


REVIEW

Update on the characteristics of blood donations. Availability, attitudes and influencing factors

Actualización sobre las características de las donaciones de sangre. Disponibilidad, actitudes y factores influyentes

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ABSTRACT

Introduction: blood is a fluid of living cells, the quantity of which can be affected by various causes. Blood transfusions are essential in the treatment of multiple medical situations that cannot be treated with other procedures. They can occur as a result of voluntary, replacement and paid donations. This research was carried out with the aim of characterizing the blood donation process.

Method: a bibliography review was carried out, where 30 articles in Spanish and English were selected, published in the last five years on the subject, in databases such as: Scopus, Scielo, Pubmed, Springer.

Results: blood donation is a social fact. The current shortage of blood donations is due to an inefficient blood supply system, in which replacement donation predominates, although voluntary donation is the most popular form of donation. This suggests a failure in primary health care and its promotional value, due to the lack of education and culture of donation in the world population. Donations are also affected by political, social and psychological aspects.

Conclusions: the low number of donations worldwide determines the presence of the unavailability of blood for transfusion as one of the current health problems. The process occurs mainly voluntarily and is affected by factors such as educational level, socioeconomic characteristics, fears, lack of education and culture on the subject.

Keywords: Blood Donation; Blood Banks; Blood Transfusion; Blood Groups; Voluntary Donation.

RESUMEN

Introducción: la sangre es un fluido de células vivas, cuya cuantía puede verse afectada por diversas causas. Las transfusiones de sangre son fundamentales en el tratamiento de múltiples situaciones médicas que no pueden intervenir con otros procedimientos. Las mismas pueden ocurrir producto a donaciones voluntarias, de reposición y remuneradas. Se realizó la presente investigación con el objetivo de caracterizar el proceso de donaciones de sangre.

Método: se realizó una revisión de bibliografía, donde se seleccionaron 30 artículos en español e inglés, publicados en los últimos cinco años sobre el tema, en bases de datos como: Scopus, Scielo, Pubmed, Springer.

Resultados: la donación de sangre es un hecho social. La escasez de donaciones de sangre existente se debe a un sistema de suministro de sangre ineficiente; en el que predomina la donación por reposición aunque la forma más popular de donación sea la voluntaria. Lo anterior sugiere un fallo en la atención primaria de salud y su valor promotora, por ausencia de educación y cultura de donación en la población mundial. Las donaciones se ven afectadas además por aspectos de índole política, social y psicológica.

Conclusiones: la baja cifra de donaciones a nivel mundial determina la presencia de la indisponibilidad de

sangre para transfusión como uno de los problemas de salud actuales. El proceso ocurre principalmente de forma voluntaria y se ve afectado por factores como el nivel educacional, las características socioeconómicas, miedos, falta de educación y cultura en el tema.

Palabras claves: Donación de Sangre; Bancos de Sangre; Transfusión de Sangre, Grupos Sanguíneos; Donación Voluntaria.

INTRODUCTION

Blood is a fluid of living cells that can renew itself through mechanisms associated with the production and maturation of mature cells so that people can donate it to those who require it.⁽¹⁾

With the discovery of blood circulation by William Harvey in 1816, the idea of administering blood directly into the bloodstream was conceived.⁽²⁾ Since the first successful transfusion in humans was achieved in 1818 by James Blundell, the development of what is now known as transfusion medicine was initiated.^(3,4) In 1900, the ABO blood system was discovered by Lansteiner. In 1944, sodium citrate was introduced as an anticoagulant.⁽²⁾

Blood donation is the safe collection of blood from a consenting individual to treat various diseases, operations, or accidents.^(5,6,7,8) According to the International Society of Blood Transfusion, a donor is any person who voluntarily donates blood or blood components; it also refers to donation as a civic act for the benefit of others and contributes to social cohesion.⁽³⁾

Blood banks are epidemiological surveillance units because, during the activities of medical selection of the donor and the screening of infections through laboratory tests, individuals at risk of suffering or carrying the disease are recognized so that these healthy people should be incorporated into the health care system.⁽²⁾

