ROMANIAN BLOOD DONORS SCREENING: IS IT REALLY NECESSARY AND/OR MANDATORY?

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ROMANIAN BLOOD DONORS SCREENING: IS IT REALLY NECESSARY AND/OR MANDATORY? (Abstract): Blood services are required to provide the safest possible products, but no transfusion can ever be totally free of the risk of transfusion transmissible infections (TTI). Over the past decade, the risk of TTI through transfusion has been reduced (e.g. 1 in 300 000 for HBV to 1 in 2 million for HIV). With the introduction in 1999 of sensitive and expensive nucleic acid testing (NAT) technology in some countries, the disease transmission rate and the window period have been significantly reduced, but a remaining concern is the chance that a blood donor will be infected and not detected by such tests. To obtain safe blood and blood components it is important to ensure that the donors are healthy and free from TTI by using a donor selection procedure meticulously made, using a donor questionnaire to assess donor health and safety and for reducing the risk of transmission of infection, in particular for infections for which no suitable screening tests are available. In Romania the prevalence of TTI among donor population is high in comparison with other European Union (EU) countries. This may require significant improvements in the screening process of both donors and donations to minimize the infectious risk. Key words: BLOOD DONATION, TRANSFUSION TRANSMISSIBLE INFECTIONS, SCREENING

Worldwide, more than 92 million blood donations are collected annually. The demand for blood and its components is increasing and there is a need for more donors to be recruited and retained. An estimated 1.6 million units are discarded annually due to the presence of infectious markers for transfusion transmissible infections (TTI).

In developed countries, blood transfusion or plasma-derived products have been the main route of HCV transmission. Zero risk, which has been the goal, has yet to be achieved. False negatives still persist and transmissions of transfusion transmissible viruses still occur, although rarely (1).

In all south-eastern Europe countries, including Romania, the prevalence of TTI among donor population is high in comparison with others European Union (EU) countries (tab. I) (2).

A study performed by Brumboiu et al in 2003-2010 (submitted), in blood donors from Cluj and Satu Mare, two counties of the North West region of Romania, describes a higher seroprevalence for HCV in comparison with other studies (3).

Donors are our essential partners in ensuring a safe and adequate blood supply (4).

The difficult question is how to balance the burdening of the donor, faced with an
increasing number of very private questions, with the voluntary character of donating blood (5).

**TABLE I**

**Prevalence of TTI in donor population from SEE countries**

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>HIV%</th>
<th>NSV%</th>
<th>HCV%</th>
<th>SYV%</th>
<th>HTLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>0.01</td>
<td>3.02</td>
<td>0.13</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Romania</td>
<td>0.36</td>
<td>2.04</td>
<td>0.38</td>
<td>0.17</td>
<td>-</td>
</tr>
<tr>
<td>Serbia</td>
<td>0.030</td>
<td>0.92</td>
<td>0.21</td>
<td>0.14</td>
<td>-</td>
</tr>
<tr>
<td>Federation Rom</td>
<td>0</td>
<td>1.83</td>
<td>0.95</td>
<td>0.69</td>
<td>-</td>
</tr>
<tr>
<td>Blood donors FEBI</td>
<td>0.001</td>
<td>3.03</td>
<td>1.0</td>
<td>0.18</td>
<td>-</td>
</tr>
<tr>
<td>Bulgaria**</td>
<td>0.003</td>
<td>0.32</td>
<td>0.45</td>
<td>0.001</td>
<td>-</td>
</tr>
<tr>
<td>Croatia***</td>
<td>0.003</td>
<td>0.02</td>
<td>0.01</td>
<td>0.002</td>
<td>-</td>
</tr>
<tr>
<td>Republic of Moldova</td>
<td>0.25</td>
<td>5.1</td>
<td>0.8</td>
<td>2.9</td>
<td>-</td>
</tr>
<tr>
<td>Romania</td>
<td>0.010</td>
<td>0.25</td>
<td>0.04</td>
<td>0.40</td>
<td>0.001</td>
</tr>
<tr>
<td>Serbia</td>
<td>0.005</td>
<td>0.26</td>
<td>0.21</td>
<td>35.8</td>
<td>-</td>
</tr>
<tr>
<td>Montenegro</td>
<td>0.001</td>
<td>0.40</td>
<td>0.10</td>
<td>0.13</td>
<td>-</td>
</tr>
<tr>
<td>The former Yugoslav</td>
<td>0.00</td>
<td>1.32</td>
<td>0.53</td>
<td>0.39</td>
<td>-</td>
</tr>
<tr>
<td>Republic of Serbia</td>
<td>0.00</td>
<td>1.32</td>
<td>0.53</td>
<td>0.39</td>
<td>-</td>
</tr>
<tr>
<td>Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Republic of Moldova, Romania, Serbia and Montenegro and The former Yugoslav Republic of Macedonia</td>
<td>No determination, not performed</td>
<td>No determination, not performed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**The former Yugoslav Republic of Serbia**

