%)
- AB	4,618 (7.4%)
- O	23,996 (38.6%)
Rhesus D	
- Positive	1.937 (99.5%)
- Negative	284 (0.5%)
Hemoglobin (g/dL)*	14.9 (12.5 – 17.9)
Component Type	
- *Whole Blood*	61,614 (99%)
- *Apheresis*	607 (1%)
Donor Status	
- Voluntary	56,801 (91.3%)
- Replacement	5,420 (8.7%)

*Data is presented in median (min-max)

Table 2. Number of female donors by age in 2017–2019.

Age (years)	Female Donors	
	N	%
17–30	9,934	71.61
31–40	1,938	13.97
41–50	1,380	9.95
51–60	598	4.31
> 60	23	0.16

Table 3. Number of female donors by blood type in 2017–2019.

Blood Type	Female Donors	
	N	%
A	3,249	23.42
B	4,189	30.20
AB	1,120	8.07
O	5,315	38.31

Table 4. Number of female donors by rhesus D in 2017–2019.

Rhesus D	Female Donors	
	N	%
Positive	13,815	99.58
Negative	58	0.42

Table 5. Number of female donors by Hb group in 2017–2019.

Hb (g/dL)	Female Donors	
	N	%
12.5-14	9,594	69.16
14.1-15.5	3,741	26.97
15.6-17.9	536	3.87

Table 6. Number of female donors by component type in 2017–2019.

Component Type	Female Donors	
	N	%
Whole Blood	13,869	99.97
Apheresis	4	0.03

Table 7. Number of female donors by donor status in 2017–2019.

Donor Status	Female Donors	
	N	%
Replacement	798	5.75
Voluntary	13,075	94.25

blood type A found in 3,249 female donors (23.42%), and blood type AB found in 1,120 female donors, amounting to 8.07% (Table 3).

Rhesus positive was found in 13,815 donors (99.58%), while rhesus negative was found in 58 female donors, amounting to 0.42% (Table 4). The highest Hb distribution in female donors was in the range of 12.5-14 g/dL found in 9,594 donors (69.16%), followed by the Hb range of 14.1-15.5 g/dL found in 3,741 donors (26.97%), and the Hb range 15.6-17.9 g/dL found in 536 donors, amounting to 3.87% (Table 5). Female donors were dominated by whole blood donors, as many as 13,869 (99.97%), and there were only four apheresis donors, amounting to 0.03% (Table 6). Female donors were dominated by voluntary donors, amounting to 13,075 donors (94.25%), while replacement donors only reached 798 donors, amounting to 5.75% (Table 7).

DISCUSSION

In this study, there were 48,348 (77.7%) male donors and 13,873 (22.3%) female donors in 2017–2019 (Table 1). It complies with the results of a study by Elsafi et al., stating that the number of male donors at the Dahran blood bank in Saudi Arabia was 98.2%, far higher than female donors, which was 1.8%.[9] A study by Siraj et al. mentioned several reasons for the lack of women's participation in blood donation, including the existence of various wrong assumptions that women are considered to have donated blood naturally every month through the menstrual process and that women have bled a lot during pregnancy and childbirth, as well as cultural problems where women have a dependence on men.[1] Other causes of the low proportion of female donors included the assumption that women are weaker and pose a higher risk of developing anemia after blood donation, fear of needles used in the blood donation process, and being of reproductive age. Female health workers stated that they did not donate their blood because of the concerns that their blood donor screening test results would be positive, the false information that plasma from female donors would not be used, and the concerns about complications after blood donation.[10] A subsequent study by Kasraian et al. mentioned that the lack of female donors was caused by the fact that women were rarely asked to donate blood, were too lazy to go through the long process of donating blood, were worried about contracting diseases through donor needles, and had no time for donors, as well as the opinion that donating blood is not important.[11]