Transfusion of hemocomponents is essential in the treatment of multiple medical situations that cannot be treated with other procedures and in which hemodynamics must be maintained to prevent complications or death, as in the case of emergencies due to accidents, violence, major surgery,^(1,9) complications of pregnancy and childbirth, ten chronic diseases and hematological disorders.⁽¹¹⁾

According to the World Health Organization (WHO) recommendations, ten blood donations per 1000 inhabitants (donation rate of 1 %) are sufficient to meet the needs of the respective population.^(12,13) Statistics show that 117,4 million blood units are collected worldwide annually.^(14,15) The blood donation rate per 1000 people is 31,5 in high-income countries, 15,9 in upper-middle-income countries, 6,8 in lower-middle-income countries, and 5 in low-income countries.^(1,6)

In Japan, blood donations are expected to decrease from 5 260,000 in 2012 to 4 770,000 in 2025 (9,3 %). This decline is mainly associated with donors in their 20s and 30s. Moreover, it is estimated that 5 660 000 donations will be needed in 2025.⁽¹⁵⁾

An adequate supply of safe blood is a significant public health challenge worldwide, where blood shortages are common and have serious consequences.⁽¹³⁾ Insufficient blood donation and blood shortages contribute to preventable deaths resulting from major surgeries, trauma, cancer, anemia, and pregnancy-related complications.⁽⁷⁾

Considering the above, the present research was conducted to characterize the blood donation process.

METHOD

A literature review study was carried out, in which a total of 30 articles were selected, published in the last five years, in Spanish and English, related to blood donations, using the keywords: blood donation; blood banks; blood transfusion, blood groups; voluntary donation, in the following databases: Scopus, Scielo, Pubmed, Springer.

The articles were downloaded and analyzed, which allowed the authors to select and synthesize the information of interest and the correct development of this research.

DEVELOPMENT

Blood donation is a social fact in which convictions of all kinds of religions, solidarity, economics, and compensation coincide. Because donation involves three obligations: giving, receiving, and giving back, donors are an example of what it means to live in a community.⁽¹⁶⁾ It is an act of humanity that points to a potential donor's social value.

According to the World Health Organization (WHO), 17 of only 62 countries have blood supply systems that rely entirely on voluntary, unpaid donations. As a result, blood donation organizations are exploring the possibility of offering incentives or rewards to increase donor recruitment. Research suggests that people may be more willing to act if they are sufficiently motivated or incentivized to give blood.

The only way to guarantee a sufficient blood supply is to increase voluntary blood donation programs at the national and local levels and to manage donors adequately.⁽¹⁸⁾ Olivera Cuadra, five states that the blood donor should be, above all, an individual who voluntarily and altruistically is willing to give his or her blood, or some of its components, to be used for patients in need.

The availability of this serum is a worldwide problem, with a growing tendency to demand this therapy in the face of a shortage of its availability for various reasons.

Blood availability

The demand for blood transfusions is increasing at an alarming rate due to the increasingly widespread use of invasive procedures, the increase in accidents, and chronic noncommunicable diseases requiring transfusion.⁽¹³⁾ There are other factors in addition to the above, such as the poor culture of donation, the lack of values such as solidarity, humanity, brotherhood, lack of knowledge about the procedure, among others.

According to the Pan American Health Organization (PAHO), only ten countries in the Latin American region have a rate of 90 % of voluntary donors, increasing by less than 1 % between 2015-2017, which is far from the goal of 100 % set by the WHO.⁽¹⁴⁾

A study shows that the gap between blood demand and supply is vast in many low- and middle-income countries, with annual global demand for blood of 304 million 711 thousand 244 and a supply of 272 million 270mil 243 units of blood products, implying a demand/supply ratio of 1,12. Of 195 countries, 119 (61 %) did not have an adequate blood supply to meet their needs. In these 119 countries, the unmet need amounts to 102 359 632 units of blood products or 1 849 units per 100 000 people worldwide.⁽⁶⁾

The shortage of blood donations is due to an inefficient blood supply system based on donations from family and friends of people in need of transfusions or to replace blood used in emergencies. This may solve the problem for a short period in small communities but is inefficient for chronic blood needs.⁽¹³⁾

Shama, 7, in his practical assessment of blood donation and its associated factors, found the number of blood donations to be below the level recommended by the World Health Organization. The absence of blood donation campaigns, university education, lack of knowledge, and poor attitude toward blood donation were the factors that influenced the practice of blood donation.

