DOI:10.23873/2074-0506-2018-10-1-15-22

Ways to improve the use of donor resources in the Nizhny Novgorod Region

S.V. Romanov, O.P. Abaeva, G.Yu. Smirnova

Volga District Medical Center

2 Nizhnevolzhskaya nab., Nizhny Novgorod 603001, Russia

Correspondence to: Sergey V. Romanov, Cand. Med. Sci., Director of the Volga District Medical Center,

e-mail: info@pomc.ru

Received: 21 December 2017

Accepted for publication: 29 January 2018

The article analyzes the system of organ transplantation in the Nizhny Novgorod Region in order to determine the ways to optimize the use of donor resource. The authors found that the most difficult are the program activities, the success of which depends on the attitude of health care professionals and the population of the region. In this regard, a questionnaire survey was conducted; its results indicated a lack of awareness among doctors and the public about the transplantation role in modern medicine and the legislation in this sphere of relations. The authors come to the conclusion on the importance of the outreach and promotion of the posthumous organ donation program among health care professionals and all population groups to optimize the use of donor resource of the region.

Keywords: organ transplantation, donor resource

Romanov S.V., Abaeva O.P., Smirnova G.Yu. Ways to improve the use of donor resources in the Nizhny Novgorod Region. *Transplantologiya. The Russian Journal of Transplantation.* 2018;10(1):15–22. (In Russian). DOI:10.23873/2074-0506-2018-10-1-15-22

Introduction

According to the Registry of the Russian Transplantation Society, in 2017 this type of high-tech medical care was provided for our country population in 45 medical organizations, 1/3 of which are located in Moscow, St. Petersburg, and the Moscow Region. Thus, only 20 non-capital regions of the country have organ and tissue transplantation centers, and half of them perform only kidney transplantation [1]. Meanwhile, as it has been repeatedly noted, in each of the regions there has been formed a system of mutual relationship between the medical institutions participating in the Program of Donation and Transplantation [2-6]. The Nizhny Novgorod Region is one of regions in the country where the human organ transplantations are performed on a regular basis. It is important to emphasize that the region is historically considered as having a poor demographic situation, and, above all, a high level of total mortality compared with the entire Russian Federation. So, the problem of saving the lives of Nizhny Novgorod residents remains an extremely urgent task for the region's authorities. For more than 10 years since 2006, the access to organ transplantation as a high-tech medical care for Nizhny Novgorod population and the residents of neighboring regions of the Russian Federation (the Republic of Chuvashia, the Kirov Region) has been provided solely by the Federal Budget Healthcare Institution *Volga District Medical Center* of the Federal Medical-Biological Agency (FBHI VDMC FMBA of Russia) where 30-40 organ transplants (of kidney, liver, pancreas) are performed annually. Undoubtedly, the logistics, personnel resources, and technological potential of FBHI VDMC FMBA of Russia allow a much more number of operations to be performed, but the shortage of donor resource remains the main factor limiting the number of rescued recipients, the same as in the rest of the

world [2]. The donor activity in the Nizhny Novgorod region is estimated as 3.3 per 1 million people, which actually corresponds to the mean value of this parameter for the whole country, but it is a rather low figure for the region where the Organ Transplantation Program is being implemented.

In connection with the above, the aim of our study was to set the ways to improve the use of the donor resource in the Nizhny Novgorod Region.

Seeking to achieve this goal, we formulated the following **tasks**:

- To study the system of interactions between the participants of the Nizhny Novgorod Regional Program of Donation and Organ Transplantation and to identify the most problematic points of contact in organizing postmortem donation;

- To identify and investigate the medical and sociological factors that influence the implementation of the Regional Donation Program, specifically, in the aspect of postmortem donation.

Material and methods

The following institutions were chosen as the study sites: FBHI VDMC FMBA of Russia, 6 hospitals designated as donor bases for the region (according to the Order enacted by the Healthcare Ministry of the Nizhny Novgorod Region, 21 medical institutions were designated as donor bases; among them, only 6 actually participate in organ donation, 3 active and 3 inactive donor bases participated in our study), Nizhny Novgorod State University named after N.I.Lobachevsky (NNSU), and Grinnell College, Iowa, USA (one of the oldest educational institutions in the USA where they provide training on bachelor's programs). Material of the study included:

- The recording and reporting documentation for 327 dispatches of donor coordination teams from FBHI VDMC FMBA of Russia for the period 2009-2016;

