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Growth of Human Organ Transplant Cases and Transplant Hospitals in Vietnam in 1992-2019

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Abstract:

From 1992 to December 31, 2019, Vietnam performed 4,689 organ transplants, of which the most were kidney transplants (94.73%), liver transplants (4.2%), and other organs (1%). Currently, the primary source of transplanted organs still comes from living donors at a rate of 93.7%. This study aims to represent statistics on human organ transplantations and promote the development of this field in Vietnam. Increasing the number of organ transplant hospitals from 5 to 19, promulgating the Law on donation, organ collection and donation, body collection of 2006; implementing insurance, honoring humane organ donation and communicating from 2013 to 2019 have directly promoted the increase in both the number of organ donation/transplant from living and brain-dead donors, rather than leading to a reduction in the rate of donor/transplant from a living donor and an increase from a brain-dead donor, as expected.

Keywords: human organ transplantation, donors, growth, statistics, Vietnam.

尼泊尔应届毕业生的自我控制与求职行为

摘要:

1992年至2019年12月31日，越南進行了4,689例器官移植，其中最多的是腎臟移植（94.73%）、肝臟移植（4.2%）和其他器官移植（1%）。目前，移植器官的主要來源仍是活體捐贈者，比例為93.7%。本研究旨在反映人體器官移植的統計數據並促進越南這一領域的發展。將器官移植醫院的數量從5家增加到19家，頒布20

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06年《捐贈、器官採集與捐贈、遺體採集法》；2013年至2019年實施保險、尊重人道器官捐贈、溝通等，直接促進了活體和腦死捐贈者器官捐贈/移植數量的增加，而不是導致器官捐贈數量的減少。

关键词：人體器官移植、捐贈者、生長、統計、越南。

1. Introduction

Since the first kidney transplant in 1992 (Military Medical Department – Ministry of National Defense of Vietnam, 2012) Vietnamese organ transplantation has undergone nearly 30 years of development. Vietnam has performed most organ transplants, including six common types of organs: kidney, heart, liver, lung, pancreas, intestine, and one upper limb, with a good survival rate (Son, 2021). In 2006, the National Assembly of Vietnam promulgated the “Law on donation, collection, transplantation of human tissues and organs and donation and removal of corpses”, officially establishing the legal framework for organ transplantation in Vietnam. After that, the Government of Vietnam, the Ministry of Health, and other ministries issued many legal documents guiding the law implementation, thereby forming a policy and legal framework to promote the development of organ transplantation in Vietnam development (Khanh & Thanh, 2019). As of December 31, 2019, according to statistics from the Vietnam National Coordinating Center for Human Organ Transplantation (VNCCHOT), there were 4.689 organ transplants of all kinds performed at 19 transplant hospitals in Vietnam. Especially since establishing VNCCHOT (PRIME MINISTER OF THE SOCIALIST REPUBLIC OF VIETNAM, 2011) and officially put into operation in 2013 (MINISTRY OF HEALTH, August 21, 2013), the recording and statistics of organ transplants from living donors and brain-dead and deceased donors have been gradually improved and standardized. This study contributes to providing relatively complete statistics on organ transplantation in Vietnam, serving the research and evaluation of organ transplantation activities, and proposing solutions to manage and coordinate this activity more effectively.

This study statistics the growth results of the number of organ transplants and the number of transplant hospitals in Vietnam from 1992 to the end of 2019, divided into two periods: Period from 1992-2012: recording the total number of transplants, the number of cases organ transplants from living donors and brain-dead and deceased donors, and the total number of organ transplant facilities across the country. In the period from 2013 to 2019, the results of organ transplantation from living donors, brain-dead and dead donors were recorded at 19 transplant facilities across the country; noting an increase in the number of transplant facilities and types of organs being transplanted compared with organ transplant results in the same period of world organ transplantation. Therefore, this study intends to recommend solutions to promote the development of this field in Vietnam.

2. Research Methods and Indicators

2.1. Research Methods

Retrospective and descriptive: research statistical documents, using SPSS software to collect, screen, classify and synthesize into secondary information. Use quantitative computational tools to describe the numbers, rates, and trends of organ transplant outcomes.

2.2. Data Collection Method

Time to record data: from June 4, 1992, to December 31, 2019. Excluded from the study was information on organ transplants with no medical facility confirming that such organ transplant was performed.

For the statistics on the number of organ transplants from November 2012 and earlier: Statistics are made in retrospective form through documents such as MILITARY MEDICAL HOSPITAL 103 (2012); VIET DUC FRIENDSHIP HOSPITAL (2012); MILITARY MEDICAL DEPARTMENT – MINISTRY OF NATIONAL DEFENSE OF VIETNAM (2012).

Statistical data on the number of organ transplants from 2013 to 2019 cases were collected by each organ transplant hospital, summarizing the report of the Information Management Department and the Donation Card on December 31 every year.

Data on organ transplants of each type are temporarily divided into six categories: kidney transplant, liver transplant, heart transplant, marrow transplant, kidney–pancreas transplant, and heart–lung transplant.

Source of transplanted organs: Transplants are performed from living donor organs, brain-dead donors, or cardiac arrest-dead donors.

Record information on registration of tissue and organ donation while alive or after death from hospitals providing consultation and receiving registration for tissue and organ donation in previous years.

Methods of data collection are as follows.

Data on organ transplants are mainly collected in three main forms: medical documents and organ transplants; documents and reports of health authorities; and reports of organ transplant hospitals (these three methods of data collection account for 99.89% of the collected transplant data).