Types of donations

Altruism, personal self-esteem needs, peer pressure, and a sense of social responsibility are among the main motives for blood donation.⁽¹⁹⁾ However, these alone do not affect the population in favor of the procedure; instead, the health system must use them through health promotion to ensure the availability of this therapy.

According to the World Health Organization (WHO), the Red Cross, and Red Crescent Societies, there are three categories of blood donations: voluntary, replacement, and remunerated.^(7,17)

Voluntary unpaid donation is giving one's own blood, plasma, or other blood components of one's own free will without receiving any payment in cash or in kind.⁽¹⁹⁾ Voluntary donation is the most reliable way to meet national blood transfusion needs.⁽¹⁷⁾

It is essential to understand that voluntary blood donation differs from other types of voluntary activities regarding specific medical and logistical requirements, although it qualifies as volunteering. Voluntary blood donation is a unique gesture of compassion and one of the most significant manifestations of social volunteering and solidarity. It is considered the highest expression of kindness to people needing a transfusion, as it is a gift of life to the recipient.^(1,19)

A voluntary donation is the most common and well-known form of fluid entry into the world's health systems. It is the result of customs, culture, and even traditions according to each region and is highly influenced by the socio-political context in the place where it occurs.

The policy of altruistic blood donation is based on the idea that altruism represents the only morally legitimate.

It is a policy promoted by the WHO, the European Union, the European Parliament, the European Blood Alliance, the International Society of Blood Transfusion, the International Federation of Blood Donors, and the International Red Cross. The main theoretical problem is whether an altruistic or completely disinterested motivation is possible.⁽²⁰⁾

Beyond the veracity of this concept, there is a problem, and that is that this modality has not been able to meet the world's blood needs by itself; the authors consider that the lack of education in the process, the political context, the educational level and the characteristics of the health systems themselves determine the success or failure of this modality.

Family/replacement blood donation is giving blood when needed by a patient's family or community member.⁽¹⁹⁾ In Latin America, the blood collected generally comes from directed or coercive donors, i.e., people who, under family or social pressure, in order to meet the requirements of hospitalization, surgery, and visits to their relatives, go to blood banks to replace the blood required by a relative or friend who is the victim of a

traumatic injury, a surgical emergency or a programmed surgery.⁽²¹⁾ Gutiérrez de Alarcón reports that of the 371 students he surveyed, only 1,7 % were regular blood donors, and 83,2 % would donate blood only if it were for a relative or friend.⁽¹⁾

The habitual donor has other people's welfare or interests in mind when donating and expects to receive blood if needed. Without a commitment to reciprocity, many donors would need more motivation to donate.⁽²⁰⁾

Paid donation is another category of blood donation in which a person donates blood for money or other payment. This latter category of blood donation is also known as professional blood donation. People who donate blood for payment are usually motivated by what they will receive in return for their blood, not by a desire to help others.⁽¹⁹⁾ Many regions of the world have had to adapt this form of donation to gain access to the liquid, yet the literature questions the actual value and usefulness of this paid blood.