**Note:** *See preceding notes.*

This paper aims to summarise the necessity and possibility of minimizing the infectious risk in order to assure safe blood products in Romania.

**Transfusion transmissible infections (TTI)**

While in the past, the risk of transfusion-transmitted infections (TTI) was accepted by patients and physicians as unavoidable, a low-risk blood supply is expected today. Since the early nineteen sixties, blood banks, as well as plasma manufacturing industries, have aggressively pursued strategies to reduce the risks of TTI (6).

The magnitude of the TTI varies from country to country, depending on TTI’s load in that particular population from where blood units are sourced. 7 There is a long list of viruses, parasites and bacteria which can be transmitted through blood transfusions. Among them, from far the most important TTI are human immunodeficiency virus (HIV-I/II), hepatitis B virus (HBV), hepatitis C virus (HCV), syphilis and transfusion-associated malaria infection.

Given the potential transmission of viruses during the 'immunological window period' [i.e. the period of early infectivity when an immunologic test is non-reactive], novel non-serology based approaches such as viral nucleic acid testing (NAT) have been established (6).

Today, the residual risk of TT HBV infection varies between 0.75 per million blood donations in Australia, 3.6 – 8.5 in the USA and Canada, 0.91 – 8.7 in Northern Europe, 7.5 – 13.9 in Southern Europe up to 200 per million donations in Hong Kong, largely reflecting the global epidemiology of HBV. The estimated risk for HIV transmission to date is between 0.14 – 1.1 and for HCV between 0.10 – 2.33 per million units transfused (6).

Table II describes the trends and prevalence of markers for HBV, HCV, HIV and HTLV I in Romanian blood donors from 2000 to 2004 (2).

**TABLE II**

**Trends and prevalence of TTI markers in Romanian blood donors, 2000 to 2004.**

<table>
<thead>
<tr>
<th>MARKERS</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV-1/2</td>
<td>0.10</td>
<td>0.08</td>
<td>0.06</td>
<td>0.05</td>
<td>0.04</td>
</tr>
<tr>
<td>HBV</td>
<td>0.01</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>HCV</td>
<td>0.01</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>HTLV I</td>
<td>0.01</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Although the risk of transfusing a blood unit collected during the window period may be decreased using NAT, the actual benefit in most populations has first to be determined and should be balanced against
the complexity and high cost of performing NAT, including the infrastructure required. The potential benefit of detecting early infections and preventing possible transmissions of infection should be assessed in relation with the incidence and prevalence of infection in the blood donor population, the effectiveness of the blood donor selection process, the sensitivity of the serological screening currently undertaken and the ability to enhance this through (8).

**Donor Selection**

The purpose of donor selection is to assess the suitability of an individual to be a blood donor and that the blood products derived from this donation are safe for the recipients. Donor selection is designed to identify high risk volunteers and defer them from donating blood. It became clear that non-remuneration of donors is an important criterion to avoid high risk donors; this is the main reason why efforts have been made to promote a volunteer unpaid donor system in various countries in the world (5).

