ORIGINAL ARTICLE

REACTIVE BLOOD DONOR NOTIFICATION; THEIR RESPONSES AND PERCEPTIONS: EXPERIENCE FROM SOUTHERN PAKISTAN

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Background: Donor notification of reactive status is important to prevent the spread of disease. Response of reactive donors to seek confirmation and treatment is a direct reflection of their knowledge and attitudes towards transfusion transmittable infections. **Method:** A cross sectional observational study was conducted from August 2014 to July 2015 at the blood bank of a tertiary care hospital, Karachi, Pakistan. Reactive donors' notification and responses were noted with reasons of failure. A cross-sectional analytical survey with non-probability purposive sampling was done on 350 potential consenting blood donors using a pre-tested questionnaire to assess their knowledge and attitude about disease awareness, transmission routes, financial implications and disease sensitization. **Result:** Out of 16660 donations, 5.57% were rejected on positive screening tests. Repeat donors (69.5%) with primary to secondary qualifications constituted the bulk of reactive donors. Donor notification rate were 54.25% whereas 28.68% donors responded to blood bank in person. The survey showed limited awareness about transfusion transmitted infections. Respondents who were ignorant of disease spread through blood transfusion comprised of 48%. 96.6% donors did not know the financial impact of treatment and 69.7% were unable to afford it. Moreover, 94.9% donors were not protected against hepatitis B. Participants with secondary education had significantly less odds of being adequately knowledgeable (OR=0.372, 95% CI: 0.203–0.681, *p*-value <0.01) but more likely to have a positive attitude. **Conclusion:** There is need for structured pre-donation counselling to sensitize donors about transfusion related diseases in resource limited countries where treatment costs are high and out of reach for most donors.

Keywords: Blood donors; Donor notification; Transfusion transmittable diseases

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INTRODUCTION

Blood donor and recipient safety is the hallmark of hemovigilance which is practiced worldwide. WHO Global Database on Blood Safety indicates that an estimated 1.6 million units of blood are discarded annually due to the presence of markers for transfusion transmitted infections (TTIs) including Human Immunodeficiency Virus (HIV), Hepatitis B virus (HBV), Hepatitis C virus (HCV) and Syphilis.[1] Pakistan falls within areas of high and intermediate endemicity for HCV and HBV with estimated prevalence of >2.9% and 2.7 % for general population and 2.8% and 2.3% for blood donors.[2,3] In Pakistan, approximately 25% of blood banks lack screening facilities; in conjunction with inadequate infection control practices and frequent use of unsafe injections are the major hurdles in curtailing these diseases.[4]

Blood banks play an important role towards control of transfusion transmittable infections by filtering out high risk donors through donor selection process, applying stringent screening tools and by reactive donor notification process performed after screening tests. Post donation counselling helps in early identification and treatment of reactive donors and pinpoints potential sources of infections among the population; hitherto unrecognized. World Health Organization (WHO) stresses on national blood policies for blood donor recruitment, selection and deferral, blood screening, confirmatory testing, notification, counselling and referral.[5] In developed countries, the standard method of notification include confirmation of results in reference laboratories before informing donors. No set guidelines are available about donor notification in our national health policy; still established blood banks in the country practice it albeit tepidly. The common modus operandi is calling up the donors and requesting them to contact a focal person in blood bank for information and counselling about positive screening results. Mailing information to reactive donors, a common practice in the west is not followed here due to constant relocation and a less reliable postal system. General perceptions about modes of disease transmission and its complications specifically among the donor population have not been explored before from this part of the region. Hence this study was conducted to review reactive blood donor notification and response rates for one-year duration at the blood bank. A concurrent survey was carried out

among potential donors to gauge their knowledge and attitudes towards TTIs.

MATERIAL AND METHODS

We evaluated reactive donations in one year, from August 2014 to July 2015 at the blood bank of a tertiary care hospital at Karachi, Pakistan.

The donors were screened post donation for HBV, HCV, HIV 1and 2, Syphilis and malaria. They were considered sero-positive for HBV, HCV, Syphilis and HIV1 and 2 on positive screening tests done by Chemiluminescent Immunoassay (CIA) method on Architect i2000SR Immunoassay analyser (Abbott Diagnostic, USA) following appropriate controls. ICT malaria tests (rapid SD malaria antigen test, Bioline, Gyeonnggi-do, Korea) positive cases were confirmed by microscopic examination. Sero-negative samples for HBV, HCV, and HIV1 and 2 were tested by Nucleic Acid Amplification Test (NAT) using multiplex Polymerase Chain Reaction Test (Cobas Taq screen MPX, Roche Molecular Diagnostics), with a pool of six samples. Reactive donors were contacted on their provided contact numbers as per hospital policy. They were divided into 2 groups; first time donors with no prior history of blood donation and repeat donors who had donated blood at least once in their lifetime.

