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International Journal of Clinical Biochemistry and Research

Journal homepage: <https://www.ijcbr.in/>

## Review Article

# Blood donation and post donation care: A clinical update

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### ARTICLE INFO

#### Article history:

Received 29-09-2024

Accepted 15-10-2024

Available online 11-01-2025

#### Keywords:

Post Donation care

Donor health

Blood Safety

Donation guidelines

Donor recovery

### ABSTRACT

Donating blood is an essential component of healthcare systems, and it is imperative to administer adequate post-donation care to donors in order to safeguard their health and maintain the blood supply's safety. This brief offers a succinct outline of crucial suggestions for persons who have made a blood donation. After receiving a donation, the initial treatment usually involves taking rest, staying hydrated, and having a light meal to replenish blood volume and glucose levels. Adequate fluid intake is crucial for preventing dehydration and promoting the restoration of blood volume. In order to maintain the health and safety of blood donors and guarantee the excellence of donated blood, recommendations frequently advise following dietary limitations, which may include refraining from alcohol and restricting caffeine use. It is highly recommended to cease smoking, as it enhances general well-being and increases the amount of oxygen in the bloodstream. Donors should vigilantly observe the donation location for any unusual symptoms and promptly seek medical aid if needed. Long-term care prioritizes maintaining good physical well-being by promoting a balanced diet, regular physical activity, and adequate rest. Regular blood donors, particularly women, may require iron supplements to avoid iron deficiency anaemia. Donors must strictly adhere to the recommended time intervals between donations in order to maintain blood safety and prevent donor exhaustion. Adhering to post-donation obligations is essential for the well-being of donors, guaranteeing the security of the donated blood, and promoting ongoing blood donation. The objective of present review is to optimise the donor recovery process, mitigate any adverse consequences, and ensure the continuous availability of a safe blood supply for patients in need.

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## 1. Introduction

Blood donation is a cornerstone of modern medicine—a selfless act with the power to save lives. Every pint of donated blood holds the potential to benefit multiple individuals, offering a critical lifeline in various medical scenarios.<sup>1</sup> This vital resource is used in a wide range of treatments, from lifesaving transfusions for accident victims and those undergoing surgery to supporting patients with chronic illnesses like sickle cell anaemia and thalassemia.

### 1.1. Blood donation's life-saving impact

The need for blood transfusions is constant. According to the American Red Cross, every two seconds, someone in the United States needs blood. Transfusions play a crucial role in numerous medical procedures, including:

1. Accident and trauma care: Blood loss is a major concern following accidents and injuries. Transfusions replenish lost blood volume and restore vital oxygen transport to tissues, increasing the chances of survival.
2. Surgical procedures: Many surgeries, especially major ones, involve significant blood loss. Blood transfusions

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ensure that patients have adequate blood volume and red blood cell count to support vital functions during and after surgery.<sup>2</sup>

3. **Cancer treatment:** The use of chemotherapy and radiation therapy can damage bone marrow, resulting in a decrease in the production of red blood cells. Transfusions help cancer patients maintain a healthy blood count to combat fatigue and infection.
4. **Individuals with chronic illnesses,** such as sickle cell anaemia or thalassemia, require regular blood transfusions to manage their condition and maintain a healthy quality of life.<sup>3</sup>
5. **Pregnancy and childbirth:** Complications during pregnancy or childbirth can lead to severe blood loss, requiring transfusions to prevent life-threatening anaemia.

The benefits of blood donation extend beyond immediate life-saving situations. It also contributes to advancements in medical research.<sup>1</sup> Researchers use blood components like plasma to develop new treatments for various diseases.