- Data of the questionnaire survey that involved 266 doctors of donor bases (173 and 93 doctors from active and inactive donor bases, respectively). The respondents made up almost equal gender groups (women made 50.7 ± 3.1%). The study involved doctors of all age groups: 7.5 ± 1.6% of doctors aged 20 ± 24 years old, 13.5 ± 2.1% of doctors aged 25-29, 12.0 ± 2.0% aged 30-34 years, 7.9 ± 1.7% aged 35-39 years, 15.4 ± 2.2% aged 40-44 years, 12.4 ± 2.0% aged 45-49 years, 6.4 ± 1.5% aged 50-54 years, 9.8 ± 1.8% aged 55-59 years, 7.1 ± 1.6% aged 60-64 years, 4.1 ± 1.2% aged 65-69 years, and 3.9 ± 1.2% doctors aged 70-74 years old, as well as of various medical specialties: there were 10.5 ± 1.9% of anesthesiologists and critical care physicians, 20.3 ± 2.5% surgeons, 2.3 ± 2.5% internists and cardiologists, 5.6 ± 1.4%, neurologists, etc.

- Data of the questionnaire survey that involved 168 students in I-II Grades of non-medical faculties of NNSU and 105 students from Grinnell College.

The students were interviewed using identical questionnaires in Russian and English. The data was processed using the Minitab software, the statistical significance was estimated on the basis of the mean error of extensive parameters; Student's t-test was used for the comparative analysis. The difference between the study parameters was considered statistically significant at t greater than or equal to 2.

Study results

For over 10 recent years there has been built a fairly simple (compared to other regions) system of interaction between the participants of the Nizhny Novgorod Regional Program that includes Donation and Transplantation Centers being the structural units of the FBHI VDMC FMBA of Russia, and the donor bases (Fig. 1).

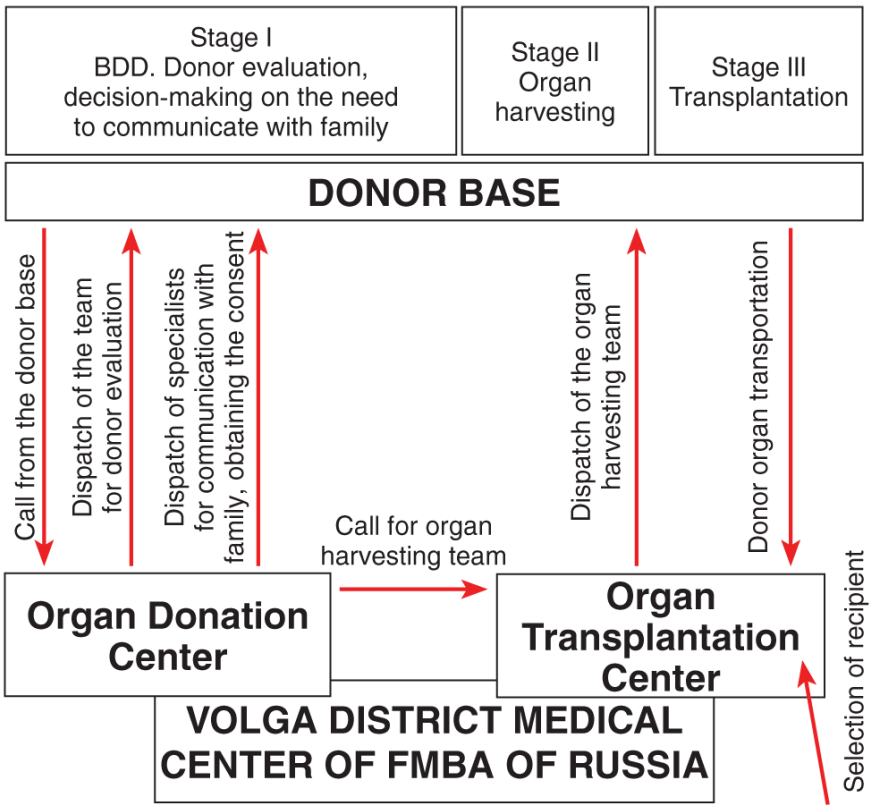

Fig. 1. The System of interactions between the participants of Organ Transplantation Program in the Nizhny Novgorod Region

The organ transplantation process involves three traditional stages. The first stage begins with the donor base experts notifying the Organ Donation Center about the presence of a potential donor. The Organ Donation Center team of doctors leaves for the donor preliminary

evaluation; meanwhile, the expert committee at the donor base undertakes the brain death determination (BDD) procedure. At the same stage, the decision shall be made on the need to obtain the donor's family consent for organ harvesting. The family consent is sought in 2 cases: when the donor's family members are present at the moment in the medical institution, being active, and in case the donor base administration expresses such a requirement in order to avoid possible conflicts. In other cases, when there is no information on the lifelong expression of the will of a potential donor containing his negative attitude to posthumous donation, the consent of relatives is not sought. Thus, the decision on the need to document the donor's family consent shall be made jointly by the experts of the donor base and the Organ Donation Center. To carry out this procedure, the trained specialists from the Organ Donation Center leave for the donor base.