Each group was further stratified based on education into primary (illiterate or educated till grade-5), secondary (grade-6 to grade-12) and tertiary (grade-13 upwards). Failure to notify with reasons and notification response at initial and subsequent follow-ups was judged for each group and levels of education.

A cross sectional analytical study using non-probability purposive sampling was conducted targeting potential donors prior to donor selection to prevent information bias. A sample size of 376 was calculated assuming a prevalence of 50% for knowledge, attitudes and practices of TTIs, a 95% confidence interval and a sample error of 5%. All consenting individuals were interviewed using a structured pre-test questionnaire prepared in Urdu. Socio-demographic data including their gender, age and education was collected. Knowledge was assessed through 15 questions regarding disease type, outcomes, modes of spread and financial impact. Attitude was checked with 5 questions about their willingness to seek results of screening tests, response to notification, vaccination status for hepatitis B and opting for confirmation and treatment if needed. Each correct answer was given a score of 1; wrong or blank answers were scored as 0. Out of a maximum score of 20, respondents with a score of 10 or more (>50%) were considered adequately knowledgeable /having a positive attitude while a score of 9 or less (<50%) was considered inadequate.

Data was analysed by using SPSS version 21 (SPSS, Inc., Chicago, IL). Mean and standard deviation were computed for quantitative variable (age). Frequency and percentage were calculated for qualitative variables. Associations were assessed using Pearson Chi-square test. All *p*-values were considered significant at ≤0.05. Multiple logistic regression analysis was used to determine their adjusted association of socio demographic variables with knowledge and attitude awareness of blood donation to donate. All odds ratios were reported with a 95% confidence interval.

RESULTS

From August 2014 to July 2015 a total of 16660 donations were made, out of which 940 donors (5.57%) were rejected on positive screening tests Mean age of reactive donors was 28.65±9.49 years. The frequency of HBsAg was 1.67%, HCV 1.91%, HIV1 2 0.07%, Syphilis 1.76%, Malaria 0.01% and for combined infections 0.13%. Repeat donors with primary to secondary qualification (n=235 and 277 respectively) constituted the bulk of reactive donors, n= 654(69.5%). The blood bank was able to notify only 54.25% of reactive donors. Foremost reason for failure to intimate was due to non- response or off contact number among repeat and first-time donors (258/290 and 105/139) with a cumulative score of 84.61% Reactive donor response rate both first time and repeat was 28.68% whereas those donors who reported to blood bank with confirmation of results were 4.08%. (Table-1) Three hundred and fifty blood donors participating in the survey had a mean age of 26.53±2.86 years. Educational status of respondents was 29.7% (n=104), 30.9% (n=108) and 39.4% (n=138) as primary, secondary and tertiary education respectively. Employment status was 18.6% (n=65) and 81.4% (n=285) as unemployed and employed respectively. Participants were asked to answer questions regarding knowledge and attitude towards blood donation. (Table-2) Education was found to have a significant association with knowledge (p<0.001) and attitude (p<0.01) scores about TTIs. (Table-3)

Multivariate logistic regression analysis for knowledge and attitude scores after adjustment for age, education and employment status showed that participants with secondary education had significant less odds of being adequately knowledgeable than participants who were well qualified (OR=4.044, 95% CI: 1.567–10.435, *p*-value <0.01). Similarly, attitude scores after adjustment for age, education and employment status showed that participants with secondary education as compared to those who had received primary education (OR=2.019, 95% CI: 1.190–3.426, *p*-value <0.01) had higher odds and significant impact for adequate attitude score as shown in Table 4. Other variables were found to have a non-significant impact on attitude score.

