



A STUDY ON SOCIOECONOMIC EVALUATION OF TRANSFUSION TRANSMITTED INFECTIONS AMONG VOLUNTARY BLOOD DONORS IN A TERTIARY CARE CENTRE

Immunohematology

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ABSTRACT

Introduction- Parenteral administration of blood and blood products carries a risk of transmitting infectious diseases, including HIV, Hepatitis B, Hepatitis C, malaria, and syphilis. TTI tests in blood donors are necessary to decrease the chance of transmission of infection. A healthy voluntary blood donor screening procedure, donor selection and proper counseling of the donor will decrease the risk of acquiring TTI. This study was conducted on voluntary blood donors in a tertiary care centre. **Aim-** To evaluate socioeconomic factors of transfusion transmitted infection cases among voluntary blood donors. **Material and Methods -** After screening of blood donor, we have collected the required amount of whole blood. We have taken 3ml of anti-coagulated Blood from the tubing's of Blood bag. Sandwich Elisa method was used for testing of Hepatitis B virus, Hepatitis C virus and HIV (Human immunodeficiency virus) **Conclusion-** This data suggests a broad demographic of blood donors, with a significant presence of individuals from lower to middle-income professions. The data indicates that strategies to encourage repeat donations are essential for maintaining a stable blood supply.

KEYWORDS

Blood transfusion, Hepatitis B, HIV, Hepatitis C

INTRODUCTION:

Parenteral administration of blood and blood products, such as Fresh Frozen Plasma (FFP), packed cells, and leucoreduced whole blood, carries a risk of transmitting infectious diseases, including HIV, Hepatitis B, Hepatitis C, malaria, and syphilis. There has been an increase in the number of voluntary donors in different countries [1]. The use of such donors would ensure the availability of safe blood. It is necessary to apply blood transfusion safety measures around the world, especially among underdeveloped and low-income countries and also developing countries like India. TTI tests in blood donors are necessary to decrease the chance of transmission of infection and also provide safe blood to the recipient so that there will be reduced mortality and morbidity. It also reduces the burden of disease in the country. A healthy voluntary blood donor screening procedure, donor selection and proper counseling of the donor will decrease the risk of acquiring TTI. This study was conducted on voluntary blood donors in a tertiary care centre. Hepatitis B is highly infectious and relatively easy to transmit and has the highest prevalence among TTI.

AIM: To evaluate socioeconomic factors of transfusion transmitted infection cases among voluntary blood donors.

MATERIAL AND METHODS:

Duration of study was one and half year. After screening of blood donor, we have collected the required amount of whole blood in 350/450ml CPD – SAGM (citrate phosphate dextrose – saline adenine glucose mannitol) Blood bag. We have taken 3ml of anti-coagulated Blood from the tubing's of Blood bag and it was centrifuged at 1200rpm (Round per min.) for 3-5 min. supernatant plasma was used for testing of transfusion transmitted infection. Sandwich Elisa method was used for testing of Hepatitis B virus, Hepatitis C virus and HIV (Human immunodeficiency virus). Rapid card test method was used for testing of Syphilis and malaria.

RESULTS:

Out of a total of 10,500 voluntary blood donors, 277 individuals were found to have Transfusion Transmitted Infections (TTIs). Among the 10,472 male voluntary blood donors, 276 were found to have TTIs, resulting in a prevalence rate of 2.636%. In contrast, out of 28 female donors, 1 case of TTI was reported.

Table 1: Socioeconomic Status (SES) Of TTI Positive cases

Valid	SES	Frequency	Percent	Valid percent	Cumulative percent
	Auto driver	9	3.2	3.2	3.2
	Businessman	4	1.4	1.4	4.7
	Driver	4	1.4	1.4	6.1
	Farmer	73	26.4	26.4	32.5

Govt. job	1	0.4	0.4	32.9
Housewife	1	0.4	0.4	33.2
Laborer	89	32.1	32.1	65.3
Mechanic	18	6.5	6.5	71.8
Milkman	1	0.4	0.4	72.2
Pvt. Job	37	13.4	13.4	85.6
Shopkeeper	14	5.1	5.1	90.6
Student	25	9.0	9.0	99.6
Truck driver	1	0.4	0.4	100.0
Total	277	100.0	100.0	

The socioeconomic status of the blood donors shows a wide range of occupations, but a large proportion (32.1%) are laborers, followed by farmers (26.4%). The distribution suggests that individuals from lower to middle-income professions were more likely to donate blood in this setting.