Table 1. Results of data collection by forms (n=4.689) (Developed by the authors)

Form	n	%
Documents specialized in medicine and organ transplantation	937	19.98
Report document of the health authority	513	10.94
Reports of medical facilities with organ	3.234	68.97

transplant function		
Press and media agencies	1	0.02
Medical staff at all levels	1	0.02
Documents of experts in the health industry and the field of organ transplantation	3	0.06
Total	4.689	100

This study included the statistics on the number of organ transplant hospitals from 1992 to 2019 and statistics through the Ministry of Health's licensing of organ transplantation for hospitals and the timeline recognized as eligible to perform the first organ transplant.

The research target is:

- The total number of organ transplants in the period 1992-2012 and 2013-2019.
- Number and rate of organ transplants from 1992 to 2012 and 2013 to 2019.
- Fluctuation (increase, decrease) in the number and proportion of transplanted organs.
- Number and percentage of organ transplants

Table 2. Statistics of organ transplants from 1992-2012 (n=933) (VNCCHOT's statistics)

Cases of kidney transplants		Cases of liver transplantation		Heart transplants	Kidney - pancreas block transplants	Heart-lung block transplants
Living donors	Brain dead donors	Living donors	Brain dead donors			
847	53	19	8	6	0	0
Total number of transplant cases: 933						

The number and proportion of organ transplants in the period 1992-2012 are shown in Figure 1 below:

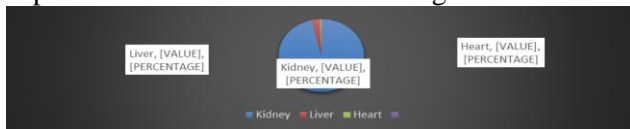


Figure 1. Number and percentage of organ transplants from 1992 to 2012 (Developed by the authors)

The number of organ transplants from living donors and brain-dead donors in the period 1992-2012 also had a huge difference. The total number of transplants performed from living sources was 866/933 transplants, accounting for 93%; The number of transplants from the source for brain death was 67/933, accounting for approximately 7% of the total number of transplants in the same period (Figure 2).

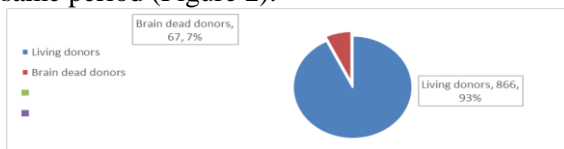


Table 3. Statistics of organ transplants in 2013 by hospital (n=232) (Developed by the authors)

Organ transplant hospitals	Cases of kidney transplants		Cases of liver transplantation		Cases of heart transplantation
	Living donors	Brain dead donors	Living donors	Brain dead donors	
Viet Duc Friendship Hospital	48	16	0	09	02
National Children's Hospital	01	0	0	0	0
Bach Mai Hospital	10	0	0	0	0
Hospital 198, Ministry of Public Security	05	0	0	0	0
Saint Paul Hospital	0	0	0	0	0
Military Hospital 103	33	02	0	01	0

from living, brain-dead, and deceased donors.

- Number and rate of organ transplants per 1 million population (pmp) of Vietnam and the world in the same period of comparison.

- Growth in the number of transplant facilities and types of organs during 2013-2019.

3. Results and Discussion

3.1. Growth in the Number of Organ Transplants from 1992 to 2012

Within 20 years, from 1992 to 2012, hospitals in Vietnam have performed 933 organ transplants of all kinds, mainly kidney transplants, with the number of 900/933 cases of all kinds accounting for 96% of the total number of transplants. Liver transplants were performed in 27 cases, accounting for 3%, and the lowest was heart transplant in 6 cases, reaching 1% of the total number of organ transplants.

Figure 2. Number and percentage of organ transplants from living and brain-dead donors during 1992-2012 (Developed by the authors)

It can be said that 1992-2012 was the period that laid the foundation for organ transplantation in Vietnam, with 3 types of organs being transplanted, with kidney transplants accounting for the absolute majority (96% of transplanted organs). Especially since 2010, Vietnam has just started transplanting organs from brain-dead donors, leading to a low proportion of transplants from brain-dead donors at this stage (7%).

3.2. Growth in the Number of Organ Transplants from 2013 to 2019

The VNCCHOT statistics record the growth in the number of transplant cases and organ types over the years as follows:

Hue Central Hospital	50	0	0	0	0
Cho Ray Hospital	41	0	01	0	0
People's Hospital 115	13	0	0	0	0
Total	201	18	01	10	02
Total number of transplants	232				

Table 4. Statistics of organ transplants in 2014 by a hospital (n=283) (Developed by the authors)

Organ transplant hospitals	Cases of kidney transplants		Cases of liver transplants		Cases of heart transplants	Cases of kidney – pancreatic block transplants
	Living donors	Brain dead donors	Living donors	Brain dead donors		
Viet Duc Friendship Hospital	18	8	0	4	2	0
National Children's Hospital	3	0	0	0	0	0
Bach Mai Hospital	21	0	0	0	0	0
Hospital 198 Ministry of Public Security	22	0	0	0	0	0
Saint Paul Hospital	5	0	0	0	0	0
Military Hospital 103	25	1	0	1	0	1
Hue Central Hospital	86	0	0	0	0	0
Cho Ray Hospital	53	0	3	0	0	0
People's Hospital 115	14	0	0	0	0	0
Children's Hospital 2	14	0	0	0	0	0
Da Nang Hospital	2	0	0	0	0	0
Gia Dinh People's Hospital	0	0	0	0	0	0
Kien Giang General Hospital	0	0	0	0	0	0
Total	263	9	3	5	2	1
Total number of organ transplants	283					