### 1.2. Overview of the blood donation process

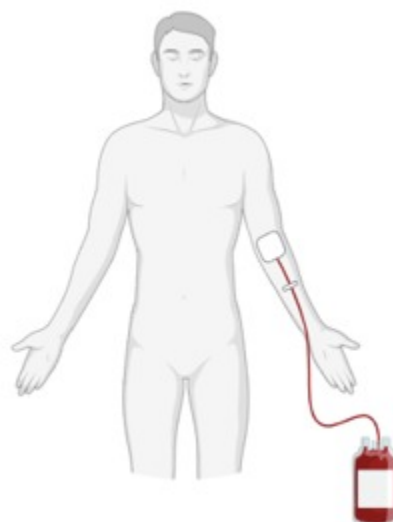
The blood donation process is generally safe and straightforward. Here's a breakdown of the typical steps involved:

1. **Initial Screening:** Before a donation, a potential donor undergoes a brief screening to assess eligibility. This includes a review of medical history, blood pressure and temperature checks, and haemoglobin level testing to ensure sufficient iron stores.
2. **Blood Donation:** During donation, a sterile needle is inserted into a vein in the arm, and a unit of blood (typically around 350ml or 450 ml) is collected over a period of approximately 10 minutes. Apheresis machines, which separate specific blood components and return the remaining blood cells to the donor, can also collect blood components like platelets or plasma.
3. **Recovery:** After a donation, donors spend some time in a recovery area where they are monitored for any adverse reactions and offered refreshments to replenish fluids.

### 1.3. Exploring potential aftereffects of blood donation

While blood donation is a safe procedure, some donors may experience temporary aftereffects. The most common side effects include:

1. **Vasovagal Reaction:** This can cause dizziness, light-headedness, nausea, and sweating. It's often triggered by anxiety or the sight of blood and can be minimised by proper hydration and relaxation techniques.



**Figure 1:** An overview of blood donation

2. **Fatigue:** Resting and staying hydrated can alleviate the temporary tiredness that blood loss can cause.
3. **Bruising:** At the needle insertion site, some soreness and bruising may occur. Applying gentle pressure and keeping the arm elevated can help minimise discomfort.
4. **Iron Deficiency:** Frequent blood donation, particularly for women, can contribute to iron deficiency. We may recommend consuming iron-rich foods and considering iron supplements.

**Evidence-Based Recommendations for Post-Donation Care:** Several strategies can help blood donors recover comfortably and minimise the aftereffects:

1. **Hydration:** Adequate fluid intake before, during, and after donation is crucial. Aim to drink plenty of water and other non-alcoholic beverages throughout the day.
2. **Diet:** Focus on iron-rich foods like red meat, poultry, fish, beans, lentils, and dark leafy greens. If advised by a healthcare professional, consider taking iron supplements.
3. **Activity Level:** Avoid strenuous activity and lifting heavy objects for at least 24-48 hours after donation. Light exercise is acceptable, but listen to your body and rest if needed.
4. **Injection Site Care:** Apply gentle pressure to the insertion site for a few minutes after the donation to stop any bleeding. Keep the arm elevated for a short period of time to minimise bruising.
5. **Monitor for Side Effects:** Be aware of potential side effects, such as dizziness or fatigue. If these persist or worsen, contact the blood donation centre for guidance. Blood donation is a simple yet powerful act of giving. By understanding the life-saving impact of blood and

following evidence-based recovery practices, donors can contribute to a healthier community and ensure a smooth donation.

## 2. After effects of Blood Donation

Blood donation is a cornerstone of modern medicine, a selfless act with the potential to save countless lives. The value of every pint of donated blood is immense, providing a critical lifeline in various medical scenarios. This vital resource is used in a wide range of treatments, from lifesaving transfusions for accident victims and surgical patients to supporting those with chronic illnesses like sickle cell anaemia and thalassemia. However, donating blood can have some physiological and psychological effects on the donor, although these are typically temporary and easily managed. Understanding these effects and implementing appropriate post-donation care practices ensures a smooth recovery experience for donors while maintaining a readily available blood supply for those in need.

