

Organ Donation and Obstacles: University Student Survey

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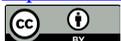
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Abstract

Background: Organ transplantation has helped improve the quality of life of patients with lethal terminal organ failure. This success is owed to the progress made in many fields such as surgery, immunology...However, in our country Morocco, we are faced with reluctance to donate. The study's objective is to evaluate the perception of organ donation among university students. **Methods:** We conducted this cross-sectional study with descriptive and analytical aims. Our target population consisted of 991 university students from eight higher education structures. An anonymous questionnaire was distributed to those students by a single interviewer. The questions of the survey answered four main themes. Thus, two types of studies were done. The first was a descriptive study of the socio-demographic characteristics of the selected population and their knowledge and attitudes about organ donation. The second was an analytical study of the correlation between the socio-demographic characteristics, type and level of education of the target population and their knowledge and attitudes towards organ donation. **Results:** 97.2% of the respondents have already heard about organ donation. If 836 of the students (84.4%) thought that transplantation could be an effective therapeutic alternative, 155 of the students (15.6%) were not aware of this possibility. Furthermore, 298 students, which means 30.1% of the students, did not know that organ transplantation was practiced in Morocco. The causes of refusal found in our study were numerous. 68.5% of students blamed the lack of information as the main cause of their reluctance. 64.7% were afraid of organ trafficking. 41.1% refused the idea of mutilating the body of the deceased, which could impact the funeral. 37.3% thought that donation would be a violation of the human body according to religious values. 33.9% were against donation because they hoped that the brain-dead patient could wake up. The main results of our survey showed the very favorable attitude towards organ donation and transplantation, despite the lack of knowledge on the subject. **Conclusion:** This study revealed the absence of information

on the practice of organ transplantation in Morocco and the underestimation of the number of people waiting for transplantation. On the other hand, like the data found in the literature, our study highlights the religious obstacles and the lack of confidence in the legislation governing donation and transplantation in our country.

Keywords

Organ Donation, Lack of Information, Religion, Legislation, Organ Trafficking

1. Introduction

Organ transplantation and grafting is a medical act that allows saving many people suffering from lethal diseases and improves the quality of life of many patients with terminal organ failure.

The success of this therapeutic means is mainly linked to the progress of surgery, to the improvement of different methods of graft preservation and to the progress of immunology thanks to the development of immunosuppressive therapeutics.

These scientific advances are necessary but not sufficient to achieve the desired objectives. In fact, the shortage of grafts is now showing the limits of these prodigious advances. As an example, at the end of 2013, the total number of kidney failure patients on dialysis in Morocco was estimated at 13,000 patients consequently the expected need for transplants was 7410 [1]. However, the total number of kidney transplants performed in that year in the whole country did not exceed 43 transplants [1].

This delay in Morocco in this field is essentially due to the conflict that organ donation has with traditional culture, religious beliefs, social and legal representations around the perception of the body, death and donation.

In order to better study the factors influencing attitudes towards organ donation and to better plan awareness programs and promotional means for the future, we conducted a study on the knowledge and opinions of Moroccan students.

2. Material and Method

This is a cross-sectional study with descriptive and analytical aims, the objective of which is to evaluate the perception of organ donation among university students.

Our target population consists of 991 university students from the following eight higher education structures:

- The Faculty of Science and Technology of Settat (FST);
- The faculty of letters and human and Islamic sciences Ain chock of Casablanca (FLSH);
- The faculty of legal, economic and social sciences Ain chock of Casablanca (FSJES);

- The Higher Institute of Health Sciences of Settat (ISSS);
- The National School of Applied Sciences of Khouribga (ENSA);
- The National School of Commerce and Management of Settat (ENCG);
- The preparatory classes for the grandes écoles of Settat (CPGE);
- The specialized institute of applied technology of Settat (ISTA).

An anonymous questionnaire was distributed to university students by a single interviewer. The validity of this questionnaire was evaluated before its distribution. The questions of the survey answered four main themes:

- Socio-demographic information of the respondents;
- Knowledge assessment;
- Opinion and attitude towards organ donation;
- Causes of refusal and ways to promote organ donation in our country.

Two types of studies were conducted:

1) A descriptive study of the socio-demographic characteristics of the selected population and their knowledge and attitudes about organ donation.

2) An analytical study of the correlation between the socio-demographic characteristics, type and level of education of the target population and their knowledge and attitudes towards organ donation.