Table 5. Statistics of organ transplants in 2015 by hospital (n=296) (Developed by the authors)

Organ transplant hospitals	Cases of kidney transplantation		Cases of liver transplants		Heart transplants	Kidneys-pancreas block transplants	Heart-lung block transplants
	Living donors	Brain death donors	Living donors	Brain death donors			
Viet Duc Friendship Hospital	39	2	0	3	3		
Cho Ray Hospital	71	14	6	2	0	0	0
Bach Mai Hospital	32	0	0	0	0	0	0
National Children's Hospital	2	0	1	0	0	0	0
Military Hospital 103	28	0	0	0	0	0	0
Hue Central Hospital	50	0	0	0	0	0	1
Hospital 198 Ministry of Public Security	1	0	0	0	0	0	0
Saint Paul Hospital	5	0	0	0	0	0	0
Thai Nguyen Central General Hospital	1	0	0	0	0	0	0
Phu Tho General Hospital	1	0	0	0	0	0	0
Nghe An General Hospital	0	0	0	0	0	0	0
Danang Hospital	3	0	0	0	0	0	0
People's Hospital 115	28	0	0	0	0	0	0
Children's Hospital 2	2	0	1	0	0	0	0
Gia Dinh People's Hospital	0	0	0	0	0	0	0
Kien Giang General Hospital	0	0	0	0	0	0	0
Vimec International General Hospital	0	0	0	0	0	0	0
Total	263	16	8	5	3	0	1
Total organ transplants	296						

Table 6. Statistics of organ transplants in 2016 by a hospital (n=447) (Developed by the authors)

Organ transplant hospitals	Cases of kidney transplants			Cases of liver transplantation		Hearts transplants	Heart– lung block transplants
	Living donors	Brain-dead donors	Deceased donors	Living donors	Brain-dead donors		
Viet Duc Friendship Hospital	102	6	0	2	5	1	0
Cho Ray Hospital	86	2	1	1	0	0	0
Bach Mai Hospital	45	0	0	0	0	0	0
National Children's Hospital	0	0	0	0	0	0	0
Military Hospital 103	39	2	0	0	0	1	0
Hue Central Hospital	84	0	0	0	0	0	0
Hospital 198	4	0	0	0	0	0	0
Ministry of Public Security							
Saint Paul Hospital	8	0	0	0	0	0	0
Thai Nguyen Central General Hospital	7	0	0	0	0	0	0
Phu Tho General Hospital	4	0	0	0	0	0	0
Da Nang Hospital	4	0	0	0	0	0	0
People's Hospital 115	38	0	0	0	0	0	0
Children's Hospital 2	0	0	0	1	0	0	0
Gia Dinh People's Hospital	0	0	0	0	0	0	0
Kien Giang General Hospital	0	0	0	0	0	0	0
Vimec International General Hospital	1	0	0	0	0	0	0
Military Central Hospital 108	1	0	0	0	0	0	0
Total	425	10	1	4	5	2	0
Total organ transplants	447						

Table 7. Statistics of organ transplants in 2017 by a hospital (n=673) (Developed by the authors)

No.	Organ transplant hospitals	Cases of kidney transplantation			Cases of liver transplantation		Heart transplants	Kidney – pancreatic block transplants	Heart-lung block transplants	Lung transplants	
		Living donors	Brain-dead donors	Deceased donors	Living donors	Brain-dead donors				Living donors	Brain-dead donors
1	Viet Duc Friendship Hospital	141	15	0	4	9	1	0	0	0	0
2	Cho Ray Hospital	95	2	0	0	2	2	0	0	0	0
3	Bach Mai Hospital	58	0	0	0	0	0	0	0	0	0
4	National Children's Hospital	3	0	0	0	0	0	0	0	0	0
5	Military Hospital 103	50	0	0	0	0	0	0	0	1	0
6	Hue Central Hospital	157	0	0	0	0	0	0	0	0	0
7	Hospital 198	0	0	0	0	0	0	0	0	0	0
	Ministry of Public Security										
8	Saint Paul Hospital	6	0	0	0	0	0	0	0	0	0
9	Thai Nguyen Central General Hospital	9	0	0	0	0	0	0	0	0	0
10	Phu Tho General Hospital	3	0	0	0	0	0	0	0	0	0
11	Da Nang Hospital	7	0	0	0	0	0	0	0	0	0
12	People's Hospital 115	53	0	0	0	0	0	0	0	0	0
13	Children's	0	0	0	3	0	0	0	0	0	0

14	Hospital 2 Gia Dinh People's Hospital	0	0	0	0	0	0	0	0	0	0
15	Kien Giang General Hospital	0	0	0	0	0	0	0	0	0	0
16	Vimec International General Hospital	24	0	0	12	0	0	0	0	0	0
17	Military Central Hospital 108	14	1	0	1	0	0	0	0	0	0
Total		620	18	0	20	11	3	0	0	1	0
Total number of transplant cases		673									

Table 8. Statistics of organ transplant cases in 2018 by hospital (n=834) (Developed by the authors)