### 2.1. Physiological effects of blood donation

While blood donation is a safe procedure, the body undergoes certain physiological adjustments to compensate for the temporary loss of blood volume. Here's a breakdown of some common physiological effects:

#### 2.1.1. Blood Volume Reduction and Related Symptoms

**Mechanism:** Blood donation involves the collection of a typical unit of blood, approximately 450 ml. This reduction in blood volume triggers a cascade of physiological responses to maintain blood pressure and ensure adequate oxygen delivery to tissues.<sup>4</sup>

**Symptoms:**

1. **Dizziness and light-headedness:** A decrease in blood volume leads to a drop in blood pressure, which can trigger these sensations. Symptoms are usually mild and transient, resolving within minutes of donation, especially if the donor remains hydrated.
2. **Fatigue:** Reduced blood volume leads to a decrease in the number of red blood cells circulating throughout the body. This can lead to temporary fatigue and tiredness as tissues receive less oxygen.<sup>5</sup>
3. **Nausea and sweating:** These symptoms can be associated with the vasovagal reaction, a reflex response triggered by anxiety or the sight of blood. Proper hydration and relaxation techniques before donation can help minimise its occurrence.

#### 2.1.2. Bruising and pain are common at the site of needle insertion.

1. **Mechanism:** During the donation process, the needle penetrates the skin and blood vessel walls. This can

cause some minor damage to surrounding tissues, leading to localised bruising and tenderness at the puncture site.<sup>6</sup>

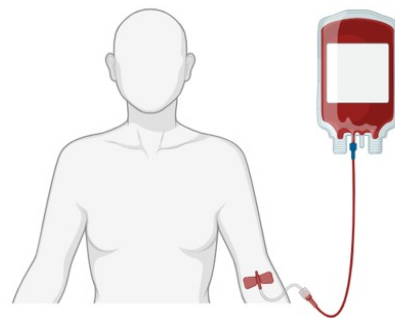
2. **Management:** Applying gentle pressure to the insertion site after needle removal helps stop any bleeding and minimise bruising. Keeping the arm elevated for a short period of time can further reduce swelling and discomfort. Most soreness resolves within a few days.<sup>7</sup>

#### 2.1.3. Iron deficiency and potential anaemia

1. **Mechanism:** Iron is a crucial component of haemoglobin, the protein in red blood cells responsible for oxygen transport. Regular blood donation, particularly for women of childbearing age with higher iron requirements, can lead to iron depletion over time.
2. **Anaemia Risk:** Chronic iron deficiency can progress to anaemia, a condition characterised by a low red blood cell count. This can cause symptoms like fatigue, shortness of breath, and pale skin.<sup>8</sup>
3. **Management:** Consuming iron-rich foods like red meat, poultry, fish, beans, lentils, and dark leafy greens is essential for replenishing iron stores. A healthcare professional may recommend iron supplements after assessing individual iron levels.<sup>9</sup>

#### 2.1.4. Psychological effects

While not as widely reported as physiological effects, some individuals may experience psychological effects related to blood donation such as urination and unwanted discharge of faecal material. The sight of blood, needles, or the donation process itself can trigger anxiety for some people. This can manifest as nervousness, restlessness, or even fear. Understanding the procedure's safety and practicing relaxation techniques can help relieve these anxieties.<sup>10</sup>



**Figure 2:** Whole blood bag collected from blood donor

**Table 1:** After effects of blood donation

Symptom	Description	Duration	Treatment
<b>Light-headedness or Dizziness</b>	Temporary feeling of imbalance or vertigo due to reduced blood volume.	Usually lasts for a few minutes.	Resting with feet elevated, drinking fluids.
<b>Nausea</b>	Feeling sick to the stomach.	Can occur immediately after donation.	Resting, deep breathing, avoiding strong odors.
<b>Weakness or Fatigue</b>	Temporary tiredness due to reduced blood volume.	May last a few days.	Rest, proper nutrition, and hydration.
<b>Bruising</b>	Discoloration at the needle insertion site.	Typically disappears within a week.	Applying ice packs, over-the-counter pain relievers.
<b>Minor Bleeding</b>	Small amount of blood leaking from the needle site.	Usually stops within a few minutes.	Applying pressure to the site, elevating the arm.
<b>Muscle Soreness</b>	Temporary discomfort in the arm where the needle was inserted.	May last a few days.	Rest, gentle arm exerci

## 2.2. Post-donation care practices

By adopting a few simple strategies, donors can minimise potential aftereffects and ensure a smooth recovery.