For the comparison of qualitative variables: the Chi-2 test or Fisher's exact test was used. For the comparison of quantitative variables: the students' test was used. The significance level was set at 0.05.

3. Results

Descriptive study

a) Socio-demographic characteristics

In our work, the age varies between 17 and 46 years with an average of 20.72. The dominant age range is 20 - 29 years. Among the 991 students interviewed, 629 are female, *i.e.* 63.5%. The majority of the respondents are 2nd-year students, *i.e.* 38.3%.

In our sample, 124 students are of low socio-economic level or 12.5%. The majority is of medium socio-economic level (84.4%).

b) Evaluation of knowledge about organ donation

97.2% of the respondents, *i.e.* 963 students, have already heard about organ donation. Among these 963 people who answered this question, 883 students had heard about organ donation through the media (89.1%), 17% through associations, 15.3% through a doctor, a minority (8.9%) had heard about organ donation through other sources: friends, family, social circle, books...

In addition, 195 people were not aware of the diseases requiring a transplant. When evaluating the knowledge of these students about transplantable organs, 749 students knew about them while 242 students were not.

When asked about the origin of transplanted organs, 694 students thought that these organs came from living relatives, *i.e.* 70%, and only 290 thought that they could come from cadavers.

If 836 of the students (84.4%) thought that transplantation could be an effective therapeutic alternative, 155 of the students (15.6%) were not aware of this possibility.

In our study, 431 of the students, *i.e.* 43.5%, thought that the number of patients waiting for transplantation was low. In addition, among the 991 respondents to the questionnaire, 298 students, or 30.1%, did not know that organ transplantation was practiced in Morocco.

From a legislative point of view, 622 students were aware of the existence of legislation governing organ donation in our country.

On the religious side, while 708 respondents felt that organ donation was compatible with religion, 214 students felt that it was not.

Concerning the structures implicated, 571 students thought that organ harvesting and transplantation were carried out at the level of private clinics.

c) Opinion and attitude towards organ donation

917 respondents were in favor of organ donation, *i.e.* 92.5%, whereas, 70 people clearly expressed their opposition. Among these 70 people, 17 students put forward religion as an obstacle, 14 people feared the short and long-term complications of transplantation, and four students thought that there was organ trafficking in Morocco.

Of the 917 students who were in favor of organ donation, 628 were in favor of certifying their consent to donation by carrying a voluntary organ donor card. On the other hand, 276 were opposed to the idea.

Our study showed that 660 students did not trust the legislation governing organ donation and transplantation in our country.

d) Causes of refusal

The causes of refusal found in our study were numerous. 68.5% of students blamed the lack of information as the main cause of their reluctance. 64.9% blamed the lack of confidence in the system governing transplantation and donation in Morocco. 64.7% were afraid of organ trafficking. 41.1% refused the idea of mutilating the body of the deceased, which could impact the funeral. 37.3% thought that donation would be a violation of the human body according to religious values. Finally, 33.9% were against donation because they hoped that the brain-dead patient could wake up (**Chart 1**).

The other main causes that lead people to hesitate or refuse organ donation according to our study population were also the fear of complications and death of the living donor, sometimes selfishness, or the belief that it was a taboo in our society.

4. Analytical Study

Gender and type of institution appear to influence knowledge of organ donation: females were more knowledgeable and students from FLSH, ISSS, and ENSA institutions have heard more about organ donation than students from other higher education facilities. On the other hand, age, family status and level of education

did not significantly influence knowledge about organ donation.

Moreover, the level of education and the type of institution influenced the level of knowledge about brain death: people with an advanced level of education have a better knowledge of this concept. The type of institution also influenced the level of knowledge about transplantation in Morocco: Students from FLSH, FSJES and ISSS were more aware of the possibility of transplantation in our country than students from other institutions. On the other hand, age, gender, family status and level of education did not have a significant influence on the level of knowledge on the subject (Figure 1).