No.	Organ transplant hospitals	Cases of kidney transplants			Cases of liver transplants		Heart transplants	Kidney – pancreas block transplants	Heart– lung block transplants	Lung transplants	
		Living donors	Brain dead donors	Deceased donors	Living donors	Brain dead donors				Living donors	Brain dead donors
1	Viet Duc Friendship Hospital	164	11	0	4	6	4	0	0	0	1
2	Cho Ray Hospital	108	9	4	21	1	3	0	0	0	0
3	Bach Mai Hospital	83	0	0	0	0	0	0	0	0	0
4	National Children's Hospital	3	0	0	2	0	0	0	0	0	0
5	Military Hospital 103	90	0	0	0	0	0	0	0	0	0
6	Hue Central Hospital	192	0	0	0	0	2	0	0	0	0
7	Hospital 198, Ministry of Public Security	1	0	0	0	0	0	0	0	0	0
8	Saint Paul Hospital	9	0	0	0	0	0	0	0	0	0
9	Thai Nguyen Central General Hospital	5	0	0	0	0	0	0	0	0	0
10	Phu Tho General Hospital	0	0	0	0	0	0	0	0	0	0
11	Da Nang Hospital	8	0	0	0	0	0	0	0	0	0
12	People's Hospital 115	40	0	0	0	0	0	0	0	0	0
13	Children's Hospital 2	2	1	0	0	0	0	0	0	0	0
14	Gia Dinh People's Hospital	0	0	0	0	0	0	0	0	0	0
15	Kien Giang General Hospital	0	0	0	0	0	0	0	0	0	0
16	Vimec International General Hospital	24	0	0	11	0	0	0	0	0	0
17	Military Central Hospital 108	14	1	0	2	0	0	0	0	0	1
18	Medicine and Pharmacy University Hospital of Ho Chi Minh City	0	0	0	3	0	0	0	0	0	0
19	Thanh Hoa General Hospital	4	0	0	0	0	0	0	0	0	0
Total		747	22	4	43	7	9	0	0	0	2
Total number of transplant cases		834									

Table 9. Statistics of organ transplant cases in 2019 by hospital (n=990) (Developed by the authors)

No.	Organ transplant hospitals	Cases of kidney transplants			Cases of liver transplantation		Heart transplants	Kidney – pancreas block transplants	Heart– lung block transplants	Lung transplants	
		Living donors	Brain-dead donors	Deceased donors	Living donors	Brain-dead donors				Living donors	Brain-dead donors
1	Viet Duc Friendship Hospital	141	23	0	4	14	8	0	0	0	2
2	Cho Ray Hospital	105	2	0	1	0	1	0	0	0	0
3	Bach Mai Hospital	95	0	0	0	0	0	0	0	0	0
4	National Children’s Hospital	7	0	0	3	0	0	0	0	0	0
5	Military Hospital 103	272	2	0	0	0	0	0	0	0	0
6	Hue Central Hospital	175	0	0	0	1	3	0	0	0	0
7	Hospital 198, Ministry of Public Security	0	0	0	0	0	0	0	0	0	0
8	Saint Paul Hospital	6	0	0	0	0	0	0	0	0	0
9	Thai Nguyen Central General Hospital	4	0	0	0	0	0	0	0	0	0
10	Phu Tho General Hospital	1	0	0	0	0	0	0	0	0	0
11	Da Nang Hospital	8	0	0	0	0	0	0	0	0	0
12	People’s Hospital 115	54	0	0	0	0	0	0	0	0	0
13	Children’s Hospital 2	0	0	0	1	0	0	0	0	0	0
14	Gia Dinh People’s Hospital	0	0	0	0	0	0	0	0	0	0
15	Kien Giang General Hospital	0	0	0	0	0	0	0	0	0	0
16	Vimec International General Hospital	6	0	0	3	0	0	0	0	0	0
17	Military Central Hospital 108	20	2	0	16	1	0	0	0	0	1
18	Medicine and Pharmacy University Hospital of Ho Chi Minh City	0	0	0	6	0	0	0	0	0	0
19	Thanh Hoa General Hospital	1	1	0	0	0	0	0	0	0	0
	Total	895	30	0	34	16	12	0	0	0	3
	Total number of transplant cases	990									

3.3. Total Number of Organ Transplant Cases during 1992–2019

During the entire period from 1992 to 2019, Vietnam performed 4,689 single- and multi-organ transplants. In this study, kidney transplants accounted for the absolute majority with a rate of 94.73%; liver transplants with 199 cases, accounting for 4.24%. Other types of organs have the same transplant rate below 1%, such as the heart with 40 cases, accounting for 0.85%; lung with 06 cases, accounting for 0.13%; heart-lung and kidney– pancreas transplants together had 01 cases, accounting for 0.02%.

Kidney Transplant	4.442	94.73
Liver Transplant	199	4.24
Heart Transplant	40	0.85
Kidney–pancreatic block transplant	1	0.02
Heart–Lung Block Transplant	1	0.02
Lung Transplant	6	0.13
Total	4.689	100

Statistics also show that organ transplants from living donors account for most cases with 4,394 cases, reaching a rate of nearly 94%; organ transplants from brain-dead donors with 290 cases, accounting for 6,2%, and organ transplants from deceased donors with cardiac arrest with only 05 cases, accounting for 0,1%.

Table 10. Statistics of transplant cases by organ type from 1992 to 2019 (n = 4.689) (Developed by the authors)

Organ transplant	n	%
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Table 11. Summary of organ sources for transplantation (n=4.689)
(Developed by the authors)

Source of the transplanted organs	n	%
Organ transplant from the living donor	4.394	93.7
Organ transplant from the brain-dead donor	290	6.2
Organ transplant from the deceased donor in cardiac arrest	5	0.1
Total	4.689	100

The number of kidney transplants from living donors still accounts for the absolute number and proportion of organ transplant achievement in Vietnam.