1. **Hydration:** Prior to, during, and after donation, adequate fluid intake is crucial. Aim to drink plenty of water and other non-alcoholic beverages. Good hydration helps maintain blood volume and reduces the risk of dizziness and fatigue.<sup>11</sup>
2. **Diet:** Focus on iron-rich foods after donations to replenish iron stores. Include red meat, poultry, fish, beans, lentils, and dark leafy greens in your meals. A healthcare professional may recommend iron supplements based on individual needs.<sup>12</sup>
3. **Activity Level:** Avoid strenuous activity and heavy lifting for at least 24–48 hours after donation. Light exercise is acceptable, but prioritise rest and listen to your body's signals.<sup>13</sup>
4. **Injection Site Care:** Apply gentle pressure to the insertion site for a few minutes after the donation to stop any bleeding. Keeping the arm elevated for a short period of time can minimise bruising.<sup>14</sup>
5. **Monitor for Side Effects:** Be aware of potential side effects, such as dizziness or fatigue. If these persist or worsen, contact the blood donation centre for guidance.<sup>15</sup>
6. **Individual Variability:** The severity of aftereffects can vary depending on factors like overall health.

**Prevalence of Different After effects:** Several studies have investigated the prevalence of various after-effects following blood donation. Here's a breakdown of the key findings:

1. **Vasovagal Reaction:** According to studies, the prevalence of vasovagal reactions ranges from 0.08% to 13%. This reaction manifests as dizziness, light-headedness, nausea, and sweating and often resolves within minutes. A 2018 study by Wang found a 0.8%

incidence of vasovagal reactions among 80,232 blood donors.<sup>15</sup>

2. **Fatigue:** Fatigue is a common post-donation effect, with a reported prevalence ranging from 13.9% to 40%. A 2013 study observed a 40% prevalence of fatigue among first-time blood donors.
3. **Dizziness and light-headedness:** These symptoms, often associated with the vasovagal reaction, have a reported prevalence of 4.6% to 18.4%. A 2019 study found a 13.2% prevalence of dizziness among blood donors.<sup>16</sup>
4. **Bruising and Pain:** Bruising and tenderness at the needle insertion site are relatively common, with a reported prevalence ranging from 10% to 30%. A 2010 study by Brito observed a 22% incidence of bruising among blood donors.

**Risk Factors Associated with Experiencing After Effects:** Certain factors can increase the likelihood of experiencing aftereffects following blood donation:

1. **Anxiety:** Studies suggest a link between pre-donation anxiety and the vasovagal reaction. Individuals with a heightened fear of needles or blood may be more susceptible to vasovagal symptoms.
2. **Dehydration:** Inadequate fluid intake before donation can exacerbate symptoms like dizziness and fatigue.<sup>17</sup>
3. **First-time Donation:** In contrast to experienced donors, first-time donors may experience a higher prevalence of vasovagal reactions.
4. **Iron Deficiency:** Low iron stores can worsen fatigue after donation.

### 2.2.1. Effectiveness of existing post-donation recommendations

Several strategies are recommended by blood donation centres to minimise aftereffects and ensure a smooth recovery. Based on existing research, here's an overview of their effectiveness:

1. Hydration: Studies suggest that adequate hydration before, during, and after donation reduces the risk of dizziness and fatigue. A 2017 study by Brito et al. demonstrated that pre-donation fluid intake significantly reduced the incidence of vasovagal reactions.
2. Iron-Rich Diet: Consuming iron-rich foods after donation can help replenish iron stores and potentially reduce fatigue. While robust evidence is lacking, some studies suggest a positive association.<sup>18</sup>
3. Reduced Activity Level: Avoiding strenuous activity for 24-48 hours after donation appears to be a standard recommendation. However, research on the effectiveness of this practice is limited.
4. Injection Site Care: After a donation, applying gentle pressure and elevating the arm can help to minimize bruising. Studies support this approach for reducing discomfort and swelling at the needle insertion site.<sup>19</sup>

Blood donation is a selfless act with the power to save lives. Donating blood replenishes crucial resources for those in need, but it's also important for donors to prioritise their own well-being during the recovery process. By following these evidence-based recommendations, you can minimise the aftereffects and ensure a smooth, comfortable return to your daily routine.