According to our results, females were more favorable to organ donation. In addition, students with better knowledge on the subject were those who were more favorable to donation. Thus, students who did not have sufficient information

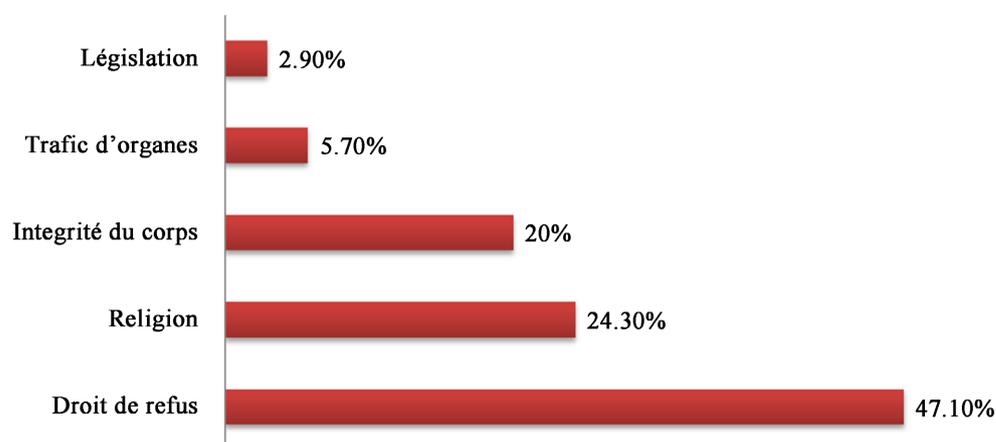


Chart 1. Principal causes of refusal of organ donation.

		Non (298)		Oui (693)		DS
		Nombre	en%	Nombre	en%	
Sexe	Féminin	182	28.9	447	71.1	NS p=0.304
	Masculin	116	32	246	68	
Situation familiale	Célibataire	286	29.9	670	70.1	NS p=0.58
	Marié	12	34.3	23	65.7	
Etablissement	CPGE	41	40.6	60	59.4	S p<0.001
	ENCG	38	37.3	64	62.7	
	ENSA	37	34.3	71	65.7	
	FLSH	22	16.4	112	83.6	
	FSJES	25	18.9	107	81.1	
	FST	83	34	161	66	
	ISSS	32	28.3	81	71.7	
	ISTA	20	35.1	37	64.9	
Année d'étude	1 ^{ère} année	67	26.8	183	73.2	NS p=0.401
	2 ^{ème} année	115	30.3	265	69.7	
	3 ^{ème} année	64	34.6	121	65.4	
	4 ^{ème} année	31	32.6	64	67.4	
	5 ^{ème} année	21	25.9	60	74.1	

Figure 1. Summary table of the correlation between the students socio-demographic characteristics and their level of knowledge about organ transplantation in Morocco.

on the subject did not think that organ transplantation could be an effective therapeutic alternative.

On the other hand, people opposed to organ donation thought that religion forbids it. Those same people were the most unaware of the existence of ethical and legislative conditions governing and regulating this alternative in Morocco.

With regard to the carrying voluntary organ donation cards, the gender and the type of institution were influencing factors. Thus, women and students at the ISTA, FST and ENCG were more in favor of carrying a donor card.

5. Discussion

Organ transplantation is one of the major medical discoveries of the last century aimed at preserving life and improving its quality. It involves the removal of organs and tissues to treat patients whose vital organs have been severely damaged.

1) Knowledge about organ donation

According to the results of our survey, most of the students interviewed, 97.2%, have already heard about organ donation and lethal diseases requiring transplantation. This level of knowledge was influenced by gender and type of institution: females and students at FLSH and ISSS were more aware of organ donation. In our results, the main source of information on the subject was the media, for 89.1% of the students.

According to a cross-sectional study conducted in Saudi Arabia in 2014 on a sample of 481 students at King Abdulaziz Medical School in Jeddah [2], 90.9% of the students have heard about organ donation before. Their main sources of information about donation were social media (34.1%), television (22.5%) and hospitals (19.3%). As we observed, the media might be the best choice to convey the message, so that people can understand their contribution and responsibilities regarding organ donation.

The results of our survey showed that 75.6% of the students interviewed knew about transplantable organs and tissues. The kidney and heart were the most common organs cited by students. Gender and type of institution seemed to influence this response. This could be explained by the nature of the medical studies that ISSS students receive and the sociology and psychology studies taught at FLSH.

It is certain that age can be an element of alteration of the function of certain organs, thus for the heart, it is rare to be able to collect a functional graft in a satisfactory way after 50 - 55 years. On the other hand, it is perfectly possible to harvest a kidney or a liver and corneas from a person over 70 years of age and to have a graft that will function in a completely suitable manner, all the more so if the recipient is himself of a slightly advanced age [3].

In the United Kingdom, there is no age limit for access to transplantation and the criteria for registration on waiting lists are the same for all patients regardless of age. However, despite this, only 7.2% of transplant recipients are aged 65 years or older [4].

The results of our survey show that 36.9% of the students interviewed believed that there was an age limit to be a donor. The estimated average of this limit was 57.1 ± 13.75 years.