4. Discussion

4.1. Growth in the Number and Types of Transplants

Research on statistics on the number and types of organ transplants in the period from 2013 to 2019 shows that 3,737 organ transplants of all kinds have been performed in Vietnam, of which mainly kidneys: 3,542 cases, liver: 172 cases, heart: 19 cases, and lungs: 4 cases. It can be seen that the growth rate of organ transplantation in Vietnam is quite high, the scale in 2019 increased by 4.3 times compared to 2013. Which, the main contribution is still kidney transplantation from living donors. The growth in the number of organ transplants in the period 2013-2019 is shown in Figure 3.

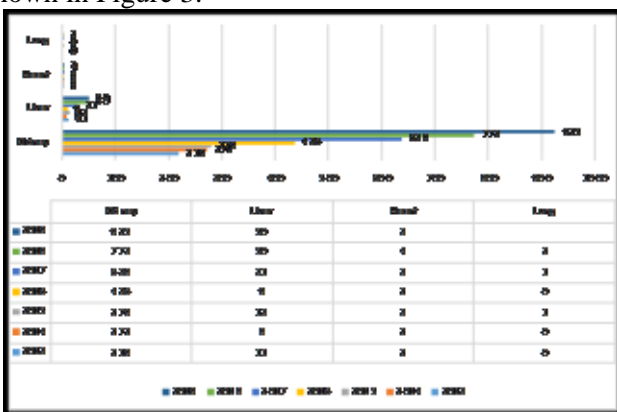


Figure 3. Growth of organ transplants (kidney, liver, heart, lung) in Vietnam from 2013 to 2019 (Developed by the authors)

The fluctuations in the number of organ transplants from the source for living donors, brain death, and deceased donors from 2013 to 2019 are shown in Figure 4.

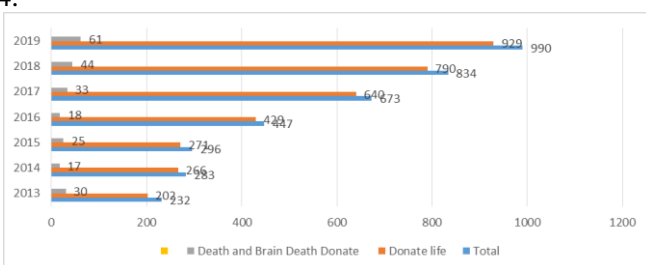


Figure 4. Number of organ transplants from living donors, brain dead donors, and deceased donors in the period 2013-2019 (Developed by the authors)

In 2013, there were 202 organ transplants from living donors, accounting for 87% of the total number of transplants, and 30 transplants from brain-dead

donors, accounting for 13% of the total number of transplants. In 3016, there were 429 organ transplants from living donors, accounting for 96% of the total number of transplants; 18 organ transplants from brain-dead donors accounted for 6% of the total number of transplants. In 2019, there were 929 transplants from living sources, accounting for 94% of the total number of transplants. This shows that from 2013 to 2019, there was strong growth in the number of transplants from living donors and brain dead donors, but there was no change in the trend of increasing organ transplant rates from brain dead donors and decreasing transplant rates from live donors.

The survey in the entire 1992–2019 period on the percentage of organ transplants also showed similar results (Figure 5).

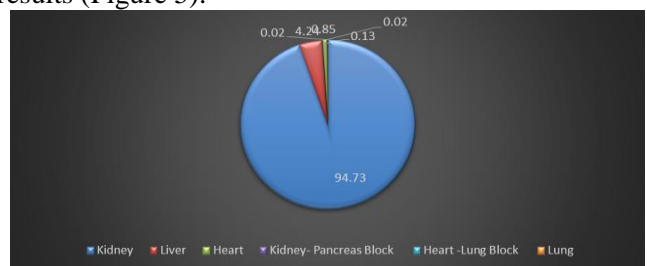


Figure 5. Rate of organ transplants in the period 1992–2019 (Developed by the authors)

The strongest growth is still kidney and liver transplants from living donors. Other organ transplants such as heart, pancreas, and multi-organ transplants still account for a negligible proportion (Figure 6).

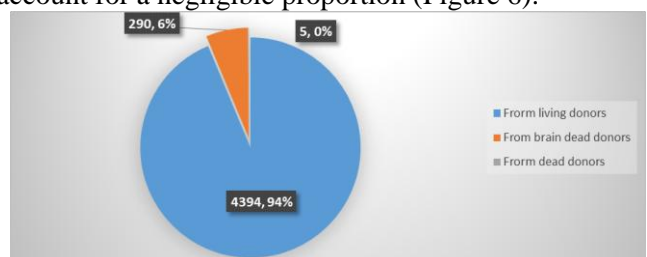


Figure 6. Number and percentage of organ transplants from living donors, brain dead, and deceased donors in the period 1992-2019 (Developed by the authors)

4.2. The Organ Transplant Rate per National Population Compared to the World

The survey on the number of transplant cases and the organ transplant rate in 2017, 2018, and 2019 compared with the total population shows that the transplant rate/population of Vietnam is in the low middle group of the world.

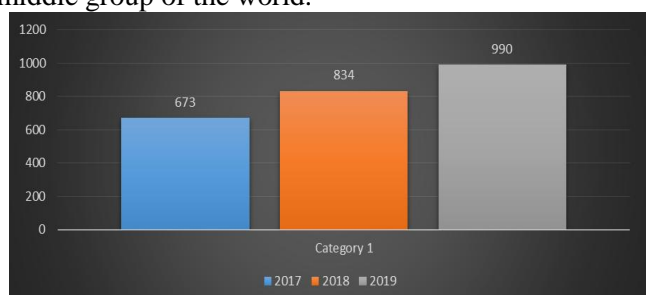


Figure 7. Number of organ transplants in Vietnam in 2017, 2018, and 2019 (Developed by the authors)

The population of Vietnam in 2017 was 2017: 94.600.648 people, 95.545.962 people in 2018, and 96.462.106 people in 2019 (DANSO, 2022). The ratio of organ transplants to Vietnam's population in 2017 was 7,12 cases per million population (pmp); it was 8.72 pmp in 2018 and 10.26 pmp in 2019 as shown in Figure 8.

