A REVIEW OF PREDONATION BLOOD DONOR DEFERRALS IN A UNIVERSITY HOSPITAL

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Objectives: To study the main causes of predonation deferral of potentially healthy prospective blood donors in a University Hospital Blood Bank unit, and to make recommendations accordingly.

Methods: A retrospective review of the main causes of predonation deferral of blood donors in King Fahd Hospital of the University (KFHU) Al-Khobar, was carried out. Records of all predonation deferrals from 1st January 1996 to 31st December 2003 were reviewed and analyzed.

Results: A total of 33,900 potential blood donors came to donate blood during the study period. A total of 6508 donors (19.2%) were deferred for various reasons. Analysis of the causes of deferral showed the following as the most common reasons in rank order: (1) recent ingestion or taking of counter-indicative medications; (2) low hematocrit level; (3) underweight; (4) abnormally high pulse rate; (5) low blood pressure; (6) temperature above 37.5°C; (7) High blood pressure;

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(8) presenting for donation too soon i.e. less than 8 weeks after the previous one; (9) age below or above the accepted limit; (10) a previous serological positive result; (11) general appearance; (12) abnormally low pulse rate.

**Conclusion and Recommendations:** It is important to provide donors with a clear message on their deferral status. Increased public education about blood donation and the common causes of donor deferral may lower deferral rates and prevent a negative impact on the donor himself as well as on subsequent blood donations. Public education is needed also to help recruit as many volunteer donors as possible.

**Key Words:** Prospective blood donors, Donor screening, Pre-donation deferral

**INTRODUCTION**

Most blood banks and transfusion services in the Kingdom of Saudi Arabia are hospital based. As a result, it is highly dependent on volunteers and replacement blood donors. All prospective blood donors must undergo pre-donation health screening to determine their suitability to donate blood. This is necessary to protect both the recipients of blood as well as the donors themselves. In the screening process, a detailed medical history is taken by means of a donor questionnaire and a limited physical examination during which weight, pulse, blood pressure, and temperature measurement are taken as well as determination of hematocrit or hemoglobin level by the blood bank physician. The screening criteria used by King Fahd Hospital of the University (KFHU) are based on the accepted universal standards of blood banking practice and more than 20 years experience of the blood transfusion service since its establishment in 1981. All blood units collected, are also screened by serological testing for transfusion transmitted diseases (TTD) including testing for Human Immunodeficiency Virus 1 and 2 (HIV 1/2), Hepatitis viruses B and C, Human T-lymphotrophic viruses I and II (HTLV I/II), syphilis, and malaria. Prospective donors who do not meet the criteria can be deferred permanently or temporarily. Deferral may result from a positive serological test for any of the TTD mentioned above. This is known as post-donation deferral in which blood is not used but discarded (this study does not include post-donation deferral). The scope of this study is pre-donation deferral and a variety of medical reasons for them and how to reduce these to a minimum. As stated above, since blood banks in the Kingdom are mostly hospital-based, there is a need to encourage people to donate blood to help maintain hospital and the country’s overall blood bank stocks. Another very important reason also is to avoid any psychological effect or negative impact on the prospective donors which may prevent them from future donations. The main general physical criteria for donors are the following: healthy general appearance and not under the influence of drugs, donors should not weight less than 50 kilograms, their temperature must not exceed 37.5°C, their pulse rate should be between 50 and 100 beats per minute, blood pressure should be no higher than 150 mmHg systolic and 100 mmHg diastolic. Packed cell volume (hematocrit) not lower than 38%, and the minimum age of blood donors must be 17-18 years. The main objectives of the study were to identify the main causes of pre-donation deferral and to discuss measures to recruit volunteer donors.

**METHODS**

Blood donor records of all prospective donors who come to the Blood Bank of KFHU between 1st January 1996 and 31st December 2003 were retrospectively reviewed and evaluated. The donors were basically of three types: replacement donors (donation for patients), statutory donors (donors for employment, official documents etc), and volunteer donors (there are no paid donors). All potential blood donors are first registered before hematocrit testing and medical screening, and must fill out the donor questionnaire. The donor questionnaire is a “health history” questionnaire in which donors are required to provide their demographic data and answer questions on their state of health. The questionnaire is critical in the screening process of donors. Its goals are two-fold: First is (protection
for the donor) to ensure that donors can tolerate the process of donation without any serious risks to themselves and the second (protection for the recipient) to prevent those who have a disease that is transmissible by transfusion from donating. The questions are clear and suitable for our society. Donor demographic data are saved in the hospital’s computer system. Predonation deferrals were coded and divided into categories covering all main causes of donor rejection. As any blood donor may come to donate blood more than once in a year, the figures analyzed are those of blood donations and not of blood donors. Specialized forms were designed to collect the data for analysis. The donors presenting at our institution were predominantly Saudi males, some non-Saudi males and very rarely occasional female blood donors.