Furthermore, the results of our survey showed that 62.9% of the respondents were convinced that there are risks and complications after organ procurement from living donors. A survey of WTPF students showed that 78.92% of students were convinced of the existence of such risks while only 21.07% were not [5]. Another study carried out among doctors at the CHU Ibn Rochd showed that 80.68% of doctors were convinced of the existence of complications after harvesting from living donors [6]. Whereas, the results of a survey of medical students in Switzerland showed that only 36% were aware of the risk associated with organ donation from living donors [7].

The outcome of the donor is excellent: studies conducted on the subject show that the donor lives better and longer than the other members of his or her sibling group [8]. There are two explanations for this: donors are necessarily in good health at the time of the donation and they are better followed up medically than the rest of the sibling group [8].

A study in Sweden of 430 living kidney donors even showed that their life expectancy was 29% higher than that of the general population. This result can probably be explained by the exclusive selection of donors in excellent health. However, it shows that kidney donation does not lead to an increased mortality risk [8].

Concerning the use of transplantation as a therapeutic means, 84.4% of the students interviewed in the study thought that transplantation was indeed an effective therapeutic alternative. These results were similar to those of a study conducted in Tunis where 80.5% of Tunisians were of the same opinion [9]. In contrast to a study conducted among university students in Marrakech, only 49.7% of the respondents found organ transplantation to be an effective therapeutic alternative [10].

A comparison of dialysis and renal transplantation as therapeutic choices for the treatment of chronic renal failure showed that dialysis involves a heavy financial burden [11]. The annual cost of treatment is estimated to average more than 140,000 dirhams. This figure only includes the cost of the dialysis session without taking into account other expenses, such as necessary drugs, biological or radiological tests and hospitalization for possible complications. Moreover, the majority of the dialysis population is young and active. On the other hand, renal transplantation is less expensive financially: the cost of a transplant without complications is estimated at 250,000 dirhams. In addition, in terms of quality of life, the transplant allows the patient to regain his health and find an almost normal life.

For organs such as the liver, the lung or the heart, whose functioning is seriously deteriorated, transplants are sometimes unavoidable. In this case, transplantation is vital because it represents the ultimate therapeutic solution for these patients [12].

Regarding the estimation of the number of people in need of transplantation, the results of our survey show that 43.5% of the students thought there were few people who needed organ transplants. On the contrary, the need for organ transplants in the world is increasing with the expansion of medical indications for transplantation on the one hand and the shortage of organs on the other.

According to a Moroccan study, 57% of all patients aged between 18 and 75 years treated by dialysis in Morocco needed a kidney transplant [1]. At the end of 2013, the number of subjects with chronic end-stage renal disease on dialysis was estimated to be 13,000, the expected need for kidney transplantation was thus 7410 [1].

2) Organ donation and legislation in Morocco

Authorized by law and successfully practiced in Morocco, organ donation, procurement and transplantation remain, however, among the medical practices shrouded in vagueness in the perception of the general population.

According to the results of our study, 69.9% of students were aware of the possibility of transplantation in Morocco. Students from FLSH, FSJES and ISSS were more aware of the practice of organ transplantation in Morocco. This could be explained by the nature of the studies containing information on the different components of organ donation from a medical (ISSS), legal (FSJES), psychological, social and religious (FLSH) perspective.

According to an opinion poll conducted by the Reins Association, an association fighting against kidney diseases, 19% of a sample of 360 people taken at random from the Moroccan urban population, believed that transplantation is not practiced in Morocco. This lack of awareness is mainly the result of a lack of information on the subject [12].

In Morocco, organ transplantation has been slow to obtain a regulatory framework. Thus, after a few kidney transplants and a heart transplant without any real legal framework, a law concerning organ transplantation was published in the official bulletin N°4726 on September 16, 1999.

Indeed, Moroccan legislation has established a set of legal, ethical, scientific and therapeutic rules and principles aimed at protecting the patient in a vulnerable situation against any abuse or exploitation of his organs.

According to our survey, 62.8% of students were aware of the existence of legislation governing organ donation, 30.8% thought that there was no legislation in Morocco and 6.5% had no opinion. A survey conducted in Tunisia showed that 64.3% of respondents were aware of the existence of such a law in their country [9]. The results of our survey show that 57.6% of the students thought that organ removal and transplantation procedures were carried out in private clinics, 42.4% said university hospital centers.