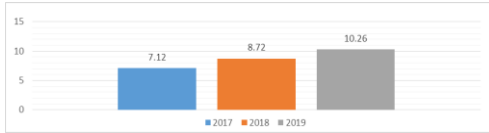


Figure 8. Percentage of organ transplants per million population (pmp) (Developed by the authors)

For a more in-depth look, the kidney transplant results of Vietnam in 2017, 2018, and 2019 and those of the world in the same period can be compared:

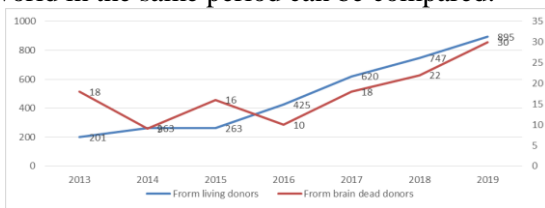


Figure 9. Changes in the number of kidney transplants in Vietnam in the period 2013-2019 (Developed by the authors)

In 2017, Vietnam received 638 kidney transplants, including 620 cases from live donors, accounting for more than 97%; while there were only 18 kidney transplants from the source of brain death, accounting for approximately 3% of the total number of kidney transplants. The number of kidney transplants from a living donor per million people reached a rate of nearly 6.6 pmp, while with 18 kidney transplants from a brain-dead donor, the rate was only 1.9 pmp, among the lowest in the world (Figure 10). However, the statistics of www.irodat.org on the rate of organ transplants from brain-dead donors per 1 million people in Vietnam in 2017 only 0.4 pmp is inaccurate, much lower than the results of the reality in Vietnam (IRODAT, 2018).

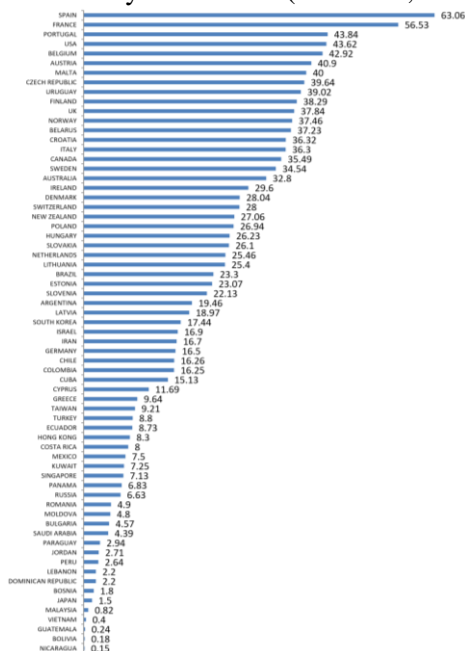


Figure 10. Rate of kidney transplantation from brain dead donors worldwide in 2017 (pmp) (IRODAT, 2018)

In 2018, Vietnam performed 773 kidney transplants, of which 747 were transplants from living sources, accounting for 96.63% of total kidney transplants and 7.82 pmp. While 26 transplants from brain-dead and death donors accounted for approximately 3.36% of total kidney transplants and 2.72 pmp. The statistics of www.irodat.org only recorded that the rate of kidney transplants from brain dead sources in Vietnam was 0.4 pmp (IRODAT, 2019), lower than the actual level of 2.32 pmp. In contrast, the statistics of www.irodat.org recorded that the rate of kidney transplants from living sources in Vietnam was 9 pmp (IRODAT, 2019), higher than the actual level of 1.18 pmp (Figure 11). However, it is a pity that until now, Vietnam has not had any official contact with the health sector responsible for bringing information about the country's organ transplant achievements to the international community to accurately reflect. data on organ transplantation in Vietnam with the world.