RESULTS
A total of 33,900 potential blood donors came to donate blood during the study period. A total of 6508 donors (19.2%) were deferred because of various categories of predonation deferral. 13630 (49.8%) of the donors were replacement donors (for relatives), 7584 (27.7%) were statutory donors and 6178 (22.6%) were volunteer donors (Table 1).

**Table 1**: Distribution of types of blood donors

| Type of donors     | No. (%) |
|--------------------|---------|
| Replacement donors | 13630 (49.8) |
| Statutory donors   | 7584 (27.7) |
| Volunteer donors   | 6178 (22.6) |
| **Total**          | 27392 (100) |

The main causes of deferral were in rank order: Recent ingestion of/or taking medications 1745 (26.8%); low hematocrit level (below 40% for males and below 38% for females) 1006 (15.5%); underweight (less than 50 kilograms) 951 (14.6%); high pulse rate 717 (11%) (more than 100 beats/minute); low blood pressure 592 (9.1%) (at least two readings below 100/60 mmHg); high blood pressure 592 (9.1%) (at least two readings above 120/80 mmHg); temperature above 37.5°C 375 (5.8%); high blood pressure (at least two readings of more than 150/100 mmHg) 371 (5.7%); previous donation of blood less than 8 weeks previously 254 (3.9%) (i.e. presented to donate again too soon before the accepted interval); age above or below the accepted age limits (< 18 or > 60) 197 (3%); a previous seropositive result for transfusion transmitted diseases 148 (2.3%); general appearance 85 (1.3%); low pulse rate (less than 60 beats/minute) 67 (1.0%) (Table 2).

**Table 2**: Causes of predonation deferral, KFHU

| Cause                                         | No. (%) |
|-----------------------------------------------|---------|
| Recent ingestion of/or taking medications     | 1745 (26.8) |
| Low hematocrit level                          | 1006 (15.5) |
| Being underweight                            | 951 (14.6) |
| High pulse rate                               | 717 (11.0) |
| Low blood pressure                            | 592 (9.1) |
| Temperature above 37.5°C                      | 375 (5.8) |
| High blood pressure                           | 371 (5.7) |
| Previous blood donation less than 8 wks ago   | 254 (3.9) |
| Age above or below the accepted age limits    | 197 (3.8) |
| A previous seropositive result, for transfusion transmitted diseases | 148 (2.3) |
| General appearance                            | 85 (1.3) |
| Low pulse rate                                | 67 (1.0) |
| **Total**                                     | 6508 (100) |