The promotion of voluntary non-remunerated blood donation in Romania is included in the current legislation of the blood service, but voluntary paid donors are still present in the country, 79% remunerated vs. 21%-non-remunerated donors (2).

By law, voluntary "remunerated" donors receive one day of holiday, free admission to health care services and food tickets (2). An inadequate stock of blood usually forces transfusion service officials to turn to replacement or possibly "hidden" paid donors which might ultimately increase safety risks attributed to these types of donations (10).

It is known that individuals cannot objectively assess their own level of risk. Extensive questioning of all donors on their sexual behaviour could lead to a loss of existing donors who may find the process intrusive. 11 A study realized in 2012 in Cluj Blood Transfusion Centre highlights that the existing routine screening methods used in the selection process of blood donors cannot detect all risk factors for blood borne infections, particularly the sensitive behavioural risk factors (drug use, sexual promiscuity) (12).

One of the most debated issues is the definite deferral of men who had sexual contacts with other men (MSM) (even if it was once in their life), whereas heterosexual individuals are excluded for only one year after a one time risk for HIV infection. 11,13 Van der Bij et al described that donors infected with HIV often reported male-to-male sex and a high proportion reported other sexual risk behaviours, such as anonymous sexual contacts.

Although some of this risky behaviour was associated with MSM, which is a permanent deferral for donating, more attention could be given to sexual risk behaviours in donor screening (14).

Ramezani and co-workers describe that among rejected unemployed donors the most common risk factor found was unsafe sexual conduct, which confirms that acquiring answers to standard questions from blood donors can prevent the transmission of blood-borne infectious diseases (15).

Another issue is that many donors either do not understand transfusion-related risks or they do have knowledge on transmission routes but believe it doesn’t apply to them. For example, a large proportion of HCV infected donors has a history of injecting drug use but deny such use at the time of screening for blood donation. People who have used and stopped using drugs in the past might not consider themselves as “addicts” or might even believe that their past injecting drug use is not harmful for the safety of the blood they now wish to donate.
Hepatitis C was found mostly among intravenous drug users and their spouses, probable virus carriers and donors with a history of unsafe sexual contact (15). In Cluj blood donors population no intravenous illicit drug use was reported (12).

The key to minimize the infectious risk is the screening of both donors and donations. Screening is thus a two-stage approach: the donor selection process is the first stage of the process and laboratory testing represents the second stage (14, 16). This strategy is used to protect the supply excluding the high-risk and potentially infected donors by selection and laboratory screening the donated blood. After the systematic selection and screening of donors, the residual risk of transfusion-transmitted HCV is very low nowadays.

A study carried out in the Netherlands in 2006 found a significant correlation between blood-borne infectious diseases and high risk behaviour (9, 15).

Donor selection appears to be an efficient and cost-effective way to reduce the risk of TTI to an acceptable level because high risk donors mirror a high incidence rate of TTI (17).

**Donors Questionnaire**

The donor questionnaire is the key tool in donor selection, being designed to protect potential donors who may be at risk for an adverse consequence of blood donation and to enhance recipient safety (13).

The screening of blood donors in Romania includes a donor self-deferral questionnaire, an interview with the responsible physician, investigating each donor for possible risk behaviour for TTI and laboratory testing used to ensure the safety of the blood supply. If a screening test sample is reactive, the donation will be discarded and more specific confirmatory testing will be asked. In most cases, even if the result of confirmatory testing is negative, donors are permanently deferred; however, in some countries, re-entry algorithms are permitted with certain donor retesting protocols (13).

Along with data collected during this screening process, each individual donor confirms by signature, that he or she has fully understood all the risks that would defer him or her from blood donation. The physician examining the donor qualifies him or her as eligible to donate blood, respecting the established criteria for donor selection, or defers the donor, thus protecting the safety of the blood stock and its potential users. In addition, all the collected blood units undergo laboratory testing for human immunodeficiency virus, hepatitis B virus, hepatitis C virus and syphilis.

The questionnaire is the only line of protection against certain infections for which no testing is performed, such as malaria, babesiosis, leishmaniasis, and Chagas disease (13).

