

Determinants of blood donation in undergraduate Medical Students in Uttar Pradesh, India

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Abstract

Introduction: Advances in healthcare require adequate quantities of safe blood, which can be obtained by regular voluntary blood donation. The college-going students constitute a healthy pool of potential donors. This study was conducted to explore the knowledge, attitudes and practices of blood donation in undergraduate medical students, so that the existing lacunae in the system may be identified and remedied.

Materials and Method: A cross-sectional study was conducted on 388 undergraduate medical students, using a structured questionnaire which contained both close and open-ended questions on attitudes and practices. Knowledge was assessed by interview by a single observer.

Results: Only 18.04% students had donated blood. Gender was found to be insignificant and socio-economic status ($p=0.00004$) and knowledge about donation ($p<0.00001$) were found to have a highly significant effect on blood donation. Voluntary donors donating for altruism constituted 82.9%. Commonest reasons for non-donation included deferrals (40.3%), apathy (35.8%) and fear (17.9%). Deferrals were due to anaemia (37.4%) and inadequate weight (2.8%), almost exclusively in females. Misconceptions related to pain (6.3%), increased rate of infections (6.0%), decreased immunity (0.6%) and syncope (0.6%) were prevalent. Non-donors felt that blood donations were risky ($p=0.0261$) and perceived a higher degree of risk than donors ($p=0.0018$). Only 0.6% of the donors were regular donors while 74.3% of donors had donated only once. Blood donation camps were the most important source of knowledge and motivation (34.3%) and all voluntary donors had donated therein. The donation experience was considered good by 58.6% students. To promote donation, non-donors advocated provision of incentives ($p=0.00016$), which included free replacement of blood for family or friends (35.6%) and free blood tests (29.4%).

Conclusions: It is essential to create awareness among medical students and organize blood donation camps to increased recruitment and retention of voluntary donors. This will help attain the goal of 100% voluntary, non-remunerated blood donation laid down by the WHO.

Keywords: Blood donation, Medical Students, Undergraduate

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Introduction

Blood transfusion is considered one of the eight key life-saving interventions in health care.⁽¹⁾ Blood is considered the elixir of life and its importance has increased with advances in the field of surgery, research in utilization of blood components and increase in the number of road traffic accidents. In India, there is a severe imbalance in the demand and supply. Despite the efforts of National AIDS Control Organization (NACO), only 10.9 million units of blood were collected in the year 2015-16 against the estimated annual requirement of 12 million units.⁽²⁾

Apart from the quantity of blood, safety of the transfused blood is another important issue. Donors across the world are classified into three categories- voluntary donors, who donate blood regularly without any remuneration; replacement donors, who donate to procure blood for a relative, or friend who requires blood; and commercial donors, who donate blood in exchange for money. In 1975, the World Health Organization (WHO) laid down the goal of obtaining all blood supplies from voluntary, non-remunerated blood donors by 2020,⁽³⁾ as this category has the least

number of transfusion transmitted infections (TTI).⁽⁴⁾ According to the NACO, only 79% of the blood collected in India in 2015-16 was through non-remunerated donation. The state of Uttar Pradesh, where this study was conducted, despite being the most populous state in India, contributed to the collection of a mere 0.9 million units, of which only 44% was voluntary donation.^(2,5) This reflects the attitude towards blood donation in the general population.

In this study, we targeted the undergraduate students as the youth constitutes a healthy population, having an open mind and are a potential source of safe blood. This study was conducted to find out the factors influencing dismal blood donation statistics in the region by obtaining inputs from undergraduate medical students regarding factors contributing or detrimental to blood donation, reasons for deferral, misconceptions and myths regarding donation, existing blood donation practices, suggestions for improvement of blood donation services and level and source of knowledge about donation. Understanding their attitudes, motivations and misconceptions about blood donation

may help frame policies accordingly and recruit them into the inadequate donor pool of our country.

Materials and Method

Study Design: This was a cross-sectional observational study conducted by the Department of Pathology from a tertiary care centre in the Greater Noida in the state of Uttar Pradesh in India on undergraduate medical students after obtaining permission from the Institutional Ethics Committee.

Study population: The study was conducted on undergraduate medical students from four consecutive batches, irrespective of their donation status or demographics. They were interviewed using a pre-validated structured questionnaire.

Sample Size: Considering the blood donation rate of 55.4% in students in a previous study,⁽⁶⁾ taking a confidence level of 95% and a margin of error of 5%, the calculated sample size is 380. A total of 388 students who consented to participate in the study after being explained the nature and purpose of the study were enrolled after taking written informed consent.

Sampling Technique: Selection of study participants was voluntary and non-random. Sample of convenience was selected.

