

## Original Article

## Incidence of immediate adverse reaction of blood donation

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*Transfusion of blood and blood components saved millions of lives each year. In most developing countries, however, preventable deaths still occur due to inadequate supply of safe blood and blood components which can be minimize by blood donation. In Bangladesh the annual demand for blood transfusion is estimated to be 2,00,000 to 2,50,000 unit per year. But due to lack of voluntary donor and consciousness among people this demand is hardly met. Because blood donors are altruistic volunteers, they should be protected as much as possible by the pre-donation counseling. This prospective observational study was carried out in the department of transfusion medicine in Bangabandhu Sheikh Mujib Medical University from February 2010 to January 2011 with the intention to see the immediate adverse reactions after blood donation. 1,500 patients were selected consecutively after considering inclusion and exclusion criteria. Adverse reaction were observed during and 30 minutes following blood donation. Among the total 1500 respondents, 394 cases experienced adverse effects of blood donation namely; vertigo (9.7%), sweating and warmth (5.0%), bruising (3.0%), nausea (6.3%) and fainting (2.3%). Careful monitoring of all blood donors after donation and counseling of adverse effect before donation is important.*

**Key words :** blood transfusion, Blood donation, adverse reactions

**Introduction**

Blood donation refers to the process of collecting, testing, preparing, and storing blood and blood components.

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Donors are most commonly unpaid volunteers, but they may also be paid by commercial enterprises.<sup>1</sup> There are four basic systems in Bangladesh for obtaining bloods 1. Paid donation (Professional donor), 2. Party donation, 3. Voluntary unpaid donation, 4. Convicts donation.<sup>2</sup>

Transfusion of blood and blood components saves millions of lives each year. In most developing countries, however, preventable deaths still occur due to inadequate supply of safe blood and blood components which can be minimize by blood donation. The unremitting need and increasing demand for blood components constantly challenges blood centers to maintain a safe and adequate blood supply from a decreasing pool of eligible donors.<sup>3</sup>

The first historical attempt at blood transfusion was described by the 15<sup>th</sup>-century chronicler Stefano Infessura. Infessura relates that, in 1492, as Pope Innocent VIII sank into a coma, the blood of three boys was infused into the dying pontiff's veins at the suggestion of a physician.<sup>4</sup>

South East Asia account for 25% (15 billion) of the world population but collects only 9% of the world's blood supply as a result 7 million units of blood.<sup>5</sup> In Bangladesh the annual demand for blood transfusion is estimated to be 2,00,000 to 2,50,000 unit per year. But due to lack of voluntary donor and consciousness among people this demand is hardly met.<sup>6</sup>

The adverse reactions that occur in donors can be divided into local reactions and systemic reactions. Local reactions occur predominantly because of problems related to venous access. The systemic reactions, in contrast to the local reactions, can be divided into mild or severe. In most cases, they are vasovagal reactions initiated by the pain of venipuncture, by the donor seeing his or her own blood, by the donor seeing another donor unwell, by the anxiety and state of tension of undergoing the donation, etc.<sup>2</sup> Syncope is defined as a sudden loss of consciousness associated with the inability to maintain postural tone, followed by spontaneous recovery, is relatively common.<sup>3</sup> The pathophysiology of all forms of syncope consists of a sudden decrease in or brief cessation of cerebral blood flow. Syncope is common, disabling, and possibly associated with a risk of sudden death, but its cause are difficult to diagnose.<sup>7</sup> Although syncope has many possible causes, several studies have used

three categories of causes – cardiac, non-cardiac, and unknown. Consequently, syncope often leads to hospital admission, multiple consultations, and performance of many diagnostic test.<sup>8</sup>

Vaso-vagal reactions occur in 2 to 3 percent of blood donors, and 0.08 to 0.34 percent of these reactions progress to syncope.<sup>9</sup> Sudden syncope is clinically significant, because the donor may suffer trauma during the fall. Such traumas sometimes lead to significant injuries, including laceration, concussions and very rarely, bone fractures.<sup>10</sup> Vaso-vagal reactions were extensively studied during World War II<sup>10-12</sup>, when mass blood-donation programs began, and additional studies have been done over the years for specific issues and for general blood donation. These studies have found that youth, low weight, first-time donor status, and past vaso-vagal reaction increase the probability of having a vaso-vagal reaction, but they are not predictive.<sup>13,14</sup>

This study was aimed to explore the incidence of adverse reactions after blood donation including the incidence vaso-vagal reaction among the whole blood donors.

### Methods

It was a prospective type of observation study & was carried out on 1,500 healthy volunteer blood donors, aged between 18 to 60 years & of both sexes. This study was carried out in the department of transfusion medicine in Bangabandhu Sheikh Mujib Medical University from February 2010 to January 2011.

Non probability (purposive) sampling method was applied. All donors were selected after considering general health without evidence of transfusion-transmitted disease. Brief history, monitoring of vital signs (pulse, BP, temperature) before blood donation and upto 30 minutes with proper advise given by using standard protocol were maintained. Following adverse events were looked for during and within 30 minutes of transfusion bruising, sweating and warmness, vertigo, nausea, fainting. Donor selection by taking

Exclusion criteria were body weight <45kg (110 lb), pulse rate <50 and >100 beats per minute, blood pressure>180/100 mmHg, Hb and Hct <13.5g /dL and <40% for male donors and <12.5 g/dL and <38% for female donors.