Table 2: Number of Times Blood Donated

Number of times blood donation	frequency	percent	Valid percent	Cumulative percent
valid	1.0	229	82.7	82.7
	2.0	47	17.0	99.6
	3.0	1	0.3	100.0
Total	277	100.0	100.0	

Most donors in this study were first-time or infrequent donors, suggesting a need for increased donor retention strategies and awareness programs to encourage repeat donations.

Table 3: Marital Status

Married	Frequency	Percent	Valid percent	Cumulative percent
valid	No	117	42.2	42.2
	Yes	160	57.8	100.0
Total	277	100.0	100.0	

This demographic distribution may suggest that married individuals were more likely to donate blood, although both marital statuses are represented fairly equally in this donor population.

Table 4: Age Group and Occupation Cross tabulation

Occupation	Age group (yrs)					Total
	18-20	21-30	31-40	41-50	51-65	
Auto driver	1	6	2	0	0	9
Businessman	0	2	2	0	0	4
Driver	0	2	1	0	1	4
Farmer	0	30	34	7	2	73
Govt. job	0	0	1	0	0	1

Housewife	0	0	1	0	0	1
Laborer	2	53	30	1	3	89
Mechanic	0	12	6	0	0	18
Milkman	0	0	1	0	0	1
Pvt. Job	1	15	17	4	0	37
Shopkeeper	0	8	2	3	1	14
Student	6	19	0	0	0	25
Truck driver	0	0	1	0	0	1
Total	10	147	98	15	7	277

Chi – square test			
Pearson Chi – square	Value	df	P-Value
	93.654a	48	<0.001

This cross tabulation shows the occupation of blood donors across different age groups. The most common occupations among donors are labourers, farmers and those working in private jobs. Donors in the 21-30 years age group predominantly fall into the laborer and farmer categories. The Chi-Square test with a p-value of less than 0.001 indicates a highly significant association between age group and occupation. This suggests that certain occupations, particularly laborers and farmers, are more likely to participate in blood donation, especially within younger age groups.

DISCUSSION:

The socioeconomic status of the blood donors in this study reveals a diverse range of occupations, with a notable concentration of labourers (32.1%) and farmers (26.4%). Other occupations, such as truck drivers, businessmen, mechanics and students, are represented in smaller percentages. This data suggests a broad demographic of blood donors, with a significant presence of individuals from lower to middle-income professions. The distribution indicates that manual laborers and farmers are more likely to donate blood in this setting. This mirrors findings by Tagny et al. (2009) [2], who observed that blood donation is often prevalent among individuals from diverse socioeconomic backgrounds, including those in manual laborer occupations.

The majority of blood donors in this study (82.7%) had donated blood only once, while a smaller proportion (17%) had donated twice, and only a very small percentage (0.4%) had donated three times. This indicates that most donors are first time or infrequent donors, highlighting a potential need for improved donor retention strategies and awareness programs to encourage repeat donations. Studies by Schreiber et al. (2003) [3] also highlight the trend of first-time donors making up the majority of the blood bank. The data indicates that strategies to encourage repeat donations are essential for maintaining a stable blood supply.

The majority of blood donors in this study (57.8%) were married, while 42.2% were unmarried. This demographic distribution suggests that married individuals may be more likely to donate blood, although both marital statuses were fairly well represented in this donor population. This observation is consistent with studies by Zou et al. (2008) [4], which have explored the relationship between marital status and blood donation, often finding a mix of married and unmarried donors. The cross tabulation between age group and occupation revealed that labourers (89) and farmers (73) were the most frequent occupations among donors, followed by students (25) and private job holders (37). The p-value of less than 0.001 indicates a highly significant relationship between age group and occupation. This supports findings by Busch et al. (2001) [5], who observed a diverse range of occupations among 66 blood donors. The high number of laborers and farmers donating blood may reflect a strong sense of community responsibility within these groups, while the presence of students indicates the potential for educational institutions to promote blood donation. The data showed a wide spread of occupations within the 21-30 and 31-40 age groups.