Study Tool: A structured questionnaire was designed by the authors after reviewing similar studies, keeping in mind the various parameters enumerated in the "Methodological Guidelines for Socio-cultural Studies on Issues Related to Blood Donation".⁽⁷⁾ It included multiple-choice questions regarding donor demographics, donor and non-donor behaviour and reasons thereof, perceptions about risks involved and factors which motivate blood donation. For donors, additional multiple-choice questions regarding the reasons for donation, source of information and motivation and level of satisfaction with services at donation locations (graded on a Likert scale) were also included. Level of knowledge about blood donation and

transfusion was graded on a Likert scale. The questionnaire was thereafter validated for construct and content by incorporating feedback from experts in Transfusion Medicine, other faculty members and prescribing clinicians.

Data Collection: A self-administered questionnaire and face-to-face interview were used to collect data. The questionnaire was administered individually to the participants and they were directed to complete all segments except that on knowledge. Thereafter each student was interviewed about criteria for eligibility for blood donation, amount of blood collected, frequency of blood donation, use of collected blood and its fractions, typing of blood and testing on donated blood. To avoid observer bias, interviews were conducted by the same principal investigator, who graded the students on a three-part Likert scale.

Statistics: The data collected were entered into Excel spread sheets and analysis was carried out using SPSS (version 17) software. Descriptive statistics and Pearson's Chi-square test were used in this study to analyse the data.

Results

Out of the study population consisting of 388 students, only 70 (18.04%) undergraduate students had donated blood. The age for both the groups ranged from 18-25 years with an average age of 21(±2.8). As females comprised 78.35% of the total study population, their number was higher in the donor group too, comprising 78.57% of donors. Donation behaviour was higher in males, with 18 males (23.07%) donating blood against 52 females (16.77%). However role of gender on donation behaviour was not found to be statistically significant ($p=0.19569$). Students were graded into four groups based on family income. It was found to have a highly significant effect on donor behaviour ($p=0.000043$).

Table 1: Demographic profile of the study population

		Donors (%)	Non-Donors (%)	Total (%)
Age (years)		21±2.6	21±2.8	21±2.8
Gender	Male	18 (25.7)	60 (18.9)	78 (20.1)
	Female	52 (74.3)	258 (81.1)	310 (79.9)
Family Income (x10 ³ per month)	< 10	0 (0.0)	6 (1.9)	6 (1.5)
	10-50	4 (5.7)	7 (2.2)	11 (2.8)
	50-100	18 (25.7)	25 (7.9)	43 (11.1)
	>100	48 (68.6)	280 (88.0)	328 (84.5)

The subjects were graded into three groups based on their knowledge of blood donation and transfusion, as determined by the interview method. (**Table 2**) This was again found to have a highly significant association with donation behaviour ($p<0.00001$).

Table 2: Knowledge about blood donation in the study population

		Donors (%)	Non-Donors (%)	Total (%)
Knowledge	Poor	0 (0.0)	6 (1.9)	6 (1.5)
	Satisfactory	11 (15.7)	147 (46.2)	158 (40.7)
	Good	59 (84.3)	165 (51.9)	224 (57.7)

The attitudes of the undergraduate medical students were also studied using the self-administered questionnaire. Reasons for donating and not donating blood are depicted in **Table 3**. Most of the donors were found to be voluntary donors, though some were found to be replacement donors. None of the students were commercial donors. The commonest reason for not donating was found to be rejection by blood bank authorities, due to anaemia in 119 (37.4%) and inadequate weight in 9 (2.8%) students. All except one of the rejected candidates were females. A substantial number (35.8%) did not donate as they were 'not asked to donate'. The various fears which contributed to non-donation in 17.9% cases included fear of needles in 16 (5.0%), fear of the procedure in 20(6.3%), fear of infections in 19 (6.0%) and fear of vasovagal syncope in 2 (0.6%) cases. Other causes included diseases like Type I diabetes mellitus in 3 (1.0%), antiepileptic medication in 1 (0.3%), infections with antibiotic therapy during blood donation camps in 4 (1.3%), myths like decreased immunity and increased susceptibility to infections after donation in 2 (0.6%) each and strict parental forbiddance in 5 (1.6%) cases.

Table 3: Motivating and de-motivating factors for blood donation

Reasons for donating blood	Donors (%age)
Voluntarily	58 (82.9)
For relative/ friend	12 (17.1)
For monetary gain	0 (0.0)
Reasons for not donating blood	Non-donors (%age)
I was rejected as donor	128 (40.3)
I was not asked to donate	114 (35.8)
I do not have time	2 (0.6)
I am afraid	57 (17.9)
Others	17 (5.3)

All the students' perception regarding risks due to blood transfusion was gathered. 17 (24.3%) donors and 122 (38.4%) non-donors felt that blood donation carries risks (**Table 4**). The perception of risk was found to have a statistically significant impact on donation behaviour ($p=0.026145$). Students who perceived blood donation as risky were directed to grade the risk on a three-part Likert scale. The perception of degree of risk also affected donations significantly ($p=0.001776$). The commonest risk perceived by donors was that of transfusion transmitted infections and by non-donors was that of post-transfusion anaemia or weakness.