The Moroccan legislator has conditioned the exercise of the activities of removal and transplantation of human organs or tissues by hospitals, by obtaining prior approval issued by the Minister of Health in order to better control these activities and to avoid any possible slippage.

To date, there are six public hospitals approved for organ and tissue removal and transplantation: Rabat University Hospital, Casablanca University Hospital, Fez University Hospital, Marrakech University Hospital, Rabat Military Hospital, and Sheikh Zaïd Ibn Soltan Hospital in Rabat.

To donate organs after death, the most effective way is to register on the acceptance register with the President of the Court of First Instance of the donor's region of residence. It is also necessary to indicate one's choice and to tell one's close relatives (spouse, parents, and children) so that it is respected, since Moroccan law requires that the family of the deceased does not object. The donor can also carry a donor card in his papers. This has no legal value but facilitates the decision of the relatives.

In our study, almost half of the students (46.9%) were unaware of the existence of a registry to make known their agreement to donate their organs after their death. Female students and students from FSJES and FLSH were more aware of the existence of this registry.

Ignorance of the existence of the organ donation acceptance registry could be explained by the lack of information on the subject through the media. This ignorance may also explain the very low number of people enrolled in the registry, which is barely 1000 people over an 18-year period [13].

3) Organ donation and religion

The lack of Quranic verses and Hadith, which are the fundamental texts of Islam, clearly authorizing organ harvesting and transplantation has led to much discussion about the religious legitimacy of such practices. Organ transplantation is a topic that has been the subject of research at the Islamic Academy.

The analytical study of our results revealed that most of the students who were against organ donation believed that religion prohibited organ transplantation. According to a study conducted in Saudi Arabia among medical students, 91.3% were convinced that Islam allows organ donation [2].

In a cross-sectional study of the Muslim population in Birmingham, United Kingdom, only 28% claimed to be aware of an Islamic Fatwa regarding organ donation, 60% believed that organ donation is unlawful in Islam.

In Asia, an Indian study of students revealed the impact of religious beliefs and the difficulty in changing these blind beliefs, as only 4.3% of those surveyed said their religions would allow organ donation, and this number only decreased to 3% after training on organ donation and transplantation [14].

Not far from Morocco, in Tunisia, where the refusal of organ donation reaches 44.1%, the infringement of the integrity of the body after death tops the list of reasons for refusal, explained by the fact that in the Muslim faith, the body, or rather "the individual" is buried naked covered with white cloths, as at birth.

Yet, a study in Saudi Arabia found that the Islamic view supporting the concepts of transplantation provided the strongest positive influence on organ donation [15]. Indeed, in Islam, the ethical references are clear and the preservation of life overrides all prohibitions. The rule of necessity abrogates the prohibitions as soon

as the common or individual interest dictates it. From this reading of the texts, organ donation and transplantation become not only licit but also strongly recommended in the name of religion. This is the opinion clearly expressed by all religious authorities for more than three decades. Muslims who refuse organ donation and do so in the name of religion are solely responsible for their choice.

There are several reasons that suggest that there are other, unspoken reasons for this refusal. The Muslim dimension has often been exaggerated when the issue of organ donation for Muslims is raised. The obstacles are probably at least as much related to the lack of trust in the health care system and socioeconomic factors as to religion itself. In Lebanon, where half the population is Christian, the National Committee for Organ and Tissue Donation and Transplantation cited religion as a major reason for refusal (46.7%) [16].

4) Promoting organ donation in Morocco

In Morocco, the deceased donor rate is 0.4 donors for every million inhabitants. Cultural, psychological, and sometimes religious barriers prevent Moroccans from donating their organs. In order to meet the constantly increasing demand, Morocco should perform 1000 corneal transplants, 250 kidney transplants and 300 bone marrow transplants annually. However, the Kingdom is currently far from these figures. Only 286 corneal transplants were operated in 2015, 84 less than in 2014, the number of kidney transplants reached 51 in the same year, including 31 kidney transplants from living donors [17].

The harvesting of organs from patients in a state of encephalic death thus constitutes the solution to overcome this shortage. Several possibilities have been explored and could help to increase the number of donors in a state of brain death, it would be necessary to provide more information and training on the subject and to make medical and paramedical personnel responsible for raising awareness.

Strengthening the management of donors in a state of encephalic death is also useful. In a study done at the Casablanca University Hospital over a period of 4 years between 2011 and 2015, traffic accidents represented the cause of 40% of brain deaths (*i.e.*, 25 cases), yet more than 4055 people had died in Morocco as a result of a traffic accident in 2012 [18]. This is without counting other causes of brain death, hence the interest in improving the management of these potential donors. The medical profession should be made aware of the importance of promptly referring possible donors in a state of encephalic death to intensive care units (ICUs) and hospital structures authorized and with expertise in organ donation and transplantation.