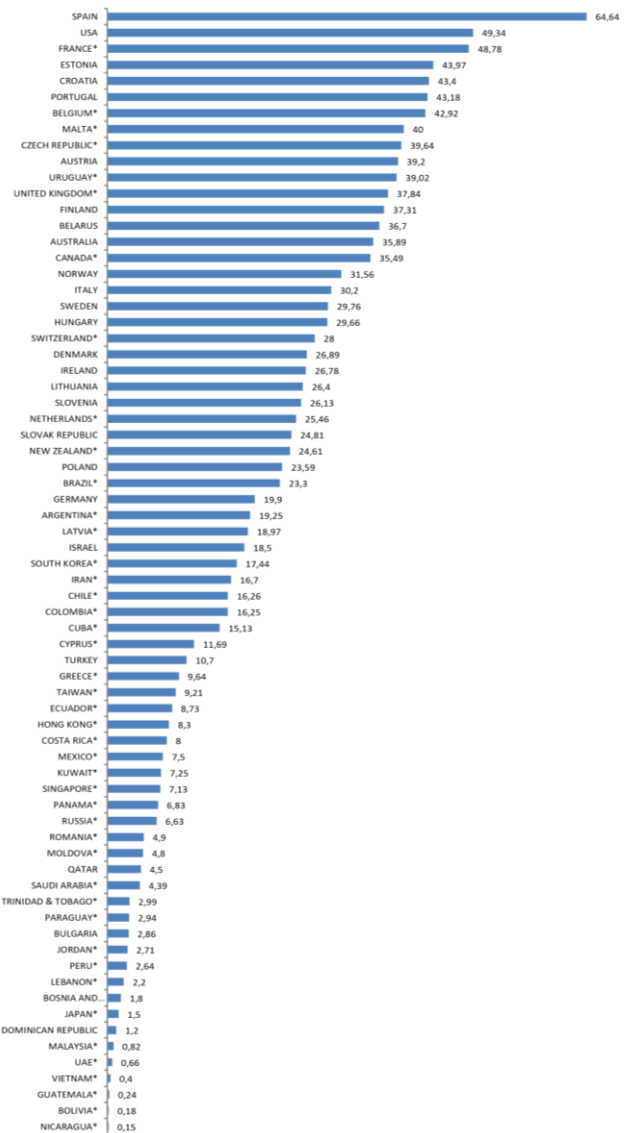


Figure 11. Rate of kidney transplantation from donors after brain death in the world in 2018 (pmp) (IRODAT, 2019)

In 2019, Vietnam performed 925 kidney transplants, of which 895 were transplants from living sources, reaching the rate of 90.4% of the total number of kidney

transplants and 9.28 pmp (Table 9). The number of transplants from brain-dead sources was 30 cases, reaching 9.6% of the total number of kidney transplants and 3,11 pmp (DANSO, 2022). According to statistics in 73 countries of the International Registry in Organ Donation and Transplantation (IRODT), in 2019, the group of 5 countries with the highest rate of kidney transplants from the source of brain death in the world is Spain: 72.8 pmp, France: 55.33 pmp, USA: 50.59 pmp, Finland: 48,49 pmp, and the Czech Republic: 43.45 pmp. The group of 5 countries with the lowest rate of organ transplants from brain-dead donors in India: 0.86 pmp, Bolivia: 0.71 pmp, Guatemala: 0.38

pmp, Nicaragua: 0.32 pmp, and the Philippines: 0.71 pmp (IRODAT, 2020). If ranked in the statistical table with these 73 countries, Vietnam ranks 60th, above the UAE: 2.1 pmp and just below Bulgaria with 3.28 pmp; lower than some neighboring countries such as Thailand: 6.96 pmp, China: 7.94 pmp (IRODAT, 2020).

4.3. Increase in Organ Transplant Hospitals

Until 2003, there were only 5 medical facilities licensed for kidney transplants in Vietnam: Viet Duc Friendship Hospital, Cho Ray Hospital, 103 Military Hospital, Hue Central Hospital, and People’s Hospital, Gia Dinh (Son T.H., 2019).

Table 12. List of hospitals and timelines recognized as eligible for first-time organ transplantation (n=19) (Trinh Hong Son, 2019)

Organ transplant hospital	Transplant	Source with Decision No. and timeline of the recognition of eligibility for the first organ transplant
Viet Duc Friendship Hospital	Kidney Transplant	Ministry of Health (2003), No. 5674/QD-BYT of October 30, 2003
Cho Ray Hospital	Kidney Transplant	Ministry of Health (2003), No. 5888/QD-BYT of November 12, 2003
Bach Mai Hospital	Kidney Transplant	Ministry of Health (2005), No. 3942/QD-BYT of October 25, 2005
National Children's Hospital	Kidney Transplant	Ministry of Health (2004), No. 1822/QD-BYT of May 24, 2004
Military Hospital 103	Liver Transplant, Kidney Transplant Liver Transplant Heart Transplant	Ministry of Health (2005), No. 2302/QD-BYT of July 1, 2005 Ministry of Health (2003), No. 5599/QD-BYT of October 24, 2003 Ministry of Health (2004), No. 12/QD-BYT of January 15, 2004
Hue Central Hospital	Kidney Transplant, Heart Transplant	Ministry of Health (2010), No. 2344/QD-BYT of July 1, 2010 Ministry of Health (2003), No. 5600/QD-BYT of October 24, 2003 Ministry of Health (2008), No. 4039/QD-BYT of October 16, 2008
Hospital 198, Ministry of Public Security	Kidney Transplant	Ministry of Health (2008), No. 4039/QD-BYT of October 16, 2008
Saint Paul Hospital	Kidney Transplant	Ministry of Health (2013), No. 5197/QD-BYT of December 25, 2013
Thai Nguyen Central General Hospital	Kidney Transplant	Ministry of Health (2015), No. 3882/QD-BYT of September 17, 2015
Phu Tho General Hospital	Kidney Transplant	Ministry of Health (2015), No. 1671/QD-BYT of May 5, 2015
Da Nang Hospital	Kidney Transplant	Ministry of Health (2006), No. 1056/QD-BYT of 27/03/2006
People’s Hospital 115	Kidney Transplant	Ministry of Health (2004), No. 250/QD-BYT of February 4, 2004
Children’s Hospital 2	Kidney Transplant Liver Transplant	Ministry of Health (2004), No. 1658/QD-BYT of April 29, 2004 Ministry of Health (2005), No. 4610/QD-BYT of December 1, 2005
Gia Dinh People's Hospital	Kidney Transplant	Ministry of Health (2003), No. 5759/QD-BYT of November 3, 2003
Kien Giang General Hospital	Kidney Transplant	Ministry of Health (2007), No. 1225/QD-BYT of March 30, 2007
Vimec International Hospital	Kidney Transplant Liver Transplant	Ministry of Health (2013), No. 5172/QD-BYT of December 25, 2013 Ministry of Health (2016), No. 6530/QD-BYT of December 25, 2016
Military Central Hospital 108	Kidney Transplant Liver Transplant Lung Transplant	Ministry of Health (2016), No. 7463/QD-BYT of December 23, 2016 Ministry of Health (2017), No. 3510/QD-BYT of August 2, 2017 Ministry of Health (2018), No. 103/QD-BYT of January 9, 2018
University Hospital of Medicine and Pharmacy, Ho Chi Minh City	Liver Transplant	Ministry of Health (2018), No. 1902/QD-BYT of March 21, 2018