The safest blood donors are those unpaid volunteers who contribute blood regularly.⁽¹⁹⁾ Although voluntary unpaid donations have increased in recent decades, it remains a problematic global problem.⁽¹⁸⁾

Studies in the literature posit that compensated donation will discourage free donation (since many potential altruistic donors will feel betrayed and expendable with the remuneration policy), with the dual effect that, on the one hand, there will be less blood available than there might be if we were to prohibit remuneration and that, on the other hand, a society that prevents expressing the idea of giving in blood donation ends up being morally worse off.⁽²⁰⁾

In several countries, most blood is obtained from hospital replacement donors, who donate when a friend or family member needs it.⁽¹⁷⁾ Blood generally relies on volunteers; however, a relatively low proportion of the general population or the population identified as eligible donates blood.⁽²²⁾

Olivera Cuadra,⁽⁵⁾ argues that the safety of blood components and derivatives depends primarily on the quality of blood donors. The recruitment and selection process must be adequate to ensure that blood donors are healthy and low-risk. Voluntary, unpaid donors who donate blood regularly are safer than those who give their blood when a family member or community member requires it (replacement donor) or those who donate their blood in exchange for money or other remuneration (paid or professional donor).

An essential role in the process is played by the selection and filtering of potential donors, a procedure that is not only limited to health promotion in order to increase the number of possible candidates but also to know how to effectively identify the safety and quality of the donated fluid according to the donor's biopsychosocial background and environment. However, even when willing patients are found, they must often meet the requirements for the procedure.

Among the causes of donor rejection most frequently reported in the literature are high hematocrit, low hemoglobin, and alterations in blood pressure.⁽¹⁴⁾

Guillen Macedo, 14 studied the causes of rejection of blood donors from a hospital in southern Peru and reported that 1458 (41,87 %) were deferred, males had the highest rate of rejection, 882 (60,49 %) compared to females, 576 (39,51 %); in addition, polyerythrocytemia was the most frequent cause of rejection 669 (45,8 %). This may be due to the greater tendency of the male over the female sex to donate.

The data show that young people are the least represented in blood donation. A recent study in Qatar revealed that only 15 % of university students were blood donors. In comparison, studies in Saudi Arabia reported a prevalence of blood donation among university students ranging from 19 % to 45 %. However, it was found that most donors only made a single donation and did not donate regularly.⁽¹⁷⁾ The possible causes of the low numbers of young people are the lack of intervention and education on the importance and characteristics of the blood donation process in adolescents and young populations.

Santillan Jesús, 23 reports in his specialty study that of the 911 pre-blood donors, 261 (28,7 %) were deferred, of which 4 % at the interview stage and 24,7 % at the clinical analysis stage, with the leading cause of deferral being other (blood group) in 6,3 % and secondly fever, headache or other illness 4,4 % and sexual behavior with 3,8 %, 3 % and in second place fever, headache or other illness 4,4 % and sexual behavior with 3,8 %. Likewise, of the 643 eligible donors from whom blood was drawn, 14,3 % were discarded in the serological tests, 11,8 % being reactive to the Core test (Hepatitis B).

Factors affecting donation

Different factors affect the practice of blood donation, including social misconceptions, knowledge and attitude about blood donation, age, sex, and educational level. A study shows a significant association between gender and blood donation practice. Female students were 43 % less likely to donate blood than male students.⁽⁹⁾

A large body of research has revealed the psychological factors that motivate and deter blood donation, highlighting possible avenues for intervention. The importance of understanding the role of the emotional experience of blood donors in developing successful recruitment and retention campaigns is well known. Negative emotional experiences can be detrimental to donor recruitment and retention. General negative mood is associated with lower intentions to donate blood. In terms of specific emotions, anticipated and experienced anxiety is negatively associated with donation and donation behavior.⁽²²⁾

Positive emotional experience is mainly beneficial for donor recruitment and retention. Many donors report a positive emotional drive to donate, often called a “sense of well-being.” Donors who report a greater sense of well-being report a stronger intention to donate and are more likely to donate again.⁽²²⁾

A more excellent perception or awareness of the social expectations, beliefs, and opinions of others regarding blood donation is also positively associated with a more favorable attitude toward participation in blood donation and greater perceived behavioral control to take action.⁽²⁴⁾ The authors believe that making blood donation a socially oriented activity, accessed in masses or groups, i.e., planning and designing the process to be a socially popular and encouraged activity, could contribute to improving the statistics of the procedure.