Table-1: Reactive donor's notification outcome (Aug 2014-Jul 2015)

REPEAT DONORS	Primary (n=235)	Secondary (n=277)	Tertiary (n=146)	Total (n=654)
DONORS NOT NOTIFIED	107 (45.53%)	107 (38.62%)	76 (52.05%)	290 (44.34%)
Not contacted from Blood Bank	2	10	7	19 (6.55%)
No Contact Number	5	1	2	08 (2.75%)
Wrong Contact Number	5	5	5	15 (5.17%)
Cell phone off/busy/no response	95 (88.78%)	101 (94.39%)	62 (81.57%)	258 (88.96%)
DONORS NOTIFIED	132 (20.18%)	153 (23.39%)	71 (10.85%)	356 (54.43%)
Donor response (1st visit)	34 (25.75%)	47 (30.71%)	19 (26.76%)	100 (15.29%)
Donor response (2nd visit)	04 (3.03%)	07 (4.57%)	03 (4.22%)	14 (3.93%)
1ST TIME DONORS	**Primary (n=150)**	**Secondary (n=97)**	**Tertiary (n=39)**	**Total (n=286)**
DONORS NOT NOTIFIED	68 (45.33%)	52 (53.60%)	19 (48.71%)	139 (48.60%)
Not contacted from Blood Bank	3	5	2	10 (7.19%)
No Contact Number	10	3	0	13 (9.35%)
Wrong Contact Number	8	3	0	11 (7.91%)
Cell phone off/busy/no response	47 (69.11%)	41 (78.84%)	17 (89.47%)	105 (75.53%)
DONORS NOTIFIED	80 (53%)	46 (47.42%)	19 (48.71%)	145 (50.69%)
Donor response (1st visit)	19 (23.75%)	14 (30.43%)	09 (47.36%)	42 (28.96%)
Donor response (2nd visit)	02 (2.5%)	03 (6.52%)	01 (5.26%)	06 (4.13%)

Table-2: Description of knowledge and attitude regarding blood donation

Donor knowledge assessment	Score: >10		Score: <10	
	Frequency	%	Frequency	%
General information about TTIs				
1. Name common transfusion transmittable infections.	92	26.3	258	73.7
2. Name major complications of TTIs	62	17.7	288	82.3
3. Name the common symptoms of TTIs.	38	10.9	312	89.1
4. Name treatment options for TTIs.	284	18.9	66	81.1
5. What is the estimated cost of TTIs?	12	3.4	338	96.6
Modes of disease transmission				
1. Through blood transfusions	182	52.0	168	48.0
2. Sharing of food/utensils of affected patients.	210	60.0	140	40.0
3. Drinking un-boiled water.	210	60.0	140	40.0
4. Getting shaves from barbers using straight razors.	266	76.0	84	24.0
5. From affected patient to spouse.	280	80.0	70	20.0
6. From affected mother to unborn child.	280	80.0	70	20.0
7. Having multiple partners or extramarital relations with sex workers.	292	83.4	58	16.6
8. Using unsterilized syringes.	292	83.4	58	16.6
9. Using unsterilized surgical instruments.	300	85.7	50	14.3
10. Through contact/touch.	294	84.0	56	16.0
Attitude variables				
1. Can you be a carrier of any of these infections?	164	46.9	186	53.1
2. Would you like to be informed about positive screening results?	320	91.4	30	8.6
3. Is the treatment of TTIs possible?	234	66.9	116	33.1
4. Can you afford the treatment?	106	30.3	244	69.7
5. Are you vaccinated against hepatitis B?	18	5.1	332	94.9

Table-3: Percentage knowledge and attitude score of blood donation by socio-demographic variables

Socio Demographic Variables	% Knowledge		Level of Significance *p*-value	% Attitude		Level of Significance *p*-value
	Adequate (n=280)	Inadequate (n=70)		Adequate (n=166)	Inadequate (n=184)	
Age (years) 21–28 31–34	 76.4 23.6	 70.0 30.0	0.266	 72.9 27.1	 77.2 22.8	0.355
Educational Status Primary/Secondary/ Tertiary	22.9 36.4 40.7	57.1 8.6 34.3	<0.001*	38.6 25.3 36.1	21.7 35.9 42.4	<0.01*
Employment Status Unemployed/Employed	16.8 83.2	25.7 74.3	0.086	19.9 80.1	17.4 82.6	0.550

Table-4: Factors predicting adequate knowledge and attitude of blood donation

Socio-demographic Variables	Adequacy of %Knowledge		Adequacy of % Attitude	
	Adjusted OR* (95% CI)	*p*-value¥	Adjusted OR* (95% CI)	*p*-value¥
Age (years)				
21–28	Reference		Reference	
31–34	1.55 (0.82–2.91)	0.171	0.78 (0.47–1.29)	0.344
Educational Status				
Primary	Reference	<0.01	Reference	
Secondary	0.37 (0.20–0.68)	<0.01	2.01 (1.19–3.42)	<0.01
Tertiary	4.04 (1.56–10.43)		0.79 (0.47–1.33)	0.384
Employment Status				
Unemployed	Reference		Reference	
Employed	0.65 (0.33–1.29)	0.222	1.05 (0.60–.84)	0.854