### 2.2.2. Hydration is the foundation of recovery

Adequate hydration plays a critical role both before, during, and after blood donation. The average blood donation removes roughly 450 ml of fluid from the body. Dehydration further reduces blood volume, leading to a cascade of effects like dizziness, fatigue, and headaches. Here's how to ensure optimal hydration:

1. Pre-donation: Aim to drink plenty of water and other non-alcoholic beverages throughout the day leading up to your donation. Experts recommend consuming clear liquids like water, sports drinks, or diluted fruit juices.<sup>20</sup>
2. During Donation: Many blood donation centres offer fluids to donors during the donation process. Take advantage of this opportunity to further replenish lost fluids.
3. Post-donation: Continue to prioritise hydration throughout the day following the donation. Focus on water, clear broths, and electrolyte-rich beverages. Avoid sugary drinks and alcohol, as these can dehydrate you further.

Studies support the link between hydration and minimising aftereffects. A 2017 study by Brito et al. demonstrated that pre-donation fluid intake significantly reduced the incidence of vasovagal reactions, a common post-donation effect characterised by dizziness and nausea.

### 2.2.3. Fuelling your body

The Importance of Iron-Rich Foods: Blood donation can deplete iron stores in the body, particularly for women of childbearing age who already have higher iron requirements. Iron is a vital component of haemoglobin, the protein in red blood cells responsible for transporting oxygen throughout the body. Iron deficiency can lead to fatigue, shortness of breath, and pale skin.<sup>21</sup>

To replenish iron stores and support optimal health post-donation, focus on incorporating iron-rich foods into your diet. Here are some excellent options:

1. Red Meat: The body readily absorbs heme iron from beef, lamb, and liver
2. Poultry: Chicken and turkey are good sources of iron, although the absorption rate is slightly lower than red meat.
3. Fish: Fatty fish like salmon, tuna, and sardines are rich in iron and offer additional health benefits.
4. Plant-Based Sources: Lentils, beans, tofu, and dark leafy greens like spinach and kale are good sources of non-heme iron. Pair these foods with a source of vitamin C (citrus fruits, bell peppers) to enhance iron absorption.
5. Foods fortified with iron: It includes many cereals, breads, and breakfast bars. However, this type of iron has a lower absorption rate than animal sources.

While research on the effectiveness of diet alone in mitigating fatigue is ongoing, some studies suggest a positive association. A 2018 review by Sattar highlighted the potential benefits of iron-rich diets in reducing fatigue among blood donors.

### 2.2.4. Activity level—prioritising rest and recovery

The body requires time to replenish blood volume and red blood cell count after a donation. Therefore, prioritising rest and limiting strenuous activity is crucial for a smooth recovery. Here are the recommendations:

1. Avoid strenuous activity: For at least 24-48 hours following donation, avoid activities that require significant exertion or lifting heavy objects. This allows your body to focus on replenishing blood volume and recovering from the donation process.
2. Light Exercise: Engaging in light activities like walking, yoga, or stretching is perfectly acceptable. Listen to your body and prioritise rest if you experience any fatigue or dizziness.<sup>22</sup>
3. Gradual Return to Activity: After 24-48 hours, you can slowly return to your regular activity level. Pay attention to your body's signals and avoid pushing yourself too hard too soon.