In the cross tabulation of age group and marital status, the findings revealed a significant number of married (160) and unmarried (117) donors. The p-value of less than 0.001 indicates a strong relationship between age group and marital status. Studies by Zou et al. (2008) [4] and Allain, J. P. (2004) [6] also observed a mix of married and unmarried blood donors, which aligns with the study's findings. The data shows that the 21-30 age groups has the largest number of unmarried donors and the 31-40 age group has the largest number of married donors. This finding aligns with the trend observed by Busch

(2001) [5] and Schreiber et al. (2003) [3], where a large proportion of blood donors are first-time donors. The high number of first-time donors highlights the importance of effective recruitment strategies, while encouraging repeat donations is crucial for maintaining a stable blood supply. The 21-30 and 31-40 age groups had the largest number of first-time and second-time donors. The cross tabulation between age group and history of transfusion-transmitted infections (TTIs) revealed that only 3 donors reported a history of TTIs, while the majority (274) had no such history. The p-value of 0.018 indicates a significant relationship between age group and history of TTIs. This finding is consistent with studies by Dodd (1992) [7], which emphasized the importance of donor screening to minimize the risk of TTIs. The low number of reported TTIs is encouraging, but it highlights the need for stringent screening protocols to ensure blood safety. Further investigation may be required to understand the reasons for the few reported cases. The cross tabulation of age group and history of high-risk behavior found that only 3 donors reported a history of high-risk behavior. The p-value of 0.018 indicates a significant relationship between age group and history of high-risk behavior. This is similar to the findings from Dodd (1992) [7], which underscored the importance of screening for high-risk behaviors in blood donors. The low number of reported high risk behaviors is a positive sign, but it remains crucial to maintain vigilance in donor screening.

CONCLUSION:

The analysis of donation frequency indicated that most donors were first time or infrequent; indicate the need for improved donor retention strategies. Statistical analyses, including chi-square tests, revealed significant associations between age group and factors such as socioeconomic status, occupation, marital status, and history of TTIs, while also showing non-significant relationships between age group and gender, number of donations. In this study identification of risk factors, including age and socioeconomic variables, provides valuable insights for targeted interventions to enhance donor recruitment and ensure the safety of the blood supply.

REFERENCES:

1. Adjei AA, Armah HB, Gbagbo F, Boamah I, Adu-Gyamfi C, Asare I. Seroprevalence of HHV-8, CMV and EBV among the general population in Ghana, West Africa. *BMC Infectious Diseases*. 2008; 8:111.
2. Tagny, C. T., Owusu-Ofori, S., Charlemagne, N., Mbanya, D., & Tapko, J. B. (2009). The blood donor in sub-Saharan Africa: a review. *Transfusion medicine reviews*, 23(3), 205-216.
3. Schreiber, G. B., Busch, M. P., Kleinman, S. H., & Korelitz, J. J. (2003). The risk of transfusion-transmitted viral infections. *New England Journal of Medicine*, 348(20), 2056-2057.
4. Schreiber, G. B., Busch, M. P., Kleinman, S. H., & Korelitz, J. J. (2003). The risk of transfusion-transmitted viral infections. *New England Journal of Medicine*, 348(20), 2056-2057.
5. Zou, S., Musavi, F., Notari, E. P., Rios, M., Trouern-Trend, J., & Fang, C. T. (2008). Factors influencing repeat blood donation. *Transfusion*, 48(10), 2138-2144.
6. Busch, M. P., Kleinman, S. H., & Jackson, B. (2001). New strategies for preventing transfusion-transmitted viral infections. *Clinical infectious diseases*, 33(9), 1548-1556.
7. Allain, J. P. (2004). Transfusion transmitted infections. *Vox sanguinis*, 87 (suppl 2), 91-100.
8. Dodd, R. Y. (1992). The risk of transfusion-transmitted infection. *New England Journal of Medicine*, 327(6), 419-421.