In the period from 2009 to 2016, we noted a tendency to reduction in the primary trips of donor coordination teams, while the number of actual donors remained unchanged[1] (Fig. 2). However, an extremely negative characteristic was the retained high number of eligible donors who have not

[1] Terms were used as defined in the draft Federal Act "On the Donation of Human Organs and Their Transplantation". https://www.rosminzdrav.ru/documents/8145: a potential donor is the donor for whom the death (biological death or brain death) determination procedure in accordance with the legislation of the Russian Federation in the field of health protection has been started and is being conducted; an eligible donor is a potential donor who has been declared dead, and no medical contraindications have been established for the use of his/her organs for transplant purposes; a real donor is an eligible donor for whom there are documented legal and medical grounds provided for by this Federal Act, allowing the removal of donor organs from his body for the purpose of transplantation; an actual donor is a real donor from whom at least one donor organ is transplanted to the recipient who needs treatment by the method of donor organ transplantation.

become actual donors due to the family denied consent to organ harvesting. A retrospective review of the documentation on the dispatches of the donor coordination teams showed that, when addressing the potential donor's family, the consent was obtained in half the cases. And there, the most significant factor leading to a denied family consent was the conversation with a clergyman, a representative of the Russian Orthodox Church, or with a familiar medical professional.

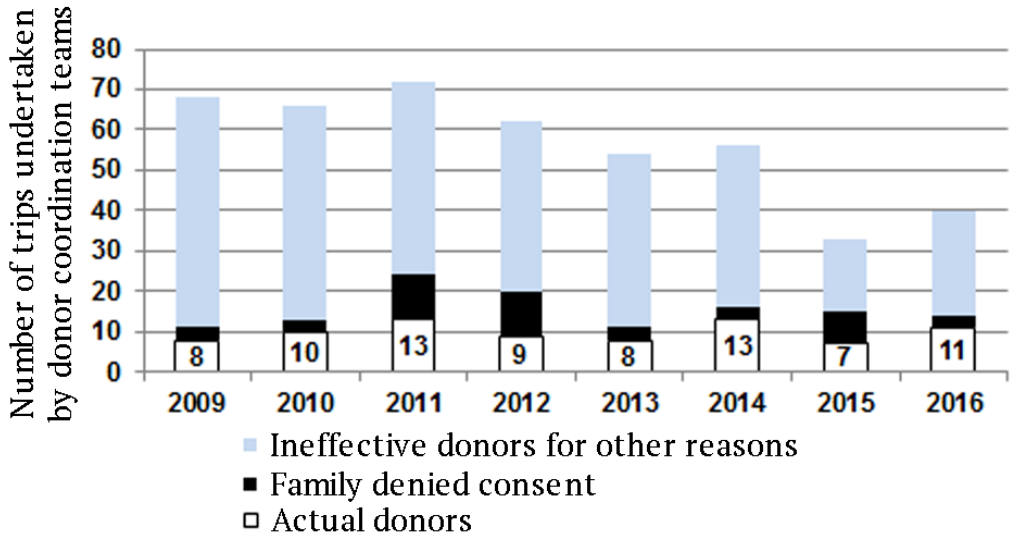

Fig. 2. The number of trips undertaken by the donor coordination teams and the number of actual posthumous donors (absolute numbers); changes over time

At the second stage, after obtaining the consent of relatives or making the decision that there is no need for such consent, the information about the real donor is transmitted to the Transplantation Center which dispatches a transplant team, and simultaneously the recipient(s) selection is undertaken.

At the third stage, the organ(s) is(are) transplanted to the recipient(recipients).

So, the significant factors that would influence the efficacy of using the donor resource in the region are the following:

- The attitude of the doctors at donor bases to the Transplantation Program, since it serves as a key moment for starting the whole procedure;

- The attitude of the population that determines both the lifelong expression of the donor's will, and the postmortem obtaining the family consent (or no denial) for organ harvesting;

- The stand of the medical community in relation to organ donation issues, which certainly affects the attitude of the population to this matter.