A lack of strong research evidence exists regarding the specific timeframe for limiting activity. However, a 2010

**Table 2:** Focus on replenishing iron, fluids, and overall energy.

Nutrient	Importance	Food Sources
<b>Iron</b>	Essential for red blood cell production.	Red meat, poultry, fish, beans, lentils, spinach, fortified cereals, tofu, cashews.
<b>Vitamin C</b>	Enhances iron absorption.	Citrus fruits, strawberries, kiwi, bell peppers, broccoli, cauliflower.
<b>Fluids</b>	Replenishes lost fluids.	Water, clear juices, sports drinks (without added sugar).
<b>Protein</b>	Supports tissue repair and blood cell formation.	Lean meats, poultry, fish, eggs, beans, lentils, tofu, Greek yogurt.
<b>Carbohydrates</b>	Provide energy.	Whole grains, fruits, vegetables, brown rice, quinoa.

study by Brito et al. observed that donors who reported heavy physical activity immediately after donation were more likely to experience vasovagal reactions. This suggests taking a cautious approach and prioritizing rest in the immediate post-donation period.

#### 2.2.5. Injection site care: Minimising discomfort

The needle-insertion site used for blood donation may experience some minor discomfort, such as soreness or bruising. Simple measures can minimise these effects such as talking to the donors, discussion on various current issues and diverting donors mind and immediately after needle removal, apply gentle pressure to the insertion site with a gauze pad for a few minutes. This helps stop any bleeding. Some key features include:

1. Hydration is Paramount: Adequate fluid intake before, during, and after donation minimises the risk of dizziness, fatigue, and headaches.
2. Replenish Iron Stores: Include iron-rich foods like red meat, poultry, fish, beans, and dark leafy greens in your diet to support healthy red blood cell production.
3. Prioritise Rest: Avoid strenuous activity and lifting heavy objects for at least 24–48 hours after donation. Light exercise is acceptable, but prioritise rest if needed.
4. Minimize Injection Site Discomfort: After blood withdrawal, apply gentle pressure to the insertion site and keep the arm elevated for a short period to minimize bruising.

### 3. Conclusion

Blood donation is a selfless act with the potential to save lives. It allows us to replenish vital resources for those in need, offering a lifeline to countless individuals facing medical emergencies, undergoing surgeries, or battling chronic illnesses. The process itself is safe and well-established, with highly trained professionals overseeing every step. While some temporary aftereffects may occur following a donation, understanding these effects and following the outlined post-donation recommendations can significantly enhance your recovery experience. Hydration,

**Figure 3:** Plasma collected after blood donation

focusing on iron-rich foods, prioritizing rest, and proper injection site care are simple yet effective measures that can minimize discomfort and ensure you feel your best after giving the gift of life. By taking care of yourself after a donation, you are enabling yourself to continue this vital act of generosity in the future. Let's continue to support blood donation initiatives, advocate for ongoing research, and empower donors with the knowledge and tools needed for a smooth recovery experience.

#### 3.1. Current research limitations

1. Long-term Effects: Further research is required to comprehend the possible long-term impacts of frequent blood donation on general health and iron stores.
2. Psychological Effects: Further investigation is needed to explore the psychological impact of blood donation, particularly on individuals experiencing anxiety.
3. Personalised Recommendations: Developing tailored recovery recommendations based on individual risk factors (e.g., pre-donation iron levels) could be beneficial.

### 3.2. Future research directions

1. Longitudinal studies: Investigating the long-term health outcomes of frequent blood donors, focusing on iron stores and overall health.
2. Psychological factors: conducting research to better understand the psychological effects of blood donation and develop strategies to manage anxiety.
3. Personalised recovery plans: developing a risk assessment tool to tailor post-donation recommendations based on individual factors like iron levels and activity level.

By addressing these limitations and pursuing further research, can continuously improve the blood donation experience for both donors and recipients. Through collaboration between blood donation centres, researchers, and healthcare professionals, we can ensure that this life-saving act remains safe and enjoyable for everyone involved.

### 4. Source of Funding

None.

### 5. Conflict of Interest

None.

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**Cite this article:** Singh AP, Saxena R, Saxena S. Blood donation and post donation care: A clinical update. *Int J Clin Biochem Res* 2024;11(4):207-213.