Studies show that donation behavior is associated with several factors, including socioeconomic status and education. Specifically, people with higher education and income levels tend to be more likely to donate blood.⁽²⁵⁾ The higher the level of education, the greater the social awareness of the importance of the process.

Olivera Cuadra,⁽⁵⁾ in his research to assess the motivations of fifth-year medical students selected for the promotion of safe blood collection and donation in primary health care, observed that 82,6 % were not interested in promoting blood donation once they graduated as physicians and that 17,4 % identified only treating sick patients as a physician’s action.

Aspects that could negatively affect donation intention include lack of awareness, indifference, and ignorance of other aspects of the donation procedure.⁽¹⁹⁾ A 2017 systematic review of motivations and barriers to blood donation in 16 sub-Saharan African countries found that fear was a significant deterrent, including fear of needles, adverse effects, and discouraging spiritual, religious, and cultural perceptions of blood donation.⁽¹³⁾

The main reasons for not donating blood among donors in sub-Saharan African countries were factors such as a lack of well-established structures for the provision of blood donation services, poor infrastructure, low recruitment and retention of blood donors, large populations (many of whom live in rural areas with little access to blood centers), poor communication networks, and misperceptions about blood and blood donation due to lack of knowledge and cultural influences.⁽¹³⁾

In Ochoa Ortega’s study, the majority of those unwilling to donate stated that they did not because of fear of puncture (38,1 %), followed by those who stated a lack of knowledge about the donation process (32,1 %).

Barriers to blood donation included medical reasons, fear (needles, dizziness, etc.), lifestyle-related barriers, lack of marketing communication, lack of knowledge about blood donation, and negative experiences related to blood donation. Rapid access to blood transfusions is essential in reducing morbidity and mortality rates in healthcare settings.⁽⁶⁾

A study conducted in China 25 on socioeconomic factors related to voluntary, unpaid blood donation found varied donation rates by age, indicating the need for tailored interventions (with prior sample assessment) to promote donation behavior, especially among youth and students.

If we consider the number of patients who are taken to surgery or suffer from chronic processes and need blood units, and if we consider that they have family and friends who are aware of this need, there is a point where the actual cause of why the health systems report such high numbers of unavailability of blood for transfusion is unknown.

Risks and associated beliefs

Although blood donation causes acute blood loss, reducing circulating blood volume decreases mean arterial pressure (MAP), followed by a decrease in cardiac output and pulse pressure.⁽²⁶⁾ The above justifies immediate effects on the donor, such as fatigue, dizziness, and tiredness.

Although blood transfusion procedures are common as a therapeutic alternative and are considered simple processes, they also involve some risks for patients.⁽¹⁵⁾ It is important to emphasize that, despite being a vital input for medicine, like any other medical intervention, it must be perfectly weighted between the benefit to be given to the patient and the risk involved, without exposing the patient to factors that could compromise his life or health, which can be grouped into infectious and non-infectious.⁽³⁾ This makes it necessary that once collected, blood tests are performed to determine or detect risks or elements that can transmit diseases from the donor to the recipient, including antibodies to HIV 1 and 2, hepatitis C, surface antigens for hepatitis B, serology for syphilis, among others.^(15,27,28)

The chances of contracting infectious diseases after transfusion are generally low but never zero. The prevention of these situations depends on the quality of the screening protocols and treatment of donated blood according to each region.

Infection caused by blood transfusion occurs by direct transmission of viral, bacterial, and parasitic agents from a blood unit to the susceptible recipient. This constitutes a complication of great importance about the morbidity and mortality of blood recipients and a public health problem.⁽²⁹⁾

The belief that blood donation carries a risk of transfusion-transmitted infections such as HIV is widely documented in the literature. It is a known deterrent to donation in various settings. Others identified include

negative impacts on physical appearance and reproductive health.⁽³⁰⁾

Even with advances in laboratory techniques for immunological and molecular screening for infectious agents, it is not possible to identify infectious agents in donors at early stages (window period), so donor selection is based on questioning and clinical evaluation to identify risk factors for transmission of infectious agents and prevent individuals in whom these risks are identified from donating.⁽³⁾