*Adjusted for age, educational status and employment status. ¥Level of significance at < 0.05

DISCUSSION

The trend of TTIs among blood donors in our institute has remained almost static when compared with last decade.[6] Comparison with a recently published local data from the same city showed a low frequency of HCV and a high frequency for syphilis than that reported by Moiz *et al*.[7] A plausible explanation for high seropositivity in case of syphilis in this study can be a different test methodology and diversity of donor population.

A major observation made was the high percentage of reactive donors who remained uninformed. Generally, blood banks in developing countries are reluctant to take up the responsibility of informing and providing counselling services to donors due to cost and time constrains. No data is available from within the country about donor notification rates and responses to notification. Kotwal et al. from northern part of India have reported similar notification rates of 49.4% which included donors informed telephonically.[8] Incomplete demographics and switched off cell numbers were the leading reasons cited in most studies for failure to communicate results.[9] Moyer *et al* reported a disconnected telephone as the frequent reason for inability to contact 65.52% donors.[10] In our case it was an off, busy or non-responding phone number (84.61%) followed by the absence of a contact number seen more often in the least educated group, making the process of notification difficult. Improvements in the notification process can be made by proper pre-donation counselling about probability of testing positive, asking the donors to collect their test results in the following week, providing at least two contact numbers and to stay vigilant for three to four days post donation. Among the notified donors, the turnover for first visit and counselling was very low in both first time and repeat donors (14.68% and 15.29% respectively). Chaurasia *et al* have reported a comparable donor response of 23 %.[11] Other studies from India have shown superior response rates at 98.2%, and 59.8% as has Roshan *et al* from Malaysia at 70.7%.[8,12,13]

The educated class invariably was found to be more concerned as nearly half of the notified first time reactive donors contacted the blood bank but the response was low among repeat donors. For subsequent visits the turnover of donors in both groups was incongruously low; raising the strong possibility of donations made under family pressures despite knowing the disease status, poor comprehension of information, seeking disease confirmation and treatment elsewhere.

The survey conducted to understand donors perception about TTIs showed that donors were receptive only to the bare basic knowledge; the odds did improve with tertiary qualification ($p<0.01$). Overall awareness about grave outcomes of diseases was not up to the mark; 9.52% for primary, 16.66% for secondary and 3.57% for tertiary qualifications. It could be a contributory factor towards reactive donors' poor response as seen in this study. Almost half of the respondents were ignorant of disease spread through blood transfusion. Majority of donors did not know the financial impact of treatment and when informed, were unable to afford it. Similarly, almost all the donors were not vaccinated against hepatitis B. Even with the addition of hepatitis B vaccination at birth in the WHO Expanded Program on Immunization (EPI) in 2002 in Pakistan; many areas of the country are still deprived. The impact of vaccination against hepatitis B needs to be seen once these children join the donor pool in a few years time. Meanwhile the current donors showed a general apathy about the possibility of being infected which reflects their limited resources. Notwithstanding good therapy response, the cost statistics suggest that in developing countries of limited resources treatment options are often misused.[14]

To our knowledge this study is the first from Pakistan to document reactive donor notification rates and responses with an effort to assess their understanding of TTIs. Though the need of pre- and post-donation counselling to sensitize donors about

TTIs was highlighted, this study was limited in its scope as feedback from notified donors regarding their reservations for approaching blood bank was not documented. A more detailed questionnaire with close ended multiple-choice questions encompassing a larger group of donors would have been more effective.

CONCLUSION

Reactive donor disclosure and counselling is not practiced judiciously in developing countries resulting in poor donor response. There is a need to standardize the donor notification process in the country with special emphasis on pre-donation counselling. Donor sensitization needs to be enhanced both at blood banks and national level using mass media communications and dissemination of informative literature about disease prevention.

AUTHORS' CONTRIBUTION

NR and HQ conceived and planned the work, NR acquired the data, AQ and HQ analysed and interpreted it, draft was written by HQ and critically approved for intellectual content by NR and AQ. Review of successive versions and final approval of the manuscript was done by NR, HQ and AQ.

Disclosures of Conflict of interest:
No conflict of interest is declared.

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