The results of this study stated that the most female donors in 2017–2019 were in the age range of 17–30 years (Table 2). It is in line with a study by Madrona et al., stating that female donors aged 18-30 years were the largest group of female donors who registered as first donors compared to other age groups.[12] Burgdorf et al. mentioned that the decline in female donors after 25 was due to the process of childbirth and breastfeeding.[13]

The highest blood type in female donors was blood type O found in 5,315 donors (38.31%), followed by blood type B found in 4,189 female donors (30.20%), blood type A found in 3,249 female donors (23.42%), and blood type AB found in 1,120 female donors or 8.07% (Table 3). This study's results align with the results of a previous study by Apecu et al., in which blood type O was the most common blood group found in blood donors, while blood type AB was the least common one.[14] It also complies with information from the Ministry of Health of the Republic of Indonesia in 2018 that from the data on the distribution of blood donations according to ABO and Rhesus blood groups, blood type O (39%) was the most common blood group, followed by blood type B (28%), blood type A (24%), and blood type AB (8%).[8]

Rhesus positive was found in 13,815 female donors (99.58%), while rhesus negative was found in only 58 female donors or 0.42% (Table 4). It is in line with the results of a study by Singh et al., who

found that 96.46% of donors had rhesus positive and only 3.54% of donors had rhesus negative.[15]

The highest Hb distribution in female donors was in the range of 12.5-14 g/dL found in 9,594 donors or 69.16% (Table 5). A previous study by Astuti et al. stated that the highest Hb range in donors was 14.1–15.5 g/dL.[16] It is widely known that the average Hb level in women is 12% lower than that in men.[17] Women are also more likely to experience iron deficiency anemia than men because of the menstrual process and less consumption of iron-rich foods, such as red meat.[18]

Nowadays, blood transfusions are often performed using only the components needed by the patient, such as red blood cells, granulocytes, platelets, and plasma containing specific proteins and clotting factors. Blood components that are often used in transfusion include platelets obtained through thrombopheresis procedures.[19] The number of female apheresis donors in 2017-2019 amounted to only four donors (0.03%), while the number of female whole blood donors amounted to 13,869 donors or 99.97% (Table 6). It is similar to the results of a study by Charbonneau et al., where it was found that women who became apheresis donors were significantly fewer than those who became whole blood donors because the apheresis donor process could not be performed in a blood donor car (mobile unit). Instead, it should be performed at a blood transfusion center located quite far from where they lived.[20]

Female donors were dominated by voluntary donors, amounting to 13,075 donors (94.25%), while there were only 798 replacement donors, amounting to 5.75% (Table 7). Several studies have shown that women have a greater tendency to donate blood voluntarily than men due to altruistic reasons, a sense of responsibility towards society, and the belief that blood donation is valuable.[11,12]

The applicable strategies to increase women's participation in blood donation based on the results of this study includes holding educational forums and blood donation events in high schools, universities, shopping centers, village halls, and places of worship. Education and dissemination can also be performed by uploading videos, infographics, and PDF booklets in various applications and social media, both regarding the information on blood donors for women, statistical information on the number of blood bag shortages in Indonesia, testimonials from female donors who have experienced the positive benefits of blood donors, as well as testimonials from patients who have received blood transfusions. Another strategy that can be done is sharing a question-and-answer link about female blood donors in various women-only internet forums and holding online seminars on female blood donors through social media.

CONCLUSION

The number of female donors in 2017–2019 was 13,873 (22.3%) donors. The proportion of female donors was much fewer than that of men, with the majority being whole blood donors. The most common blood type was blood type O, and the most common age group was 17-30 years. The highest Hb group was 12.5-14 g/dL, and most of them were voluntary donors.

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AUTHOR CONTRIBUTION

All authors had contributed for manuscript writing and agreed for the final version of the manuscript for publication.

CONFLICTS OF INTEREST

The author reports no conflicts of interest in this work.