Table 4: Perception of risks due to blood donation

		Donors (%)	Non-donors (%)	Total (%)
Does blood transfusion pose any risk?	Yes	17 (24.3)	122 (38.4)	139 (35.8)
	No	53 (75.7)	196 (61.6)	249 (64.2)
Nature of risk	Anaemia	6 (8.6)	158 (49.7)	164 (42.3)
	Infection	11 (15.7)	6 (1.9)	17 (4.4)
	Sexual dysfunction	0 (0.0)	0 (0.0)	0 (0.0)
	Others	0 (0.0)	0 (0.0)	0 (0.0)
Grade of risk	High	0 (0.0)	12 (3.8)	12 (3.8)
	Medium	11 (15.7)	29 (9.1)	40 (10.3)
	Low	6 (8.6)	81 (25.5)	87 (22.4)

Possible means to promote donations were also explored. 41 (58.6%) donor and 254 (79.9%) non-donors felt that incentives should be provided. (**Table 5**) The difference in attitude among both the groups was found to be statistically significant ($p=0.000157$). Free replacement for family, friends or relatives and free blood tests were the two incentives advocated by both, with non-donors preferring the former (37.7%) and donors the latter (32.9%).

Table 5: Role of incentives in blood donation

		Donors (%)	Non-donors (%)	Total (%)
Should incentives be given to blood donors?	Yes	41 (58.6)	254 (79.9)	295 (76.0)
	No	29 (41.4)	64 (20.1)	93 (24.0)
Nature of incentive	Free replacement for family/ friends/ relatives	18 (25.7)	120 (37.7)	138 (35.6)
	Free blood tests	23 (32.9)	91 (28.6)	114 (29.4)
	Paid leave from work/ class	0 (0.0)	34 (10.7)	34 (8.8)
	Others	0 (0.0)	9 (2.8)	9 (2.3)

Data was gathered from donors to further probe the blood donation behaviour and experience. The majority of the donors, that is 52 students (74.3%), had donated only once in their lifetime, 16 (22.9%) had donated twice and only 2 (0.6%) had donated four times. 12 students (17.1%) had donated in the previous month, 35 (50.0%) in the previous year and 23 (32.9%) had donated more than one year back. All the voluntary donors had donated in blood donation camps held in the hospital. Camps were found to be the most important source of knowledge regarding blood donation, having motivated 24 (34.3%) students, followed closely by family and television, each of which provided knowledge to 17 (24.3%) students. Friends provided knowledge and motivation to a mere 12 (17.1%) students. The donation experience was perceived as good by 41 (58.6%) students and satisfactory by the remaining 29 (41.4%), none of them rating it as bad. 21 (30%) donors reported complications, the predominant one being a feeling of weakness, experienced by 19 (27.1%) students and 1 (1.4%) each reported pain and scarring at the phlebotomy site.

Discussion

This study aimed to explore knowledge, attitudes and practices (KAP) of blood donation among undergraduate medical students, so as to frame strategies which would help attain the goal of self-sufficiency in blood transfusion services through 100% voluntary blood donation. The rate of donation of 18.04% correlated well with other studies conducted on students in developing countries like 11% in Thailand,⁽⁸⁾ 14.3% in Brazil,⁽⁹⁾ 15% in Nigeria,⁽¹⁰⁾ 16% in Bangladesh,⁽¹¹⁾ 17.5% in Mmabatho,⁽¹²⁾ 18% in Pakistan,⁽¹³⁾ 19.02% in KSA,⁽¹⁴⁾ 24% in Greece,⁽¹⁵⁾ 28.5% in Nepal,⁽¹⁶⁾ with higher values in some developed countries like USA (49% in African Americans),⁽¹⁷⁾ and Serbia (41.4%).⁽¹⁸⁾ Indian studies showed a huge variation, from 55.4% in the east,⁽⁶⁾ 12.32% in the west,⁽¹⁹⁾ and less than 1% in the south.⁽²¹⁾ Most studies conducted on students have found a male pre-disposition in donation behaviour.^(6,10,15,16,22) In our study, similar to some other global studies, though donation behaviour is higher in males, the difference is not statistically significant.^(8,23) The role of family income, which has been found to be significant in this

study ($p=0.00004$), has not been explored in students and was found to be insignificant in studies on the general population.⁽²⁴⁾

Knowledge about blood donation practices was found to have a strong impact on donor behaviour ($p<0.00001$) similar to other studies in India^(6,20,22) and abroad.^(10,16,23,28,29,30) Knowledge alleviates fear and misconceptions and creates awareness about our social responsibility and the need of an adequate supply of blood and blood products.