Awareness and training of hospital staff and coordinators is one of the pillars of success of the Spanish model. There are courses that cover the entire organ donation process (to raise awareness among all emergency and intensive care staff) as well as courses on specific aspects designed for hospital coordinators. Courses on communication with relatives in the context of organ donation also play an important role.

Another equally interesting proposal is the establishment of inter-hospital

networks for organ procurement. Inter-hospital networks allow for the detection and identification of patients with brain death as well as an obligation to justify unsuccessful retrievals. This system makes it possible to establish relations between the health establishments involved and to apply the rules for the distribution and allocation of grafts.

Since 1985, the number of organ transplants has increased exponentially in Morocco, despite the fact that we are lagging far behind, thanks to numerous initiatives taken to promote organ donation in various fields: legislative, medical and organizational. We cite as an example:

- The Euro-Mediterranean cooperation: it was initiated in 1999 by a close collaboration between the Ministry of Health and the French establishment of transplants then with the agency of biomedicine. The result of this collaboration is an ambitious program for the management of chronic renal disease and medical emergencies, “APCIRCUM”, which has been extended to include a program of organ harvesting and transplantation.
- Training of medical and paramedical staff,
- Improvement of the legislative framework,
- The constitution of the advisory council of human organ transplantation.

5) Organ trafficking

Transplantation, this alliance of medical-scientific performance and solidarity, is in some ways a victim of its own success. To date, the main surgical, immunological or infectious risks have been mastered, but the challenge is to find grafts to meet the demand. Thus, organ trafficking appears as a dirty fruit of medical progress. The success of the practices has sparked the idea, and the scarcity of transplants has created the market.

The World Health Organization (WHO) estimates that there are 10,000 illicit operations (10% of the total) using organs from vulnerable people, in exchange for payments ranging from €5000 to €10,000 per organ sold. This mafia market involves the removal of organs from dead bodies or from living people, particularly kidneys. Organ trafficking is reprehensible for two essential reasons: the first is the flagrant violation of ethics and law, the second concerns the health safety of the donor and the recipient [19].

In 2004, the World Health Organization (WHO) called on its member states to take measures to ensure that the poorest and most vulnerable groups of people are protected from transplant tourism and the sale of their organs, with particular attention to the major problem of international trafficking in organs and tissues [20].

Increasing the number of available organs is essential to combat organ trafficking because as long as waiting lists persist or continue to grow, the black market will exist.

States must provide the means to facilitate organ donation. Thus, at the meeting in Istanbul in 2008, transplant professionals drew up the Istanbul Declaration, which condemns organ trafficking and transplant tourism, lists the principles on which a transplant program should be based and gives states recom-

recommendations for preventing and combating organ trafficking based essentially on increasing the number of cadaveric donors [20].

6. Conclusions

Every year, the number of patients with terminal organ failure increases. This is why organ transplantation is the alternative of choice that could save several thousand lives, or at least improve the quality of life in many cases.

Successful transplantation is a real cure and a liberation from the budgetary fears imposed by the high cost of certain techniques such as dialysis.

However, the establishment and development of a transplant program remains dependent on many factors. Among them, the shortage of organs, the lack of public awareness and the scarcity of adapted infrastructures. Thus, the perception of organ donation by the general population and their support for such an act will be determining factors for the development of organ transplantation in our country in the future.

The main results of our survey show the very favorable attitude towards organ donation and transplantation, despite the lack of knowledge on the subject. This study also revealed the absence of information on the practice of renal transplantation in Morocco, the underestimation of the number of people waiting for transplantation, the ignorance of the structures of organ removal and the absence of information on the legislation including the existence of registers of acceptance and refusal of organ donation.

On the other hand, our survey as well as the data in the literature highlight the religious obstacle, the lack of confidence in the legislation governing donation and transplantation in our country.

The present study shows a large pool of potential donors that can be transformed into effective donors through increased publicity via the media, education within universities and communities on the various components of the subject from a scientific, religious, legislative and organizational point of view, as well as simplification and explanation of the legislation governing the donation process.

7. Statement of Ethics

This study was conducted and designed in accordance with the Declaration of Helsinki. The need for written informed consent was waived because of the non-interventional design. Patient information was kept confidential.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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