In a report by the Pan American Health Organization (PAHO), it was reported that the Latin American countries with the highest prevalence according to each of the serological markers were HIV in Honduras, Paraguay, and the Dominican Republic; HBsAg in Guatemala, Costa Rica and Cuba; HCV in Cuba, Mexico, and Argentina; and syphilis in Paraguay, Venezuela, and Guatemala.⁽²⁹⁾

The different health institutions need to know the epidemiological behavior of the donors attended in order to be able to implement strategies in the selection processes to increase the recruitment of regular voluntary donors.⁽²⁹⁾

In addition, it should be considered that blood units may present poor quality if adequate preservation measures are not applied, and a small percentage should also be given to the possibility of medical error when applying an incorrect donation according to blood group.

Studies available

In his study on blood donation among undergraduate university students, Elias Idris found that the overall blood donation practice was 35,7 %. Having positive knowledge about blood donation, being male, and being a student in the Department of Obstetrics and the Department of Nursing were significantly associated with blood donation practice.⁽⁹⁾

In a multicenter cross-sectional study,⁽¹⁷⁾ conducted in students from 16 countries, on knowledge and attitudes toward blood donation, 22,7 % had donated blood at least once. Barriers to donation included unsolicited (37 %), medical ineligibility (33 %), fear of pain or infection (18 %), concerns about adverse health effects (18 %), difficulty in accessing donation centers (15 %), and medical mistrust (14 %).

Coaches 1 conducted the study with a sample of 341 students; the results were as follows: 41,1 % did not know what type of blood group, likewise, the level of attitude about blood donation of students of the Scientific University of Peru only 2,1 % had an acceptable attitude, 52,5 % had a poor attitude, and 45,5 % had no attitude at all. It was also found that the level of knowledge about blood donation of the students of the Scientific University of Peru, in 22,6 %, was regular, and in 61,3 %, the evaluation was deficient.

In his study on university students' perceptions of blood donation during the pandemic, Flores Quispe found that 75,5 % (n=170) of the students considered the need to donate blood in the future plausible. In comparison, only 11,2 % (n=25) had previously donated blood.⁽¹⁶⁾

The author's attention is drawn to the large amount of research on the subject applied to students. This could be due to the findings of low numbers of incorporation as donors in this population group and, therefore, coordinated efforts to reverse this situation.

Abdulahakim Mussema,⁽¹⁸⁾ in his research on knowledge, attitudes, and practices on voluntary donation, found that male participants were more than two and a half times more likely to donate blood than female participants, with 29,5 % of participants having a good knowledge level and favorable attitudes.

Amehd Seid Mohammed,⁽¹³⁾ in his research on voluntary blood donation and its associated factors among civil servants in associated factors among civil servants in Ethiopia, the practice of voluntary lifetime blood donation among civil servants was 27 %; the main reason for not donating blood was fear related to blood donation 42,4 %. Having a family member or relative who has previously donated blood, previous participation in a blood donation campaign, and willingness to donate blood were variables significantly and positively associated with voluntary blood donation, respectively.

Baidoo⁽¹²⁾ reports in his study that although two-thirds of the participants expressed willingness to donate blood, less than one-third (31,7 %; 127/382) had previously donated blood. Overall, less than one-third of the participants were able to correctly identify the minimum weight (26,4 %) or the interval between donations (14,7 %); 37,4 % and 58,1 % were able to indicate respectively, the required age of the donor or the infectious agents detected prior to blood collection.

Among the main limitations of the present investigation is its bibliographic character that a systematic study of the selected publications was not carried out in order to group opinions and compare positions among the scientific community, which limited the search to the last five years in order to guarantee the updating of the investigations.

CONCLUSIONS

The low number of donations worldwide determines the unavailability of blood for transfusion as one of the current health problems. The process occurs mainly voluntarily and is affected by factors such as educational level, socioeconomic characteristics, fears, lack of education, and culture of the subject.

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