The Supreme Court of India banned commercial blood donation in 1996. In keeping with this, none of the students had donated for monetary gain. 82.9% donors were voluntary donors who had donated for altruistic motives, which was similar to other studies conducted on students, both in India⁽⁶⁾ and abroad.^(13,14,16,25) In other studies, helping family or friend in need^(10,13,14,26) and religious reasons^(14,26,27) have also found to have an important role.

The commonest reason for non-donation was deferral by blood bank personnel (40.3%), the majority of which were due to anaemia and inadequate weight, occurring almost exclusively in females. This pathetic state of affairs in unmarried, non-childbearing, educated females, most of who belong to a higher income group, reflects the poor nutritional status of females in India. This was followed closely by the statement 'I was not asked to donate' (35.8%), which has also been documented in other studies.^(13,21,22,29) This data also brings to light the apathy in the youth towards blood donation services, as well as the lack of active recruitment drives by the blood bank personnel. Various fears, the majority being related to the procedure (11.3%) also act as detriments in 17.9% cases in our study, which have been highlighted as the major cause in some studies.^(6,8,11,16,17,22,25,26,29) Some misconceptions and myths were also unveiled, which included those related to pain (6.3%) and syncope (0.6%) during the procedure; and increased rate of infections (6.0%) and decreased immunity (0.6%) thereafter. These have been reported in other studies globally.^(11,12,14,16,21,22,25,28,29) However, the myth of decreased fertility due to blood donation, prevalent in India, seems to have been busted in the newer generation, as none of the subjects gave a positive response to this option provided in the reasons for non-

donation. Instead of encouragement, parents were seen to forbid donations in 1.6% cases, also noted in another study on Indian students.⁽²¹⁾

In our study, the perception of risk was found to have a statistically significant impact on donor behaviour ($p=0.0261$) and included chiefly chances of anaemia and infection, which have been observed in other studies.^(12,17,25,29) Among all the subjects who perceived blood donation as unsafe, non-donors felt that the degree of risk associated with blood donation was significantly higher ($p=0.0018$).

Apart from knowledge and attitudes, the practices related to blood donation were also studied. Our study showed that 74.3% of the students had donated only once, with a mere 0.6% donating regularly. Studies have shown that regular donation enhances knowledge and positive attitudes towards blood donation.^(15,20,22) The retention of a donor is as important, if not more, than donor recruitment, to attain the ideal of 100% non-remunerated blood donation. It is here that further strategic intervention is required to prevent dropouts. However blood donation services in the area, though not robust, have played a role in influencing donor behaviour, as blood donation camps organized, were found to be the single most important source of knowledge and motivation, unlike other studies, where family,⁽²¹⁾ friends or media provided information.⁽³⁰⁾ The donation experience was also considered good by 58.6% students, with no subject rating it as bad. Adverse effects reported were similar to other studies and included weakness^(13,17) and pain.

Inputs on methods to promote donation were gathered. There was a significant difference ($p=0.00016$) in the attitude of donors and non-donors, with the latter supporting provision of incentives. Incentives suggested included free replacement of blood for family or friends (35.6%) and free blood tests (29.4%). Most global studies have emphasized on convenience-oriented factors for promoting donation, like free transport,⁽⁶⁾ organizing camps at educational institutions.^(13,17,26,29) The fact that such factors were not mentioned in our study is a testimony to the regular blood donation camps organised by the blood bank in the university. It was highlighted by the fact that all the voluntary donors in this study had donated in camps.

Conclusion

Our study revealed that the pool of undergraduate medical students as a potential source of healthy, safe, voluntary blood donors has been largely unexplored. Altruistic motives are primarily responsible for voluntary donation. On the other hand, malnutrition, especially in females, apathy, irrational fears and misconceptions hinder blood donation. Non-donors often have an exaggerated perception of risk, which is another de-motivating factor for them. As knowledge and socio-economic variables have a significant impact on donor behaviour, it is essential to create awareness

among college-going students, organize blood donation drives and improve blood banking services. This will lead to increased recruitment and retention of voluntary donors to attain the goal of obtaining all blood supplies from voluntary, non-remunerated blood donors by 2020 laid down by the WHO.

Limitations

This study refers to the data obtained from a single medical college in Greater Noida and studies from other medical colleges in the country are needed to for further insight on this topic.

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