In connection with the above, we conducted a questionnaire survey among the doctors of the active and inactive donor bases, asking them on their professional and personal attitude to donation and human organ transplantation. The results of the survey showed that the majority of the respondents (80.1 ± 2.4%) stated that they, in their opinion, were well informed about modern clinical options in terms of human organ transplantation. However, we did not find a statistically significant difference in this parameter between the doctors of active and inactive donor bases.

Regardless of their place of work, 88.7 ± 1.9% of doctors believe that the development of this type of medical care in the region is an important task for saving the lives of patients, while every one of ten respondents (11.3 ± 1.3%) sticks to the opinion that the development of transplantation is not justified financially in the current economic situation. It was interesting to note that while giving a rather high subjective assessment of their knowledge

of the modern medical options of transplantation, 1/3 of the doctors (38.7 ± 2.9%) were not sure if they would have given their consent to an operation involving organ or tissue transplantation to them or their relatives in case of a necessity.

The survey demonstrated that while participating in the Transplantation Programme only 11.1 ± 1.3% of the doctors from the donor bases were motivated by a clear understanding of the importance of that work; 59.3 ± 3.0% of the doctors were mainly guided by directives and regulations issued by the administration, and for other doctors (29.6 ± 2.8%) both factors mattered. Almost half of the respondents (44.2 ± 3.1%) expressed the opinion that the work related to organ transplantation meets the support among their colleagues; 1/5 of doctors (20.3 ± 2.5) perceive this problem indifferently; 4.2 ± 1.2% of respondents reported negative attitude to their work from the colleagues. The rest of those respondents (31.3 ± 2.9%) were uncertain while answering the question on the attitude of their medical colleagues to organ transplantation.

In case of identifying a potential donor, only 10.9 ± 1.9% of the respondents, regardless of the activity of their medical organization as a donor base, would contact transplantologists on their own accord, 13.9 ± 2.2% of doctors would first discuss the donation possibility with the donor's family, 44.0 ± 3.0% would inform the hospital administration, 27.1 ± 2.1% would do nothing.

We found no statistically significant differences between the doctors of the active and inactive donor bases in their awareness on the regulatory and legal base of transplantation. The results showed that only 44.3 ± 3.1% of respondents were completely informed on the norms of the Russian legislation regulating the presumed consent of the population to posthumous

organ donation, and only 18.6 ± 2.4% of responders expressed their support of this norm; every one in five respondents (22.8 ± 2.6%) considered the removal of organs possible only if there existed the documented consent of the donor registered while he/she had been alive.

More than a half of the respondents (58.6 ± 3.0%) believe that organ harvesting is possible only if there existed lifetime consent of the donor or the relative's consent obtained after the donor's death. However, we found that such public position is more typical for the doctors of inactive donor bases (66.6 ± 4.9%) than for the doctors actively involved in transplantation (53.2 ± 3.8%; t = 2.2).

We also studied the personal attitude of doctors to their participation in the Donation Program. Less than half of the respondents (44.7 ± 3.1%) would consider it possible to donate their organs for medical purposes in case of sudden death, 15.1 ± 2.2% expressed their refusal, the rest were uncertain. Also, half of those polled would agree to register their lifetime consent for potential posthumous organ donation. There were no statistically significant differences between the doctors of active and inactive donor bases.

The attitude of the population to transplantation issues was studied by a comparative analysis of homogeneous social groups of the population that differed by their opinion in respect to the legally adopted norm of the presumed consent or the need for mandatory obtaining the donor's consent while being alive. We interviewed students of the same age group who studied in disciplines not related to medicine in regional universities in Russia and the United States. The choice of students as the study subjects was determined by the advantageous influencing their social stand by environmental factors rather than by their personal experience. The survey

results that demonstrated statistically significant differences between the Russian and American respondents are presented in Table. 1.