Certain questions aim to identify recently infected individuals who may be undetectable by currently used screening tests (window-period donors). For example, donors are asked if they have had a tattoo or a needle stick injury in the last 12 months. Other questions aim to reduce the number of prevalent infections, in part to offset testing and inventory release errors or lack of test sensitivity. For example, intravenous drug users are permanently excluded from blood donation. (13).

It is unclear if individuals currently deferred for MSM behaviour would consider additional questions about behaviours specifically addressed to them as being discriminatory or as being a positive development in identification of a low-risk group that would then be allowed to donate (4).

The use of a donor questionnaire prompts donor selection staff to ask im-
important questions and carefully assess the donor’s health. By presenting all relevant information in a standard format, a donor questionnaire facilitates decisions on the acceptance or deferral of the donor. However, individuals who do not respond accurately or truthfully to the questionnaires about infectious disease risk factors at the time of screening represent a potential threat to the safety of the blood supply due to enhanced risk for window-period infections. There are donors, who had donated primarily to receive the results of an HIV test and nearly 25% thought it was reasonable to donate to be tested for HIV, and that 12% believed that donating with known risk factors is acceptable (5).

The decrease in HCV seroprevalence in blood donors observed in other studies was not present in the study performed by Brumboiu et al., where the prevalence evolution trend was stable. Such trend may reflect the HCV prevalence in the general population, the need for maintaining the same methods for donors’ selection and at the same time the necessity of educating donors on transfusion-related risks and transmission routes for TTI.

**CONCLUSIONS**

In most countries - Romania included - it seems difficult to keep a balance between the increasing demand for blood and the need to recruit and retain more donors. What stays the most important is to ensure safe blood supply by excluding high risk donors. The assessment of the donor’s health and TTI risks requires a sensitive, non-judgemental approach to ensure confidentiality (9).

Most blood donors perceive themselves to be healthy, but some are unsuitable to donate blood. Additional time and effort should be spent by the trained personnel who interview the donors to explain why all very private questions are necessary.

The process of selecting blood donors based on their potential exposure to transmissible diseases is not always simple and straightforward, nor is it always strictly and / or exclusively based on scientific and epidemiologic data (4).

**REFERENCES**


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**NEWS**

**PERINATAL CHARACTERISTICS AND BREAST CANCER RISK IN DAUGHTERS**

Authors from Divisions of Cancer Epidemiology and Genetics, National Cancer Institute, in a paper published in Journal of Developmental Origins of Health and Disease, highlighted that the *in utero* origins of breast cancer are an increasing focus of research. However, the long time period between exposure and disease diagnosis, and the lack of standardized perinatal data collection makes this research challenging. Authors assessed perinatal factors, as proxies for *in utero* exposures, and breast cancer risk using pooled, population-based birth and cancer registry data. Birth registries provided information on perinatal exposures. Cases were females born in Norway, Sweden or Denmark who were subsequently diagnosed with primary, invasive breast cancer (n=1419). Ten controls for each case were selected from the birth registries matched on country and birth year (n=14,190). Relative risks (RRs) and 95% confidence intervals (CIs) were estimated using unconditional regression models. Breast cancer risk rose 7% (95% CI 2-13%) with every 500 g (roughly 1 S.D.) increase in birth weight and 7% for every 1 S.D. increase in birth length (95% CI 1-14%). The association with birth length was attenuated after adjustment for birth weight, while the increase in risk with birth weight remained with adjustment for birth length. Ponderal index and small- and large-for-gestational-age status were not better predictors of risk than either weight or length alone. Risk was not associated with maternal education or age, gestational duration, delivery type or birth order, or with several pregnancy complications, including preeclampsia. These data confirm the positive association between birth weight and breast cancer risk. Other pregnancy characteristics, including complications such as preeclampsia, do not appear to be involved in later breast carcinogenesis in young women. (Troisi R, Grotmol T, Jacobsen J, et al. Perinatal characteristics and breast cancer risk in daughters: a Scandinavian population-based study. *J Dev Orig Health Dis*. 2013; 4(1):35-41)

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