### Results

This Cross Sectional descriptive study was conducted among 1500 blood donors who attended the blood bank of Bangabandhu Sheikh Mujib Medical University for donating

their blood. Among 1500 donors only 200 (13.3%) were female and rest 1300 (86.7%) were male. (Table-I)

**Table-I:** Distribution of respondents by sex

Sex	Frequency	Percent
Male	1300	86.7
Female	200	13.3
Total	1500	100.0

It was found that out of 1500 donors, majority (53.6%) were in the age group of 21-30 years followed by 40% in the age group of 31 to 40 years, 4% in the age group of 41-50 years and only 2.67% in the age group below 20 years. (Table-II)

**Table-II:** Distribution of respondents by age group

Age in Group	Respondents	Percentage
<20 years	40	2.67
21 to 30 years	800	53.33
31 to 40 years	600	40.00
41 to 50 years	60	4.00
Total	1500	100.0

Among 1500 respondents only 40% has experience of blood donation before and 60% respondents denotes for first time. Among the total 1500 respondents 394 cases experienced adverse effects of blood donation namely; vertigo (9.7%), Sweating and warmness (5.0%), Bruising (3.0%), Nausea (6.3%) and Fainting (2.3%). (Table-III)

**Table-III:** Distribution of respondents by adverse effects due to blood donation.

Adverse effects	Respondents (N=1500)	Percentage
Bruising	45	3.0
Sweating and warmness	75	5.0
Vertigo	145	9.7
Nausea	95	6.3
Fainting	34	2.3
Total	394	26.3

Sweating, Vertigo, Nausea, Fainting and Bruising were experienced mostly by the respondents those who donated blood for the first time and the association of blood donation related adverse effects were found statistically insignificant. (Table-IV)

**Table-IV:** Distribution of respondents by first time and subsequent donation and Different Adverse Effects. (n=1500)

History of blood donation	Sweating	Vertigo	Nausea	Fainting	Bruising
First time	33	60	114	20	30
More than once	33	18	30	6	6
Total	66	78	144	26	36

### Discussion

In this study a total 1500 blood donor were included of whom only 200 (13.3%) were female and rest 1300 (86.7%) were male (Table-1). Majority 800 (53.3%) of them were in the age of 21-30 years followed by 600(40.%) in the age group of 31-40 years, 6.0% in the age group of 41-50 years and only 40(2.67%) in the age group below 20 years (Table-2). Among the respondents only 600(40%) has the experience of blood donation before and 900 (60%) respondents donates for first time.

The current study revealed that among the respondents 394 cases experienced adverse effects of blood donation namely; vertigo 145(9.7%), sweating and feeling of warm75 (5%), pain in the punctured area and bruising 45 (3%), nausea (6%) and fainting 95 (6.3%).

Study conducted by Newman BH in America reported the most common systemic adverse effects as fatigue (7.8%), vasovagal symptoms (5.3%), and nausea and vomiting (1.1%).<sup>15</sup> The most common arm findings were bruise (22.7%), arm soreness (10.0%), and haematoma (1.7%).<sup>15</sup> Another related study by the same researcher defined the common complications based on a post donation interview as bruise (23%), sore arm (10%), fatigue (8%), and vasovagal reaction (7%)<sup>16</sup>. Some blood donation-related adverse events (AEs) can negatively impact the blood donor return rate (BDRR) and decrease donor retention. Newman BH and his associates identified some adverse effects which may impact on blood donation negatively. The four most common AEs were bruise alone (15%), sore arm "alone" (7%), fatigue "alone" (5.1%), and donor reaction "alone"(4.2%), where "alone" is defined to also include who had a bruise but no other AE.<sup>17</sup> American Red Cross report on blood donation adverse effects based on donor interviews

reported bruise (23%), Sore arm (10%), fatigue (8%), and vasovagal reaction (7%), while uncommon events include nerve irritation (0.9%), syncope (0.1-0.3%), and arterial puncture (0.01%).<sup>18</sup> Study was to estimate the tupe, incidence and cause of donor adverse reactions during and after blood donation in a Greek blood bank on 12173 blood donors found one-hundred and seven (0.87%) donors had a vasovagal reaction.<sup>19</sup> Another study in America reported four hundred and fourteen consecutive blood donors to a hospital blood bank had the occurrence of "reaction." Since it is probable that blood donor "reactions" are almost always vasovagal faints, they are so referred.<sup>20</sup>

Although vomiting, haematoma are common adverse effects of blood donation but in this current study such adverse effects was not found.

The current study revealed the adverse blood donation affects as sweating, vertigo, nausea, fainting and bruising, which were experienced mostly by the age group of 31 to 40 years. The association of blood donation related adverse effects were found statistically insignificant except the bruising.

The adverse blood donation affects were experienced mostly by the respondents those who were male. And the association of blood donation related adverse effects were found statistically insignificant. Though the ratio among the females were more. Study conducted by Newman BH in America reported Men were half as likely as women to have an AE (23% AE vs. 48% AE,  $p < 0.0001$ ).<sup>15</sup> There was no significant difference between men and women (0.85 versus 0.95%) was observed in Greek study.<sup>19</sup>

The adverse blood donation effects Sweating, Vertigo, Nausea, Fainting and Bruising were experienced mostly by

the respondents those who donated blood for the first time. And the association of blood donation related adverse effects were found statistically insignificant (Table-5). Study conducted by Newman BH in America reported Repeat blood donors had fewer adverse Effects than first-time blood donors (36% AE vs. 47% AE,  $p < 0.007$ ).<sup>15</sup> Greek study found first-time donors (1.7 versus 0.68%) had a significant greater possibility to have a reaction ( $p < 0.001$ ).<sup>19</sup>

Careful monitoring of all blood donors after donation and counseling of adverse effect before donation is important. The VVR which is delayed is more dangerous as is life threatening.

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