Table 1. The survey parameters demonstrating significant differences between the students studying under the bachelor's degree programs in Russia and the USA (% of responders)

The survey parameters demonstrating significant differences	Proportion of students, Russia	Proportion of students, USA
Family or relatives have ever encountered the necessity to have an operation involving organ transplantation (t = 4.0)	7.1%	25.7%
Have absolutely no information about the modern medical options in terms of organ and tissue transplantation (t = 2.7)	36.3%	20.8%
In case of a clinical necessity of getting an operation involving organ or tissue transplantation		
Consider getting an operation involving organ or tissue transplantation to oneself or next to kin possible (t = 5.7)	55.4%	85.7%
Not sure yet (t = 10.5)	42.2%	1.0%
Would oppose transplantation (t = 3.1)	2.4%	13.3%
Postmortem organ harvesting can take place:		
- Only as long as there exists the documented consent from the donor registered while he/she was alive (t = 7.3)	69.0%	27.6%
- If there exists the documented consent of the donor or of his/her relatives after donor's death (t = 4.8)	25.6%	59.0%
- Regardless of the consent from the donor and his family (t = 2.1)	5.4%	13.4%
Would register their consent for postmortem donation (t = 9.7)	44.1%	90.5%

Table 2. The survey parameters demonstrating no significant differences between the students studying under the bachelor's degree programs in Russia and the USA (% of responders)

The survey parameters demonstrating no significant differences	Proportion of students, Russia	Proportion of students, USA
Making the decision on whether to register the consent for posthumous organ donation would be influenced by:		
- The opinion of the official representative of some religious group	11.3%	14.3%
- Some factors of financial motivation	34.5%	37.1%
- Information about the people you can save	25.6%	59.0%

According to the survey results, 20.8 ± 4.0% of students at the American College have absolutely no information about the modern medical options in terms of organ and tissue transplantation, which is significantly lower than the number of such students in the Higher Education Institution of Nizhny Novgorod (36.3 ± 3.7%, t = 2.7). Meanwhile, 1/4 of American students (25.7 ± 4.2%) already encountered the necessity to have an operation involving organ transplantation for their family or relatives; that parameter was 7.1 ± 2.0% for the Russian students (t = 4.0, statistically significant). The personal attitude of American students to transplantation as a treatment method, in case of necessity, was defined very clearly: the overwhelming majority (85.7 ± 3.4%) considered this surgical intervention a routine clinical practice and only 13.3 ± 3.3% do not accept transplantation for oneself or their next to kin. The proportion of students who were uncertain while answering that question was not statistically significant. A significantly smaller proportion of Russian students would agree to have the transplantation for themselves and their next to kin (55.4 ± 3.8%, t = 5.7). However, in our opinion, the most interesting group included those who

were uncertain while answering that question, their number amounted to 42.2 ± 3.8%.

The analyzed answers of the respondents to the question on the need to obtain consent to organ donation showed that the majority of the Russian students (69.0 ± 3.6%) had the opinion that postmortem donation could be possible only if there existed the documented consent of the donor registered while being alive. The part of such respondents among American students was statistically significantly lower and amounted to 27.6 ± 4.4%; t = 7.3). The consideration of the family opinion when deciding on a post-mortem organ donation was supported by 25.6 ± 3.4% of Russian respondents and 59.0 ± 5.7% of US respondents (t = 4.8, statistically significant). The advocates of presumed consent made accounted for 5.4 ± 1.7% among the Russian students and 13.4 ± 3.3% among the American students (t = 2.1, statistically significant).

Currently, 44.1 ± 3.8% of Russian participants in the survey would sign their consent to the participation in the postmortem donation programs; a statistically significantly higher figure 90.5 ± 2.9% (t = 9.7) was registered for the Americans. Meanwhile, we found the similarity of the factors that would influence the decision on posthumous donation among the students, irrespective the country of residence; the leading factor in favor of posthumous organ donation programs was the Information about the person whose life depends on donor's decision (52.6 ± 3.9% of Russian students, 59 , 0 ± 4.8% of American students, t = 1.0). Then came the factors of financial motivation, the difference between the countries was not statistically significant (35.4 ± 3.7% of Russian respondents, 37.1 ± 4.6% of Americans, t = 0.3). The opinion of the official representative of some religious group ranked the third by frequency and it was important for 11.3 ± 2.4% of

Russian and 14.3 ± 3.4% of American respondents (t = 0.7, statistically significant). The survey results demonstrating the identified statistically significant differences between the answers of Russian and American respondents are presented in Table 2.