By 2019, 19 hospitals were licensed for kidney transplants. In 2004, only 103 Military Hospitals were licensed for liver transplantation; by 2019, there were 8 liver transplant hospitals across the country. By the end of 2019, there were 19 organ transplant facilities across the country, including leading facilities such as Viet Duc Hospital, that had transplanted almost all types of organs, both single and multiple organs. What is quite special in organ transplantation in Vietnam is that out of

228 organ transplants from brain- and heart-dead donors from 2013 to 2019, Viet Duc Hospital alone accounted for 155 cases, Cho Ray Hospital accounted for 45 cases, 103 Military Hospital accounted for 11 cases, and Hue Central Hospital accounted for 06 cases. The remaining 15 hospitals accounted for 11 cases. The total number of source organ transplants for brain and heart death from 1992 to 2019 was 295 (Table 6), the number of transplants from 1992 to 2012 was 67 (Table

2), and the number of transplants in the 2013–2019 period was 228. Statistics on the number of organ transplants from the source of brain and heart death according to medical facilities are from Tables 3–9.

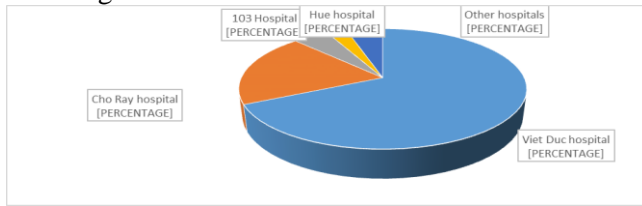


Figure 12. Percentage of organ transplants from brain and heart deaths of transplant facilities in the period 2013-2019 (Developed by the authors)

The reason is that until now, only 04 hospitals: Viet Duc Hospital, Cho Ray Hospital, 108 Central Military Hospital, and 103 hospitals have a system to diagnose and collect organs from deceased donors. Brain; and only Cho Ray Hospital has performed diagnosis and taken and transplanted organs from deceased donors of cardiac arrest. The reason for the phenomenon that Viet Duc Hospital accounts for the majority of organ transplants from brain-dead donors is due to aside from professional factors, the diagnosis of brain death and the work of counseling and mobilizing the family to donate organs from brain-dead patients. implemented regularly, continuously, and effectively by Viet Duc Hospital over the past time is the decisive factor. In addition, the investment in human resource development for the field of organ transplantation also plays an important role in promoting the increase in the number of transplant hospitals and the number of organ transplant cases in Vietnam. A 2017 study showed that, in the period 2017-2018, the number of human resources involved in routine organ transplantation at 17 transplant hospitals was 1.087 people, of which: Professors, Associate Professors had 77 people, Doctors had 204 people, Masters had 357 people, Bachelors has 284 people; Colleges has 100 people and Intermediates has 65 people. Age under 39 years old accounts for 73.3% (National Coordination Center for Human Organ Transplantation, 2018). Most of Vietnam's transplant doctors have undergone training and study in countries with developed organ transplant backgrounds, so they have good technical skills. This is an important factor contributing to the development of the field of organ transplantation in Vietnam.

5. Conclusion

From 1992 to December 31, 2019, Vietnam performed 4,689 organ transplants, the number and percentage of organ transplants per population (pmp) in the low average group in the world. Of which, the majority are still kidney transplants with 94.73%, liver transplants with 4.2%, and other organs are under 1%. In 2016, for the first time, Vietnam successfully performed an organ transplant from a donor who died of cardiac arrest in a scientific project conducted at Cho Ray Hospital, so five organ transplants have been performed from the dead of cardiac arrest.

Currently, the primary source of transplanted organs still comes from living donors at a rate of 93.7%. Increasing the number of organ transplant hospitals from 5 to 19, Promulgating the Law on donation, organ collection and donation, body collection 2006; The implementation of insurance, honoring for humane organ donation, and promotion of communication in the period 2013-2019 have directly promoted the increase in both the number of organ donation/transplant from living and brain dead donors rather than leading to a reduction in the rate of donor/transplant from a living donor and an increase in the transplant from a brain-dead donor as expected.

Although there are currently 19 hospitals with a decision on eligibility to perform organ transplantation, the majority of 12/19 organ transplant hospitals can only perform single-organ transplants, specifically kidney transplants. Hospitals that can perform liver, heart, and lung transplants are still few, leading to a decrease in the chance of receiving organ transplant treatment for patients with end-stage organ failure and affecting the ability to connect and treat patients with organ donation from brain-dead patients.

The phenomenon that Viet Duc Hospital performed 155/228 organ transplants from brain-dead donors, accounting for two-thirds of transplants from brain-dead and heart-dead donors in the period 2013-2019, shows that in addition to professional factors, the scale and promote brain death identification, counseling, and organ donation for the families of brain dead patients play a decisive role in increasing the number of organ donation/transplant cases from brain and heart-dead patients.

Vietnam needs to quickly establish a focal point providing information on organ donation and transplantation of the Ministry of Health to provide and exchange official information with countries and international and regional organizations in organ transplantation. To avoid the current situation, Vietnam's organ transplant achievements and results are misinformed, or there is no information about Vietnam's organ transplants on regional and international forums on organ donation and transplantation.

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