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REFERENCES

1. Siraj S, Shazia B, Jallu AS. Gender Differences in Blood Donation among Donors of Kashmir Valley. 2015;14(2):116–9.
2. Zimmerman BJ, McGregor AJ. Sex- and Gender-Related Factors in Blood Product Transfusions. Gend Genome. 2020;4:247028972094806.
3. Chaparro CM, Suchdev PS. Anemia Epidemiology, Pathophysiology, and Etiology in Low- and Middle-Income Countries. Ann N Y Acad Sci. 2019;1450(1):15–31.
4. Middelburg RA, Van Stein D, Zupanska B, et al. Female Donors and Transfusion-related Acute Lung Injury. Transfusion. 2010;50(11):2447–54.
5. Wise J. Increased Risk of Death for Men Given Blood Transfusions from Previously Pregnant Women, Study Shows. BMJ. 2017;359:4795.
6. Saxton P. Changes to Blood Donor Deferral in New Zealand Summary for the Gay Community. 2020.
7. Issues J, With B, Australian. The Blood Donation in Australia. 2020;(1):1–16.
8. Haslinda, Hariyani I, Siti Mayuningsih I. Pusat Data dan Informasi Kementerian Kesehatan RI. Pelayanan Darah di Indonesia. 2018.
9. Elsafi SH. Demographical Pattern of Blood Donors and Pre-donation Deferral Causes in Dhahran, Saudi Arabia. J Blood Med. 2020;11:243–9.
10. Toogeh G, Mirrezai S, Tabatabaee SM, et al. Women's Blood Donation: A Qualitative Study Exploring the Reasons for Non-Donation of Blood in Female Staff at Tehran Blood Transfusion Center Gholamreza. 2015;1(3):24–8.
11. Kasraian L, Ashkani-Esfahani S, Foruozandeh H. Reasons of Under-representation of Iranian Women in Blood Donation. Hematol Transfus Cell Ther. 2021;43(3):256-262. doi: 10.1016/j.htct.2020.03.009
12. Madrona DP, Dolores Fernández Herrera M, Prados Jiménez D, et al. Women as Whole Blood Donors: Offers, Donations and Deferrals in the Province of Huelva, South-Western Spain. Blood Transfus. 2014;12(1).
13. Burgdorf KS, Simonsen J, Sundby A, et al. Socio-Demographic Characteristics of Danish Blood Donors. PLoS One. 2017;12(2):1–11.
14. Apecu RO, Mulogo EM, Bagenda F, et al. ABO and Rhesus (D) Blood Group Distribution among Blood Donors in Rural South Western Uganda: a Retrospective Study. BMC Res Notes. 2016;9(1):1–4.
15. Singh A, Srivastava R, Deogharia K, et al. Distribution of ABO and Rh Types in Voluntary Blood Donors in Jharkhand Area as a Study Conducted by RIMS, Ranchi. J Fam Med Prim Care. 2016;5(3):631.
16. Astuti Y, Artini D. Comparative Hemoglobin and Hematocrit Before and After Donation To Blood Donate in Unit Transfusion Yogyakarta City. J Ris Kesehat. 2019;8(2):40.
17. Murphy WG. The Sex Difference in Haemoglobin Levels in Adults-Mechanisms, Causes, and Consequences. Blood Rev. 2014;28(2):41–7. Doi: 10.1016/j.blre.2013.12.003.
18. Awidi M, Bawaneh H, Zureigat H, et al. Contributing Factors to Iron Deficiency Anemia in Women in Jordan: A Single-Center Cross-Sectional Study. PLoS One. 2018;13(11):1–10.
19. Wicaksana A, Triyono T, Intansari U. Factors Influencing Plateletpheresis Donations in Dr. Sardjito General Hospital, Yogyakarta, Indonesia. J thee Med Sci (Berkala Ilmu Kedokteran). 2018;50(3).
20. Charbonneau J, Cloutier MS, Carrier É. Whole Blood and Apheresis Donors in Quebec, Canada: Demographic Differences and Motivations to Donate. Transfus Apher Sci. 2015;53(3):320–8. Doi: 10.1016/j.transci.2015.06.001.