Discussion

Thus, the results of our study have demonstrated that in the current system of interactions between the participants in the Regional Donation Program in the Nizhny Novgorod region, the most challenging in terms of posthumous organ donation are the activities whose efficacy depends on the attitude of health care professionals and the population of the region. At the same time, the interviewed experts of the clinical bases adhered to a cautious and avoiding position on the issues of participation in the donation program, which is primarily due to insufficient information they had been provided about clinical advances and the legal and regulatory base of transplantation in Russia (38.7 ± 2.9% doctors were not sure in the appropriateness of organ transplant surgery, even when clinically indicated, only 44.3 ± 3.1% of respondents were well informed on the issues of the presumed consent of population to posthumous organ donation). Accordingly, the leading factor influencing the activity of the donor base was the hospital administration instructions. The most disturbing factor, in our opinion, was the passive attitude of doctors towards donor programs: the proportion of doctors willing to become posthumous donors appeared identical to that of students; the viewpoint of a health care professional with a higher education turned to be similar to that of a common lay-person not related to a medical specialty.

The survey among students has demonstrated the key role of the social environment for creating a positive attitude toward donation programs in a

person. American students have grown up in a society where the clinical and legal components of transplantation have become a normal standard of living: every fourth American interviewed has somehow encountered this problem, the vast majority of them consider organ transplantation to be an acceptable clinical practice, and, most importantly, there are few of those who have not formed a clear point o view on this issue. Among the Russian students, on the contrary, predominant was the group of those who were uncertain while answering the question as to whether they would admit the possibility of organ transplantation for themselves and their relatives, in case of necessity. American students clearly support the norm of their legislation, the Russian students, on the contrary, mainly oppose the principle of the Russian National Organ Transplant Act. Interesting was the fact that the Russian students considered the organ harvesting should take place only if there existed the documented consent of the donor, they did not express their trust on that matter even to donor's family. We believe that the above opinions have been made because of an insufficient level of awareness among the respondents about the legal guarantees for safe posthumous donation. At the same time, the leading factor that could influence the opinion of the social group under study, in terms of obtaining consent to posthumous organ harvesting, is the awareness-raising work explaining a humane nature of transplantation and its role in saving people's lives.

We believe that the informational activities aimed at popularizing organ donation, which must be carried out both in the professional medical environment and in all social groups of the population, make an obligatory condition for the further development of the Organ Transplantation Program

and the optimization of using donor resource in the Nizhny Novgorod Region.

Conclusions

1. Currently, all activities for organizing posthumous organ donation in the Nizhny Novgorod Region are being carried out by transplantologists without any support from other interested parties. The passively cautious attitude of doctors, and, primarily of hospital administration, results in a limited use of donor resource: less than 1/3 among the hospitals designated donor bases by the local Healthcare Authorities actually participate in the implementation of Organ Donation Program. The negative attitude of the population to organ donation that has been formed, including due to lacking the support of transplantation from representatives of religious organizations, leads to significant losses of actual donors: over several years, the number of ineffective donors because of the family-denied consent was almost equal to the number of actual donors.

2. The most important medico-sociological factor determining the success of the regional posthumous organ donation program is the awareness of both the population and medical community about the legal safeguard and humane nature of transplantation as a medical care.

Conflict of interests. Authors declare no conflict of interest.

Financing. The study was performed without external funding.

References

1. Gautier S.V., Khomyakov S.M. Organ donation and transplantation in the Russian Federation in 2016. 9th report of the National Registry. *Russian Journal of Transplantology and Artificial Organs.* 2017;19(2):6–26. (In Russian). DOI:10.15825/1995-1191-2017-2-6-26

2. Vinogradov V.L. Actual issues of organ donation. Introduction. The lecture. *Transplantologiya. The Russian Journal of Transplantation*. 2013;(4):15–23. (In Russian).

3. Minina M.G. To some organizational aspects of organ donation. *Russian Journal of Transplantology and Artificial Organs*. 2010;12(3):81–88. (In Russian). DOI:10.15825/1995-1191-2010-3-81-88

4. Mironov A.A., Yaremin B.I., Kolsanov A.V., et al. Organ donation and transplantation coordination in the Samara region: Features of the regional model. *Russian Journal of Transplantology and Artificial Organs*. 2015;17(2):140–143. (In Russian). DOI:10.15825/1995-1191-2015-2-140-143

5. Serebryakov I.Yu., Badaev F.I., Klimusheva N.F., Leshchenko I.G. Current state of donor procurement service in the Sverdlovsk region. *Russian Journal of Transplantology and Artificial Organs*. 2015;17(2):139. (In Russian). DOI:10.15825/1995-1191-2015-2-139-139

6. Nikolaev G.V., Gordeev M.L., Karpenko M.A., et al. Organizational aspects of organ donation in St. Petersburg. *Russian Journal of Transplantology and Artificial Organs*. 2015;17(2):134–138. (In Russian). DOI:10.15825/1995-1191-2015-2-134-138