DISCUSSION
Blood donors are deferred for numerous reasons. Some deferrals are to protect the donor from the risks of blood donation; and in those cases related to infectious diseases they serve to protect the recipient; and some deferrals serve to protect both recipient and donor. Deferrals resulting from certain positive serological test results for TTD are permanent and may unfortunately be stigmatizing. The majority of the predonation deferrals are short temporary deferrals that can be resolved in days or months, after which the donors can return to donate. As shown in the results, the main reason for predonation deferral is when donors are on medication. This actually relates to a broad category of drugs ranging from drugs which are taken for a short period of time such as analgesics, antibiotics and drugs for upper respiratory tract infections, for which the donor can be temporarily deferred, to drugs which are taken on a long term basis for chronic illness, for which donors are permanently excluded. These deferrals due to medication(s) are not only due to the nature of the underlying disease disorder, but also the pharmacological properties of the drugs. The pharmacological properties of the drugs cannot be overlooked, as there may be a small but potential risk of drug reaction if the donated blood is transfused before the drug has cleared from donor’s blood stream. These deferrals may be avoided if a more detailed list of medications is
made available to donors. However, many individuals are uncertain about the specific medications they are taking i.e. the exact name and / or the specifications. The second most common reason for predonation deferral was a low hematocrit level, in deferred donors and especially in our occasional female donors, most of whom were deferred because of low hematocrit levels correlating or consistent with anemia. It has been reported that ninety-five percent of the deferrals for low hemoglobin and hematocrit occur in women. It has even been suggested that the hemoglobin/ hematocrit acceptance standard be lowered to increase female eligibility and to offer iron treatment for premenopausal women who want to donate or who are frequent donors. Underweight was the third cause, many donors being below fifty kilograms. This is important because no more than 10.5 ml of whole blood per kilogram of body weight should be collected at a donation. A high pulse rate was another very important cause for deferral. Many donors especially first time donors are usually nervous and anxious about donation, and although staff give them time to relax and reassure them before taking a second pulse reading, the rate often remains high. Low blood pressure, the fifth cause, may have different causes. It could be the fear of donation and the sight of blood as many donors feel “giddy and dizzy” even before the finger is pricked for blood to be taken to determine the blood group. Raised temperature and blood pressure are other important causes although they don’t necessarily mean there is an infection or hypertension respectively. However, according to the standard criteria to protect both donor and recipient, they are unacceptable for donation. If these conditions persist, the donors are deferred temporarily and are advised to seek medical attention, but encouraged to return to donate later. A very important cause for deferral is that some donors, especially volunteer donors return to donate too soon after a previous one. The accepted interval for donation is 8 weeks.2 Age is another important cause for predonation deferral. Prospective donors below the age of 18 years or above 60 years are deferred. Some standards however, do not have a strict “upper age limit” as this depends on other criteria as well. For example, the general condition of the donor and his willingness to donate are also taken into consideration, so the decision is left to the discretion of the blood bank physician. This means that a 61 to 65-year-old may be accepted particularly if he/she is a volunteer or replacement donor or belongs to a rare blood group.6 Some reports consider that there is no clinical or physiological rationale for deferring donors above 60 years, so they should not be eliminated from the donor pool simply for reasons of age.6,8 This demographic group is growing and is potentially a willing source of blood components.6 The issue of age limit deserves reevaluation and reconsideration to prevent unnecessary deferrals. Positivity for serological tests for any of the TTD is a cause for deferral, as all records of donors who have had any positive result previously are kept in the blood bank records and are revealed when donors' identification are entered in the computer. Such deferrals are usually permanent. This is a very sensitive issue as already mentioned, and many deferred donors actually come back “to confirm” what they have been notified about, to see if they could be accepted later. Others misunderstand the deferral message. The presentation of ineligible donors has long been recognized as a problem for blood centers. The reasons for this may be that the information given may have been misunderstood, they may want to be retested or they may not have received the letters of deferral or misunderstood them. They may be highly motivated to donate, have a desire to help others or simply want some time off work or may have other motives.9 This unfortunately, may leave the donor with a negative feeling on blood donation, or diminish his own self-worth. This is an area of concern for us as transfusion consultants. The suggestion has been made for the establishment of a special clinic to give care to those prospective donors deferred for medical reasons, especially permanently for transfusion transmitted diseases. This clinic should deal with follow-up and provide referral care as well as moral and psychological support for donors found to be positive for any of the TTD. For example, donors found to be Hepatitis positive can be referred to internal medicine and gastroenterology clinics. The general appearance of the donor is important (donor looking ill, has a skin disease or with any evidence of behavioral risk i.e. drug addiction). Low pulse rate, the rarest cause, occurs occasionally in some donors, and
therefore, results in temporary deferral. In comparison with similar studies on predonation deferral, a study from India in 1993, presented the main causes in the following rank order: age below the minimum accepted, low body weight, and a low hemoglobin level. History of jaundice was a cause for permanent deferral. This is slightly different from our study. Another report from the multi-population country of Singapore during the years 1988–1991, revealed the following common causes: medications, influenza, low hemoglobin, raised blood pressure, recent high risk sexual exposure, underweight, Tattoos, Hepatitis B carrier status, viral infections (measles, chickenpox) and too short an interval between donations. This report is similar to our study to a great extent. A study from the United States of America showed that the most common temporary causes of deferral were low hemoglobin (46%), colds and /or sore throat (19%), elevated temperature (10%), elevated blood pressure (9%), on medications (8%), donor not feeling well (6%) and abnormal pulse (3%).

Deferrals for whatever reason represent loss of time and effort for both potential donors and blood bank staff. They should be kept as low as possible, even if they are temporary because donors must be encouraged to donate and so every effort should be made to prevent any negative impressions that might stop them from coming back later. Studies have shown that even temporary deferral of prospective donors can have a psychological effect. Being deferred from donation is a psychologically distressing experience. This has been noticed particularly in our female donors with low hematocrit levels and other donors on medications, having high blood pressure, and low weight, who became angry and depressed. Studies have also shown that temporarily deferred donors were less likely to return. The overall deferral rates in the studies, by Chaudhary et al and Lim et al were 16.4% and 14.4% respectively, but it is higher (19.2%) in this study. Our rate is also higher than other studies in which donor rejection rates varied from 10.3% to 17.6%. In this study, most of the donors were replacement donors (50%) and statutory donors (28%) while volunteers donors were the least (23%). Unfortunately, most of the blood in Saudi Arabia is provided by replacement donors. This seems to be due to misconceptions on blood donation in the Saudi population. This present study has prompted us to make certain recommendations to improve recruitment of donors in order to increase the nation’s blood supply. Blood donors are a national resource and voluntary blood donation must be encouraged as much as possible. Temporarily deferred donors should also be encouraged to return. Various methods such as education and motivation of the public, especially targeting the youth and support from primary care physicians is needed. Well-designed campaigns to encourage current donors to give more regularly, and to recruit new donors are needed. It has been shown that time constraints, inconvenient hours and the location of donation sites were related to the unwillingness to donate. This means that it is important to set up mobile units, and make the hours of donation convenient.

In conclusion, temporary deferrals should be kept to a minimum, and a clear message must be given to the deferred donor to explain short-term deferral and encouragement given to come back and donate after the specified time. Improved strategies and intensive health education are needed to encourage and promote an interest in voluntary blood donation.

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